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East Kapolei I

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FINAL  
ENVIRONMENTAL IMPACT STATEMENT

# EAST KAPOLEI PROJECT

E W A, O A H U, H A W A I I

VOLUME I



APRIL 1996

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PLANNING DIVISION

FINAL  
ENVIRONMENTAL IMPACT STATEMENT

# EAST KAPOLEI PROJECT

E W A, ♦ O A H U, ♦ H A W A I I

VOLUME 1

PREPARED FOR: SCHULER HOMES, INC.  
PREPARED BY: HELBER HASTERT & FEE, PLANNERS  
FOR SUBMITTAL TO: PLANNING DEPARTMENT CITY & COUNTY OF HONOLULU  
IN SUPPORT OF: EWA DEVELOPMENT PLAN LAND USE MAP AMENDMENT

APRIL 1996

**TABLE OF CONTENTS**

<u>Section</u>	<u>Page</u>
<b>PREFACE</b>	
<b>1. INTRODUCTION AND SUMMARY</b>	
1.1 Introduction.....	1-1
1.2 Development Summary.....	1-1
1.3 Summary of Probable Impacts and Mitigation Measures.....	1-4
1.4 Alternatives Considered.....	1-8
1.5 Unresolved Issues.....	1-8
1.6 Compatibility with Land Use Plans and Policies.....	1-9
1.7 Necessary Permits and Approvals.....	1-10
1.8 Statement of Purpose and Need for Action.....	1-10
1.9 Purpose of and Need for this Environmental Impact Statement.....	1-11
<b>2. PROJECT DESCRIPTION</b>	
2.1 Location.....	2-1
2.2 Background.....	2-1
2.3 Existing and Surrounding Land Uses.....	2-4
2.4 Regional Plans.....	2-9
2.5 Project Description.....	2-10
2.6 Project Rationale.....	2-18
2.7 Project Phasing.....	2-18
2.8 Projected Developments Costs.....	2-19
2.9 Use of Public Funds or Lands.....	2-19
<b>3. RELATIONSHIP OF THE PROPOSED PROJECT TO EXISTING PUBLIC PLANS, POLICIES AND CONTROLS</b>	
3.1 Federal.....	3-1
3.2 State of Hawaii.....	3-1
3.3 City and County of Honolulu.....	3-14
<b>4. ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND MITIGATION: PHYSICAL ENVIRONMENT</b>	
4.1 Climate.....	4-1
4.2 Geology and Topography.....	4-1
4.3 Soils.....	4-2
4.4 Flooding.....	4-8

<u>Section</u>	<u>Page</u>
4.5 Water Resources.....	4-8
4.6 Flora.....	4-11
4.7 Terrestrial Fauna.....	4-11
4.8 Air Quality.....	4-12
4.9 Noise.....	4-14
4.10 Visual Resources and Open Space.....	4-16
4.11 Historic, Cultural and Archaeological Resources.....	4-17
4.12 Interrelationships and Cumulative Impact: Physical Environment.....	4-18
<b>5. ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND MITIGATION: SOCIO-ECONOMIC ENVIRONMENT</b>	
5.1 Population and Potential Impact on Surrounding Communities.....	5-1
5.2 Housing.....	5-3
5.3 Employment.....	5-5
5.4 Fiscal Impacts.....	5-6
5.5 Market Analysis.....	5-7
5.6 Agricultural Impacts.....	5-12
5.7 Interrelationships and Cumulative Impact: Socio-Economic Environment.....	5-13
<b>6. ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND MITIGATION: PUBLIC FACILITIES AND SERVICES</b>	
6.1 Transportation.....	6-1
6.2 Water Supply.....	6-6
6.3 Wastewater.....	6-8
6.4 Drainage.....	6-10
6.5 Solid Waste.....	6-19
6.6 Schools and Libraries.....	6-20
6.7 Recreational Facilities.....	6-23
6.8 Police Protection.....	6-25
6.9 Fire Protection.....	6-26
6.10 Power, Communications and Civil Defense.....	6-26
6.11 Health Care Facilities.....	6-28
6.12 Interrelationships and Cumulative Impact: Public Facilities and Services.....	6-29
<b>7. ALTERNATIVES TO THE PROPOSED ACTION</b>	
7.1 No Action.....	7-1
7.2 Commercial Development.....	7-1
7.3 Major Public Facilities.....	7-2
7.4 Conclusion.....	7-2

<u>Section</u>	<u>Page</u>
8. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES	
9. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY	
10. REFERENCES	
11. PREPARERS OF THE DEIS	
12. CONSULTED PARTIES AND PARTICIPANTS IN THE DEIS PREPARATION PROCESS	
13. CONSULTED PARTIES AND PARTICIPANTS IN THE FINAL EIS PREPARATION PROCESS	

**LIST OF TABLES**

<u>Table</u>	<u>Page</u>
1. Proposed Land Utilization .....	2-13
2. Residential Product Types.....	2-14
3. Itemization of Total Project Costs.....	2-18
4. Year 2010 and 2020 Population in Ewa: Policy vs. Projection.....	3-15
5. Requested Development Plan Land Use Designations and Acreages .....	3-21
6. Estimated Minimum Setback Distances for Residences .....	4-15
7. Year 2010 and 2020 Population in Ewa: Policy vs. Projection.....	5-3
8. Ratio of East Kapolei Trips to Intersection Capacity .....	6-4
9. Projected School Enrollment at Buildout.....	6-22
10. Park Dedication Ordinance Calculation .....	6-24

**LIST OF FIGURES**

<u>Figure</u>	<u>Page</u>
1. Location Map .....	2-2
2. Tax Map Parcels .....	2-3
3. Kapolei Area Long Range Master Plan (East Kapolei) .....	2-5
4. East Kapolei Framework Plan .....	2-11

<u>Figure</u>	<u>Page</u>
5. Preliminary Concept Plan .....	2-12
6. Commercial/Park Concept .....	2-16
7. State Land Use District Boundary Map .....	3-7
8. Existing D.P. Land Use Map .....	3-19
9. Proposed DP Land Use Map .....	3-20
10. D.P. Public Facilities Map .....	3-22
11. Environmental Conditions .....	4-3
12. SCS Soil Survey Map .....	4-4
13. UH LSB Soil Productivity Ratings .....	4-6
14. ALISH Map .....	4-7
15. Potable Water Systems .....	6-7
16. Sewer Tributary Areas .....	6-11
17. Drainage Map .....	6-12
18. Drainage Channel Sections .....	6-14
19. Pedestrian Overpass Over Drainage Channel .....	6-16

**APPENDICES (included in Volume 2)**

- A. Letter from Stephen H. MacMillan, Chief Operating Officer, The Estate of James Campbell, dated October 30, 1995.
- B. Letter from Michael D. Wilson, Department of Land and Natural Resources, to Cheryl Soon, Chief Planning Officer, Planning Department, dated November 21, 1995.
- C. Memorandum from Don Hibbard, Administrator, State Historic Preservation Division, Department of Land and Natural Resources, dated September 22, 1994.  
  
Letter from Don Hibbard, Administrator, State Historic Preservation Division, Department of Land and Natural Resources, dated December 4, 1995.
- D. East Kapolei Project Market Assessment Report, October 1994;  
East Kapolei Project Limited Scope Update of the Market Assessment, December 1995; Gail W. Atwater, MBA, MURP, AICP
- E. Socio-Economic Impact Assessment of East Kapolei Residential Project, November 1994. Community Resources, Inc.  
Socio-Economic Impact Assessment of East Kapolei Residential Project, Update Memorandum, December 1995. Community Resources, a division of SMS Research and Marketing Services, Inc.

- F. Environmental Noise Assessment, East Kapolei Project, September 1994;  
Environmental Noise Assessment, East Kapolei Project (update), December 13,  
1995. Darby & Associates
- G. East Kapolei Project: Impact on Agriculture, September 1994;  
East Kapolei Project: Impact on Agriculture (update), December 1995.  
Decision Analysts Hawaii, Inc.
- H. Oahu Biological Resources Survey Report, July 1994;  
Addendum, 1995. Evangeline Funk, Ph.D.
- I. Air Quality Impact Report, East Kapolei Project, October 4, 1994;  
Air Quality Impact Report, East Kapolei Project, December 18, 1995.  
J. W. Morrow.
- J. Potable Water Master Plan for the East Kapolei Area, October 1994;  
Addendum Report for the East Kapolei Potable Water Master Plan, December  
1995. Tom Nance Water Resource Engineering.
- K. Traffic Impact Assessment Report for East Kapolei Project, October 1994;  
Updated Traffic Impact Assessment Report for East Kapolei Project,  
December 11, 1995. Pacific Planning and Engineering, Inc.
- L. The East Kapolei and Vicinity Wastewater Collection System Master Plan,  
February 15, 1996. Gray, Hong, Bills & Associates.
- M. Preliminary Drainage Study, West Loch Drainage Basin, East Kapolei Project,  
December 1, 1995. Gray, Hong, Bills & Associates.
- N. Proposed Draft Revisions to Ewa DP Special Provisions

## PREFACE

Since publication of the Draft EIS in January 1996, minor changes have been made to the East Kapolei Project concept plan in response to comments and further analysis. The central park has been increased in size from 16 to 20 acres, the two neighborhood parks have been reduced from eight acres to six acres each, and a two to three acre mini-park to serve the *mauka* area has been added. Other minor modifications to the loop road and intersections surrounding the central park have also been made. All land use tables and acreages in the FEIS have been revised accordingly. These revisions did not change the total number of residential units or other aspects of the plan.

Agency comments on the DEIS and the associated response letters are included in Chapter 13. Comments covered a wide range of issues, including concerns over project impacts to the Ewa by Gentry-East drainage system, potable water source, potential use of non-potable water, traffic, etc. In addition to the responses to these letters included in Chapter 13, many of the agency comments have been incorporated into the text of the FEIS.

A summary of the major changes to the EIS document is provided below:

### Chapter 1. Unresolved Issues

Section 1.5, Unresolved Issues, has been revised to include a discussion of:

- potential sources of potable water
- use of non-potable water
- off-site drainage
- intermediate and high school requirements

### Chapter 2. Project Description

- Section 2.6, Project Proposal, now includes a discussion of off-site infrastructure.
- Anticipated prices for the various types of units and unit sizes have been included in Table 2.
- An itemization of project infrastructure costs, Table 3, has been added.

### Chapter 3. Existing Public Plans, Policies and Controls

- Discussion of all CZM policies and objectives has been added.
- Expanded discussion of the State Land Use Law.
- Discussion of the Office of State Planning's 2020 Growth Scenarios for Oahu has been added.



- Updated 2010 and 2020 population projections have been incorporated (Table 4).
- Requested development plan acreages have been updated (Table 5)

#### **Chapter 4. Physical Environment**

- Discussion of climate, Section 4.1 has been expanded.
- Section 4.5, Water Resources has been expanded to include a discussion of existing potable and non-potable water resources.
- A separate section discussing interrelationships and cumulative impact has been added.

#### **Chapter 5. Socio-Economic Environment**

- Updated 2010 and 2020 population projections have been incorporated (Section 5.1).
- A separate section discussing interrelationships and cumulative impact has been added.

#### **Chapter 6. Public Facilities and Services**

- An expanded discussion of the project's relationship to proposed regional transportation improvements (Kapolei Parkway, Farrington Highway and North-South Road) has been added.
- Options for a non-potable water system are discussed.
- Wastewater discussion updated.
- Drainage discussion updated to clarify that the project is included in the Ewa by Gentry-East drainage improvements. An expanded discussion of direct and indirect impacts is provided.
- Added discussion of concerns and recommendations raised by the Oahu Civil Defense Agency.
- A separate section discussing interrelationships and cumulative impact has been added

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INTRODUCTION AND SUMMARY

## CHAPTER 1 INTRODUCTION AND SUMMARY

### 1. Introduction

This Final Environmental Impact Statement (FEIS) has been prepared in support of a Development Plan (DP) Land Use Map application submitted by Schuler Homes, Inc. ("applicant") to the City and County of Honolulu Planning Department (PD). The project area consists of about 793 acres at Kapolei, Ewa, Oahu. The application seeks to amend the existing Ewa Development Plan Land Use Classification for the project area from "Agriculture" to "Low Density Apartment," "Parks and Recreation," "Public and Quasi-Public" and "Commercial." Proposed changes to the Ewa Development Plan Special Provision are also requested.

The project is presently referred to as the "East Kapolei Project," given its location in east Kapolei. The entire 793-acre project area is presently in the State Agricultural District.<sup>1</sup> The Estate of James Campbell (EJC) currently holds title to the entire project area, with the exception of 183 acres owned by the State of Hawaii.

The project is subject to Chapter 343, HRS (Environmental Impact Statement Law) as it requires an amendment to the City and County of Honolulu's Ewa Development Plan. The City Planning Department has determined that the project may have a significant effect on the environment and has therefore required the preparation of this Environmental Impact Statement.

An Environmental Impact Statement for a similar project in the same area was prepared in 1995, as part of a 1995 DP Land Use Map application to the Planning Department. The FEIS was accepted by the Planning Department on May 11, 1995. In its review of that proposal, the Planning Department expressed concerns on several issues, including impacts to the Kalo Drainage basin, community design, transportation and schools. In response, the applicant has revised the boundaries of the project area and the concept plan to address those particular concerns. This EIS was prepared in support of the revised East Kapolei Project.

### 1.2 Development Summary

**Project Name:**

The 793-acre development is collectively referred to as the "East Kapolei Project."

<sup>1</sup> A small portion of the project area (c. 0.5 acres) adjacent to Ewa Villages lies within the State Urban District. Applicant is working with LUC staff to complete a boundary interpretation in this area.

**Applicant:** Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813  
Attention: Mr. Michael Angotti, Director of Land Services

**Accepting Agency:** Planning Department  
City and County of Honolulu  
850 South King Street, 8th Floor,  
Honolulu, Hawaii 96813  
Attention: Ms. Lin Wong

**Preparers of the EIS:** Helber Hastert & Fee, Planners  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813  
Attention: Ms. Leslie Kurisaki, Senior Associate

**Landownership:**

The Estate of James Campbell	610 acres
State of Hawaii	<u>183 acres</u>
Total Project Area:	793 acres

The Estate of James Campbell and the State of Hawaii have authorized Schuler Homes, Inc. to file this application with the Honolulu Planning Department to amend the Ewa Development Plan Land Use Map (See authorization letters in Appendices A and B).

**Location:** Ewa (Kapolei) area of west Oahu; south of Farrington Highway and north of Ewa Villages (see Figure 1)

**Tax Map Key: (see Figure 2)**  
Project Area:

9-1-17:04 (por); 9-1-18:01 (por); 9-2-02:01 (por);  
9-2-04:05 (por); and 9-1-10:02 (por)

DP Application Area:

9-1-17:04 (por); and 9-1-18:01 (por)

**Total Project Area:** 793 acres

<b>DP Application Area:</b>	<u>Parcel</u>	<u>Acres</u>
	<i>Mauka</i> Parcel	79
	<i>Makai</i> Parcel	<u>671</u>
	Subtotal	750

<b>Off-Site Infrastructure:</b>	<u>Parcel</u>	<u>Acres</u>
	440' reservoir site	7
	228' reservoir site	5
	Detention basin site	<u>31</u>
	Subtotal	43

**Existing State Land Use:** State Agricultural District. The entire project area is presently within the State Agricultural District with the exception of a small (c. 0.5 acre) parcel along the southern boundary in the Urban District (see footnote on previous page) (see Figure 6). A Petition to redistrict 1,300 acres of land adjacent to the site (including the 183-acre State-owned portion of the project area) to the State Urban District was filed in September 1994 by Office of State Planning (LUC Docket No. A94-708). This petition is still before the Land Use Commission.

**Ewa Development Plan (DP)  
Land Use Map Designation:** Agriculture

**Ewa DP Public Facilities  
Map Designation:** Plans Beyond Six Years: Construction of the North-South Road along the western boundary of the project area, including a freeway interchange with the H-1 Freeway; widening of Farrington Highway; and a new electrical substation, Ewa Nui (recently completed).

Private Funding: Construction of a water pump station along Farrington Highway, near the northern boundary of the *makai* parcel, potable water transmission lines along Farrington Highway (now

operational) and construction of drainage facilities (Ewa by Gentry-East offsite drainage facilities) to serve the West Loch watershed.

**Land Use Ordinance/Zoning:** Ag-1, Restricted Agriculture

**Applicant Request:** Applicant requests an amendment to the Ewa Development Plan Land Use Map (and related changes to the DP Special Provisions) to support the development of a 793-acre residential community. The proposed East Kapolei project will include up to 8,000 residential units developed over an approximate 16-year period. The development will also include associated commercial, educational (elementary and intermediate schools) and recreational (parks and bikeways) facilities.

### 1.3 Summary of Probable Impacts and Mitigation Measures

#### Physical Environment

**Soils.** According to the U.S. Department of Agriculture, Soil Conservation Service, soils within the project area include Kunia silty clay (KyA); Honouliuli clay (HxA and HxB); Waipahu silty clay (WzA and WzB); Ewa silty clay loam (EaB); and Molokai silty clay loam (MuB and MuC). The most extensive soil type is HxA (approximately 60 percent) followed by KyA (approximately 20 percent).

**Flora and Fauna.** There are no threatened or endangered species of flora or fauna on the project site. Vegetation on site includes ruderal or wayside vegetation, Koa haole/grass and fallow agricultural fields. The three indigenous plants found on site (*Ilima*, *Popolo* and *Akulikuli*) are commonly found in the coastal lowlands. Fourteen bird species were identified on or around the site. However, because the entire site has been extensively modified by agricultural activity, it has almost no value as native bird habitat (Funk 1995)

**Air Quality.** The principal source of short-term air quality impact will be construction activity, including construction vehicle emissions and particulates associated with earthmoving. Long-term impacts will result from vehicular emissions, and indirect impacts associated with electrical power generation. Mitigation measures include appropriate dust control during construction and setting back residential structures from major roadway intersections. Energy conservation measures should be considered to

minimize electrical power demands, and recycling and composting should be considered to minimize solid waste generation. (Morrow 1995).

**Noise.** Short-term, temporary noise impacts will be generated during construction by earth-moving equipment such as bulldozers and diesel-powered trucks. The anticipated increase in vehicular traffic associated with the project may be perceptible at noise sensitive locations along Farrington Highway and in the residential areas. Mitigation of construction noise will be accomplished by compliance with Department of Health noise regulations and noise mufflers on construction equipment. The proposed residential areas, particularly the *mauka* residential area adjacent to the H-1 Freeway, may be impacted by traffic noise. These impacts can be mitigated by a combination of measures including appropriate building setbacks from roadways; noise barrier walls; carpeting/louvered closet doors/absorptive ceiling tiles in affected bedrooms; providing air conditioning; good quality window seals and double wall construction and insulation. (Darby & Associates 1995).

**Visual Resources and Open Space.** The development of the project will gradually and irretrievably alter existing visual resources along Farrington Highway, the H-1 Freeway and from the areas *makai* of the property. The present agricultural uses and open space will diminish as the area is developed. Due to the relatively flat topography, views of Honolulu from the site will be obstructed by multi-story development except for areas along the property's fringes. Major views of the Waianae Range from *makai* areas should not be obstructed.

**Historical and Archaeological Resources.** There has been extensive, agriculture-related land modification during the last century and there are no known historic, cultural or archaeological resources within the project area. Due to the absence of information to the contrary, no significant impacts to historic, cultural and archaeological resources are anticipated. The Department of Land and Natural Resources, State Historic Preservation Division (DLNR-SHPD) has concurred that the project will have "no effect" on historic sites (Hibbard 1995). The project will comply with all notification and stop work requirements if potentially historic or archaeological remains should be encountered during construction.

#### **Socio-Economic Environment**

**Population and Demographics.** The project's mix of multi-family and single family units will increase the resident population of the area. The development is expected to have about 22,400 residents at full buildout (assuming a projected average household size of 2.8 persons per household). The projected increase is consistent with City and County

population guidelines for 2010 and 2020, and will bring the Ewa population closer to the General Plan's target goals.

**Housing.** The project will increase the existing housing stock in the Ewa-Kapolei region by up to 8,000 homes over a 16 year construction period. Thirty percent of the units will be affordable to families earning up to 120 percent of (City and County of Honolulu) median income, and the developer will comply with the City's affordable housing requirements. Both single and multi-family homes will be constructed (about 2,000 single-family and 6,000 multi-family homes) with sales prices ranging from about \$133,000 (multi-family affordable) to about \$285,000 (single family market). Actual sales prices are subject to change as they are, in part, based on macro-economic variables such as median household income and mortgage interest rates. The annual absorption rate for the entire project is estimated at about 500 dwelling units with production of homes estimated to commence in 1998.

**Employment.** The project will generate both short-term construction jobs and permanent operations jobs. The project will support some 700 full-time direct construction jobs each year through project build-out in 2013. About 700 direct on-site operations jobs will be generated, primarily at the neighborhood commercial areas. Statewide, an additional 420 indirect and induced jobs will be supported by spending by project-related operations enterprises and employees. (Community Resources, Inc. 1995).

**Project Costs and Fiscal Impacts.** Total project infrastructure cost is estimated at \$233.285 million, including \$54.8 million for off-site infrastructure and \$178.5 million in on-site costs.

Personal incomes of work force associated with the project (direct, indirect and induced) would reach a high of about \$90 million annually (1994 dollars) after the year 2000, when construction remains at a high pitch but some operations jobs will have begun at the site. After buildout, on-site jobs would support some \$10 million in payroll and another \$10 million in indirect and induced jobs. The project will generate up to \$5.2 million in annual property tax revenues for the City and County at buildout. State revenues from construction (excise taxes, corporate income taxes and personal income tax) are projected to reach as high as \$85 million over the entire construction period. (ibid).

**Agriculture.** The soils are classified as "B" or prime agricultural land, according to the University of Hawaii's Land Study Bureau (LSB) Detailed Land Classification system. The Agricultural Lands of Importance to the State of Hawaii (ALISH) system identifies the project area soils as "Prime Agricultural Land." Until recently, the project site was presently leased to Oahu Sugar Company, Ltd. (OSCo) for sugar cane cultivation. In



1995, the plantation was closed for reasons unrelated to the proposed development. As such, the project will have no impact on sugar operations. The project will not have an adverse impact on the growth of diversified agriculture. (Decision Analysts Hawaii, Inc. 1995).

### **Public Facilities and Services**

**Transportation/Roads.** The project will significantly impact transportation facilities in the Ewa region. In order to minimize the project impacts and provide for smoother operating conditions, several improvements are recommended by the year 2010. They include two left-turn lanes westbound at the intersection of Farrington Highway and the proposed North-South Road; the addition of an extra through lane from the project's Farrington Highway access road intersection to the western edge of the project; and two left-turn lanes entering and exiting two of the project access roads along the planned North-South Road. Sufficient right-of-way will be reserved along the entire Farrington Highway frontage to allow for future widening as proposed in the Ewa Region Highway Master Plan. Alternate transportation actions, including development of a comprehensive plan that includes both Transportation System Management and Transportation Demand Management concepts are recommended. (Pacific Planning and Engineering, Inc. 1995).

**Infrastructure.** The applicant will construct all major on-site project infrastructure and its share of off-site infrastructure, including potable water, wastewater collection, on-site drainage improvements and major electrical and roadway system improvements. The addendum report to the project's water master plan was approved by the Honolulu Board of Water Supply on April 17, 1996. Estimated average water demand for the entire project is 3.7 million gallons per day (Tom Nance Water Resource Engineering, 1995). A wastewater system will be constructed to collect and transport project-generated sewage to the Honouliuli Wastewater Treatment Plant. A wastewater master plan has been prepared and is now being reviewed by the City Department of Wastewater Management. The project will generate an average wastewater flow of about 1.98 million gallons per day.

The project area is confined within the West Loch drainage basin. A drainage master plan has been prepared and is now being reviewed by various City agencies. The project will provide an on-site drainage collection system and a channel from the southern project boundary passing underneath Fort Weaver Road following an existing cane haul road ("Balfour Boulevard"), connecting to an existing detention basin and the proposed Ewa by Gentry-East drainage facilities south of West Loch Fairways. The entire drainage system, from the H-1 Freeway to the Ewa by Gentry-East detention basin is planned to be

dedicated to the City and County of Honolulu. Planning of the entire drainage system is being coordinated with the City Department of Public Works.

Electrical power will be provided via Hawaiian Electric Company's new Ewa Nui substation. Underground cables will provide telephone and cable television service. (Gray Hong Bills & Associates, Inc. 1995).

**Recreational Facilities.** The project will significantly increase demand on recreational facilities in the Ewa area. To accommodate increased demand, the project will provide 34 to 35 acres of dedicated park space, including a 20-acre central park, two 6-acre neighborhood parks and a 2-3 acre mini-park for the *mauka* residential area. Additional open space and park areas will be provided in the form of the proposed bikeways and private recreational areas within the various condominium projects to meet City parks standards.

**Schools and Libraries.** The project will significantly increase demand on public educational facilities in the Ewa area which are presently insufficient to meet the growing population of the region. Two eight-acre sites for new elementary schools and a nine-acre portion of an 18-acre intermediate school will be provided within the project area. The nine acres provides for the project's share of this regional facility. It is assumed the adjacent landowner, the State of Hawaii, will provide the additional nine acres to complete the intermediate school campus. The applicant will work with the Department of Education to ensure that the intermediate school needs of the project are accommodated. Current State plans to expand library services, including construction of a new Kapolei Library, will accommodate additional project residents.

#### 1.4 Alternatives Considered

Several alternatives to the proposed action were considered, including "no action," commercial development and other public facilities. The proposed action, affordable residential development, was deemed to be the preferred alternative. A more detailed discussion of these alternatives can be found in Chapter 7.

#### 1.5 Unresolved Issues

##### North-South Road

This major regional highway is being developed by the State and County. The applicant is expected to contribute its fair share to fund construction. Initial phases of the project are not dependent on the roadway, and the actual development timing of the facility is beyond

the applicant's direct control. Present estimates are for the North-South Road and H-1 Freeway interchange to be operational in the 2001 to 2005 timeframe, relatively early in the anticipated 16-year project build-out period.

#### Potable Water Source

The developer is currently working toward securing commitments for project water source. At the present time, water source remains an unresolved issue. In addition to existing water sources within the Pearl Harbor Water Management Area, potential sources include: 1) excess allocation within the Pearl Harbor Water Management Area which may be available due to the closure of Oahu Sugar Company; and 2) development of other water sources (i.e., North Shore and Windward Oahu), or a combination of the above.

#### Use of Non-Potable Water

Current City policy requires use of non-potable water for irrigation of non-residential areas, including the project's schools, parks, commercial areas and along major roadways. Development of an on-site dual water system is being investigated. Potential sources of non-potable water include 1) treated effluent from the Honouliuli Wastewater Treatment Plant; 2) Ewa caprock aquifer; and 3) brackish basal aquifer.

#### Off-Site Drainage

The project's drainage master plan assumes the construction of the Ewa by Gentry-East drainage facility adjacent to West Loch. That project has received City EIS, SMA and DP Public Facility approvals, but still requires approval from the Army Corps of Engineers and the Department of the Navy.

#### Intermediate School

Plans for the intermediate school assume that the adjacent landowner, the State of Hawaii, will provide an additional nine acres to complete the school. The developer will coordinate efforts with the appropriate State entity in providing the intermediate school and will continue to work with the Department of Education to ensure that the project's intermediate school needs are met.

### **1.6 Compatibility with Land Use Plans and Policies**

Chapter 3 include a discussion of the project's compatibility with existing government plans, policies and objectives. Because of the competing nature of many of these plans,

policies and objectives, the project supports many and is inconsistent with others. Generally, the plan is consistent with State and County growth policies related to the second city and housing policies related to the production of affordable housing.

**1.7 Necessary Permits and Approvals**

Development of the property as proposed will require a number of permits and approvals from State and County agencies. A summary of possible required approvals is provided below.

<u>Approval</u>	<u>Authority</u>
<i>State of Hawaii</i>	
Land Use District Boundary Amendment	Land Use Commission
National Pollutant Discharge Elimination System (NPDES) permit	Department of Health
Water Commission Approvals	State Water Commission
<i>City and County of Honolulu</i>	
Ewa DP Land Use Amendment	City Council
Ewa DP Special Provisions Amendment	City Council
Ewa DP Public Facilities Map Amendment	City Council
Zoning Change	City Council
Water Master Plan	Board of Water Supply
Wastewater Master Plan	Department of Wastewater Management
Subdivision Approvals	Department of Land Utilization
Grading Permits	Department of Public Works
Building Permits	Building Department

**1.8 Statement of Purpose and Need for Action**

The applicant is requesting an amendment to the Ewa DP Land Use Map to change the land use designation of the area of application from Agriculture to Low Density Apartment, Parks and Recreation, Public and Quasi-Public and Commercial. The purpose of this action is to permit the development of up to 8,000 residential units and associated

commercial, educational (elementary and intermediate schools) and recreational (parks and bikeways) facilities.

### **1.9 Purpose of and Need for this Environmental Impact Statement**

The purpose of this Environmental Impact Statement (EIS) is to describe and assess a proposal for the development of the 793-acre East Kapolei residential project. The EIS is a disclosure document which provides information on all known or potential effects that a proposed action may have on the environment, economic and social welfare of the community and State. It includes a discussion of potential impacts of the proposed project, both beneficial and adverse, and proposes measures to either avoid or minimize adverse impacts to the environment.

An application for Development Plan Amendment and Environmental Assessment for the proposed East Kapolei Project was submitted to the City and County of Honolulu Planning Department in November 1995. The proposed action was subject to the provisions of Chapter 343, Hawaii Revised Statutes, Environmental Impact Statements, because the proposed amendment to the Ewa Development Plan would result in a designation other than agricultural, conservation or preservation.

By letter dated November 9, 1995, the Planning Department notified the Office of Environmental Quality Control (OEQC) that it had determined that the project may have a significant effect on the environment and that an EIS was required. Notice of this determination was published in the November 23, 1995 edition of *The Environmental Notice*, commencing a 30-day public review period which ended on December 23, 1995. Chapter 12 contains a listing of agencies, organizations and individuals consulted during the preparation of the Draft EIS. The chapter also contains reproductions of written comments on the EIS Preparation Notice (EISPN) and the applicant's response to those comments.

Notice of availability of the Draft EIS (DEIS) was published in the January 23, 1996 edition of *The Environmental Notice*, commencing a 45-day public comment period which ended on March 9, 1996. Chapter 13 contains a listing of agencies, organizations and individuals sent copies of the DEIS. The chapter also includes reproductions of written comments received and the responses to those comments.

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PROJECT DESCRIPTION

## CHAPTER 2 PROJECT DESCRIPTION

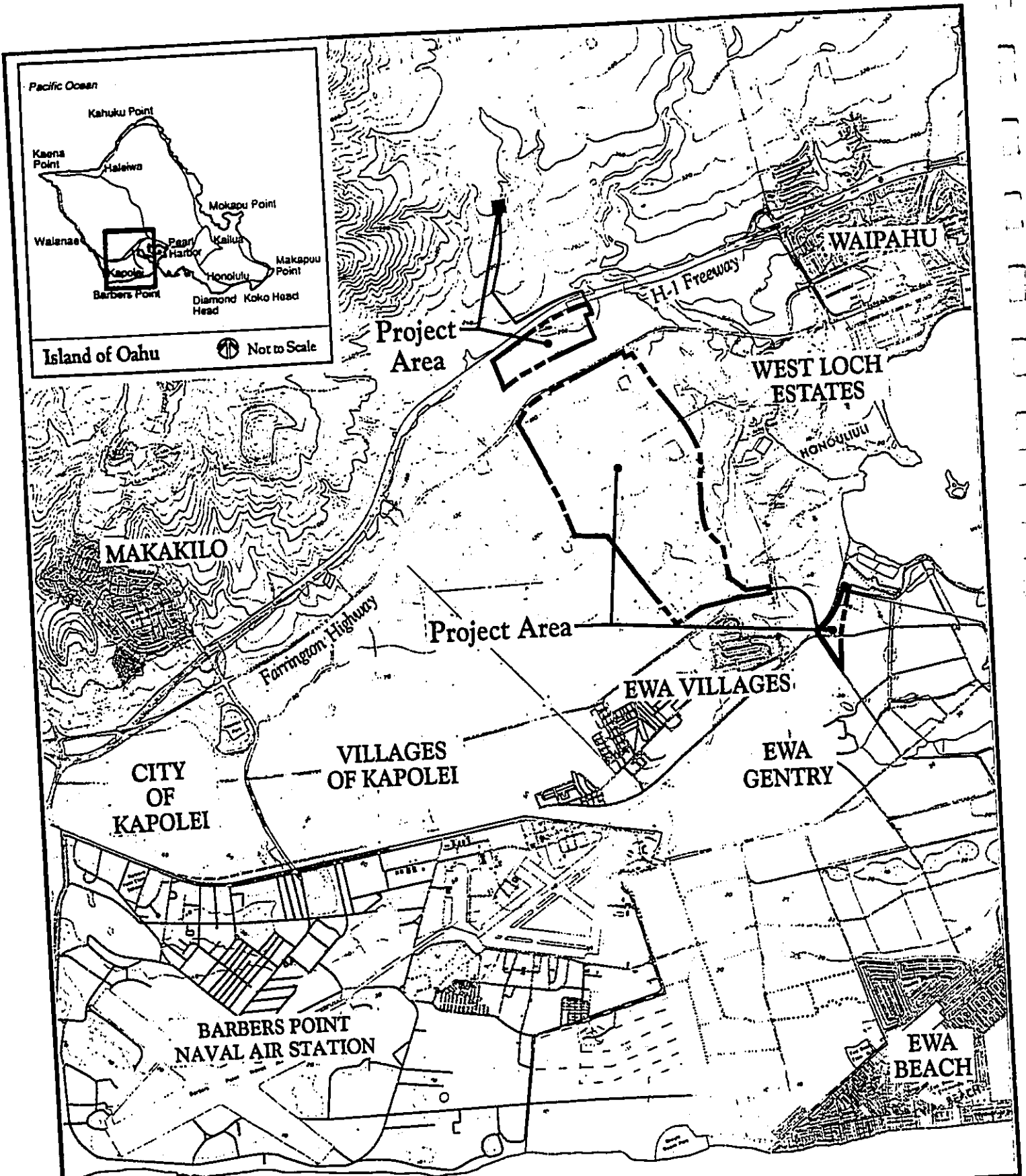
### 2.1 Location

The 793-acre East Kapolei Project is located in east Kapolei in the Ewa District of west Oahu. The Ewa-Kapolei area is a growing community designated in the City's General Plan as Oahu's "second city." As shown in Figure 1, the "project area" consists of four non-contiguous areas. The largest parcel, the "*makai* parcel," is bordered by Farrington Highway to the north, by agricultural lands to the east, the Ewa Villages residential area to the south, and by Estate of James Campbell-owned lands to the west, and is about 671 acres in size. The "*mauka* parcel," located between Farrington Highway and the H-1 Freeway comprises about 79 acres. A rectangular-shaped, five-acre portion of the *mauka* parcel will be used for a 228-foot water reservoir(s), but is not included in the Development Plan application (shown as the "notch" in the northeast corner of the *mauka* parcel in Figure 1). The 671-acre *makai* parcel and the 79-acre *mauka* parcel comprise the 750 acres which are the subject of the Development Plan application. The project area also includes the various infrastructure parcels, comprising approximately 43 acres. They include a seven-acre site *mauka* of the H-1 Freeway for a 440-foot water reservoir(s), the five-acre 228-foot reservoir(s) site, and a 31-acre triangular-shaped parcel for a drainage detention basin, east of Fort Weaver Road.

### 2.2 Background

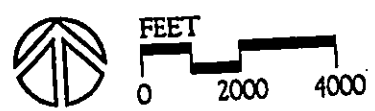
An Environmental Impact Statement for a similar project was completed in 1995 as part of a DP Land Use map application to the Planning Department, and accepted by the Planning Department on May 11, 1995. In its review of that proposal, the PD expressed concerns regarding several issues, including impacts on the Kalo Drainage basin, community design, transportation and schools (1995 Development Plan Annual Amendment Review, July 1, 1995). In response, the applicant has revised the boundaries of the project area and the concept plan to address those concerns.

The project area is identified as TMK 9-1-17:04 (por); 9-1-18:01 (por); 9-2-02:01 (por); 9-2-04:05 (por); and 9-1-10:02 (por), as shown in Figure 2. The DP application includes only the two largest sites: TMK 9-1-17:04 (por) (*makai* parcel) and 9-1-18:01 (por) (*mauka* parcel). The entire 793-acre project area is located in the State Agricultural District, with the exception of a small (0.5 acre) portion near Ewa Villages which is in the Urban District. The Estate of James Campbell currently holds title to the entire project area, with the exception of 183 acres owned by the State of Hawaii. The State-owned portion was included as part of a 1,300-acre petition for State Land Use District boundary



Base Map: Ewa D.P. Base Map

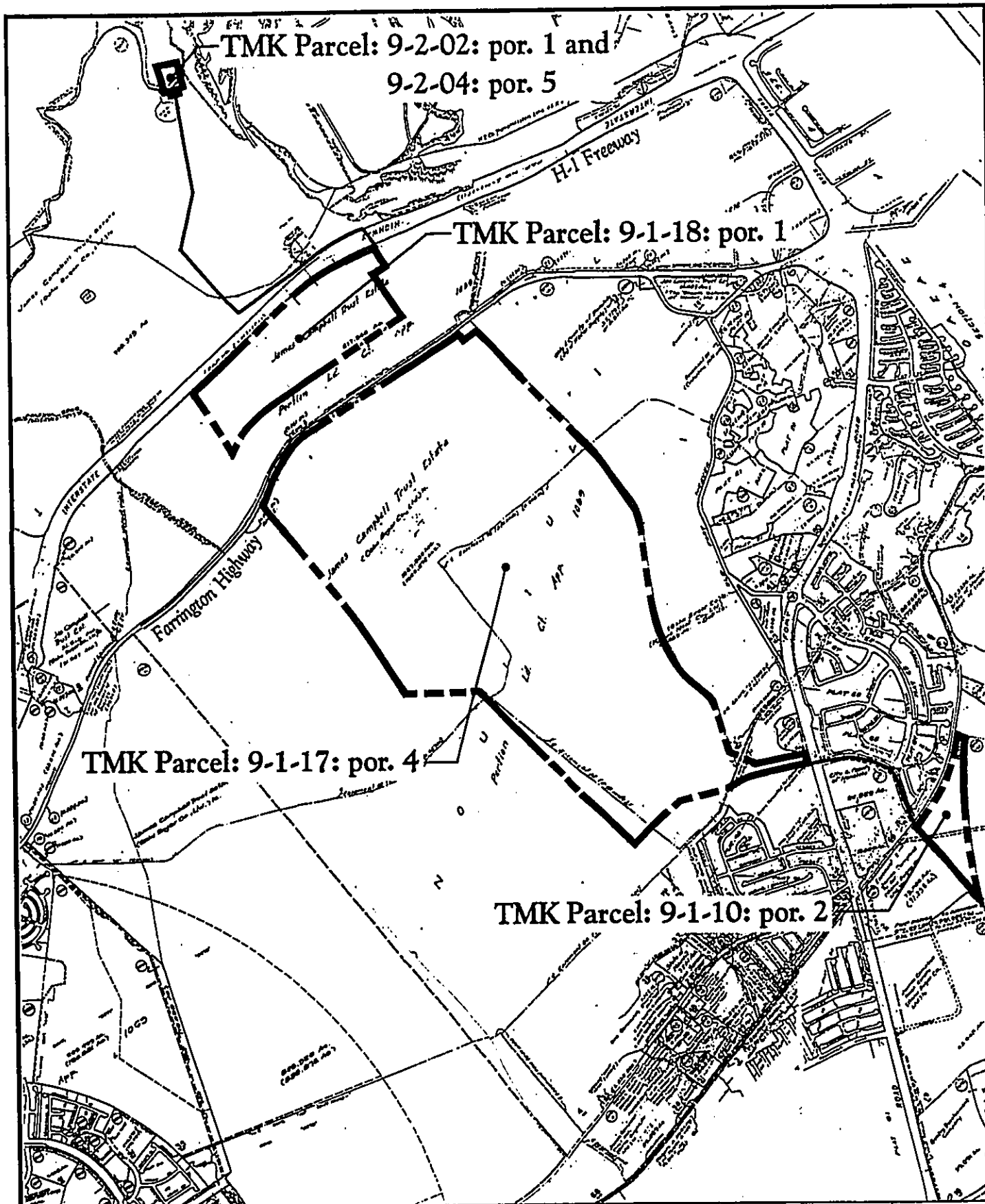
**Location Map**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.



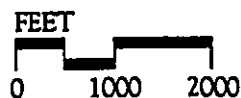
Helber Hastert & Fee, Planners

Figure  
**1**





**Tax Map Parcels**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.



Helber Hastert & Fee, Planners

Figure

2

amendment submitted to the State Land Use Commission (LUC) by the Office of State Planning in September 1994 (Docket No. A94- 708). A petition for a Land Use District Boundary Amendment for the Agricultural portion of the project area will shortly be submitted to the LUC by Schuler Homes, Inc.

The Estate of James Campbell and the State of Hawaii have authorized Schuler Homes, Inc. to file this application with the Honolulu Planning Department to amend the Ewa Development Plan Land Use Map (Authorization letters in Appendices A and B).

### 2.3 Existing and Proposed Surrounding Land Uses

The project site has been planted in sugar cane since the late 1800's, and the entire 793-acre project area was until recently under lease to Oahu Sugar Company (OSCo). Due to financial hardship, OSCo ceased sugar cane cultivation in 1995, when its leases expired.

Existing and proposed land uses in the Ewa-Kapolei region are shown in Figure 3, the Kapolei Area Long Range Master Plan (July 1993), prepared by The Estate of James Campbell. The project area is designated "agriculture" use on the map.

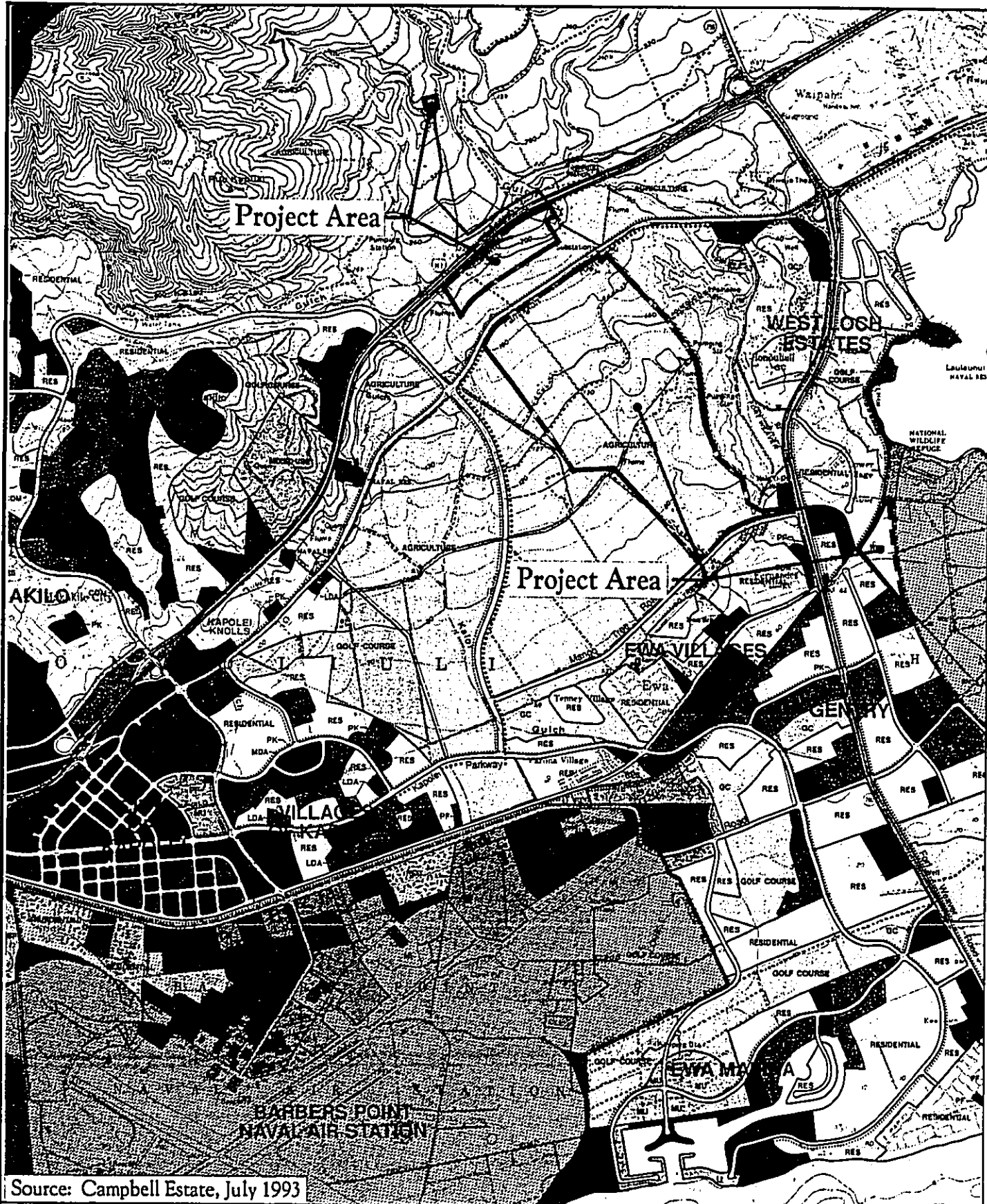
The Ewa-Kapolei area is comprised of many different and distinct communities, both old and new. Existing residential development in the vicinity of the project includes the older Honouliuli residential area and the West Loch residential development and golf course to the east, the plantation-era Ewa Villages to the south and the Villages of Kapolei to the west. The City of Kapolei, Barbers Point Naval Air Station and proposed Ewa Marina project are also within a two mile radius of the site. To the northeast lies Waipahu town, and to the northwest, the residential community of Makakilo.

A brief description of the major surrounding land uses is provided below:

#### 2.3.1 Major Residential Communities

##### Ewa Villages

The Ewa Villages plantation housing, located just south (*makai*) of the subject project, developed around the Ewa sugar mill in the early part of the century. At one time, there were eight villages, housing immigrant plantation workers from Portugal, Spain, Korea, Japan and the Philippines. Four of the newer villages--Renton, Tenney, Varona and Fernandez--are still standing, while the older four have been demolished. The population of the Ewa Villages was 3,780 in 1990. The City Department of Housing and Community Development has plans for revitalizing the Ewa Villages, including developing additional



Source: Campbell Estate, July 1993

**Kapolei Area Long Range Master Plan**  
**EAST KAPOLEI PROJECT**

Schuler Homes, Inc.



Helber Hastert & Fee, Planners

Figure

**3**

residential units, expanding the Ewa Elementary School, creating a new golf course, district park and commercial/retail center and business park. The plan also includes rental and homeownership programs for village residents.

The project will encompass a total of 600 acres at build-out, 242-acres of which will be in residential use. There will be approximately 1,600 dwelling units at build-out, of which 277 are existing and will be rehabilitated.

#### Ewa Beach

The town of Ewa Beach, located about 2-1/2 miles *makai* of the project, began as a weekend recreational area in the 1940s and eventually developed into a permanent residential community. There were 3,426 housing units in Ewa Beach in 1990.

#### Ewa Marina

The Ewa Marina project is located adjacent to Ewa Beach, and is being developed by Haseko (Ewa), Inc. The 1,100-acre site has been master planned as a mixed-use marina community. The master plan calls for 4,850 residential units, 950 visitor units, a 27-hole golf course, a health and fitness center, and a community-scale commercial project.

#### Naval Air Station (NAS) Barbers Point

The NAS Barbers Point is located just over a mile to the southwest of the project site. This facility was established during World War II as a major Navy aviation station. Today, the station comprises 3,700 acres and operates on a 24-hour basis. There are three 7,000-foot runways which allow operation of fixed-winged and rotary-winged aircraft. In 1990, NAS Barbers Point had 2,218 residents. (In addition, the Iroquois Point military housing area, in east Ewa, houses about 5,000 persons). NAS Barbers Point has been scheduled to close in 1999 as part of the national base realignment initiative. However, Navy housing units, as well as recreation areas, will be retained after the Navy aviation facility closes. The airfield is being considered for civilian general aviation uses and possible continued use by the U.S. Coast Guard.

#### Makakilo

Residential development in Makakilo commenced in 1962, and presently encompasses 1,202 acres. Makakilo is located to the northwest of the site, on the *mauka* side of the H-1 Freeway. The area, which includes single and multi-family, mid-priced homes, was developed primarily by Finance Realty. In 1990, there were nearly 8,000 residents at

Makakilo, with two-thirds of the population having arriving after 1985. Development is more than half-way through and a total of 6,174 homes are anticipated at build-out.

#### Ewa by Gentry

Ewa by Gentry is located about a mile to the south (*makai*) of the project, off Fort Weaver Road. This development's first subdivision, Soda Creek, was opened in 1988. By 1990, Ewa Gentry had 752 homes and a population of 2,000. Gentry Development Company plans to ultimately construct about 8,300 homes on about 1,000 acres of land. To date, about 3,500 units have been completed, with the remainder scheduled to be built through 1999. Planned community facilities include an 18-hole golf course, elementary school, two community parks and a neighborhood commercial center.

#### West Loch Estates/Fairways

The West Loch Estates/Fairways was developed by the City and County of Honolulu, and encompasses 491 acres in Honouliuli, on the western edge of Pearl Harbor's West Loch. West Loch is located directly east (Diamond Head) of the subject project. Phase 1 of the West Loch project, which has a total of 593 units, was completed in 1990. A total of 1,600 residential units are planned by buildout. Other existing and planned features of community include a commercial center, church, child care facilities, Asing Community Park within the civic center, an 18-hole municipal golf course and a 40-acre shoreline park.

#### Villages of Kapolei

The State Housing Finance and Development Corporation is developing this master planned residential community at Kapolei. The first homes in the Villages of Kapolei were completed in 1990, with up to 5,000 units on 890 acres planned at buildout. Kapolei will include a variety of residential types, including market rate and affordable single and multi-family units, and assisted, rental and elderly housing. A full range of community support facilities are being constructed at Kapolei, including an 18-hole golf course, parks and recreational amenities, churches, schools and commercial areas.

#### 2.3.2 Non-Residential Developments

##### City of Kapolei

The Estate of James Campbell is in the process of developing an approximately 890-acre commercial center in the area roughly bounded by the Barbers Point Access Road to the

east, the Naval Air Station Barbers Point to the south, the Ko Olina Resort option area to the west, and the lower slopes of Makakilo to the north. The heart of this site is the City of Kapolei, a triangular-shaped 570-acre parcel.

The development concept for the city is to provide a self-contained, urban economic center. The development program for the City of Kapolei calls for over seven million square feet of office and retail space and a 73-acre regional park. Land within the City of Kapolei will be dedicated to the State of Hawaii and City and County of Honolulu for government offices and other public facilities including parks, bus terminal, civic center, police station and regional library.

#### Kapolei Business Park

The Kapolei Business Park (KBP) is located on 800 acres between the James Campbell Industrial Park and the City of Kapolei. Development of this new facility will be limited to light industrial and maritime-related uses. The park is zoned I-2, and the first increment includes 135 acres. The KBP is expected to generate about 6,090 jobs by the year 2010.

#### James Campbell Industrial Park (JCIP)

Campbell Estate developed this park as a heavy industrial complex in 1959. Major tenants in this 1,367 acre complex include two oil refineries, a concrete manufacturing plant, cattle feed lot operation, large building material supply yards, numerous other industrial businesses and the City's H-POWER garbage to energy plant.

#### Barbers Point Harbor

The new State-owned harbor is located at the northwestern edge of the JCIP. The first increment of the development was completed in 1990, and ships now make regular calls at the harbor. Facilities include 1,600 feet of pier, 30 acres of paved back-up area and related infrastructure, and a bulk cargo ship unloader. Harbor development is scheduled to be completed in the next 15 to 20 years, with a total of 237 acres of developed area surrounding the basin. The harbor is being planned to accommodate Oahu's shipping needs for the next 50 years.

#### Ko Olina Resort

Ko Olina is a planned resort community at the southwest end of the Ewa region, being developed by West Beach Estates. To date, one hotel, a golf course and man-made

beaches and lagoons have been developed, with plans for up to 8,700 housing units within the 1,000 acre resort. A basin for a 350 to 400 slip marina has already been constructed.

#### Other Proposed Facilities

The State of Hawaii is planning to develop a West Oahu Campus of the University of Hawaii in the vicinity of the East Kapolei project. In 1994, the University of Hawaii Board of Regents selected a 500-acre site directly to the west of East Kapolei for the future university. That site is part of the 1,300 acres that the State acquired from The Estate of James Campbell. The State administration is presently recommending relocating the proposed campus to a 900-acre site north of the project area, centered around Puu Kapuai. The new site was recently approved by the University Board of Regents, but is yet to be formally approved by the Legislature. Until that time, the original 500-acre site remains the "official" site for the university.

The State and County also have plans for future construction of a major north-south regional roadway near the western boundary of the project area. Plans include a freeway interchange, providing direct access from the H-1 Freeway and Farrington Highway to the proposed Kapolei Parkway regional connector roadway, and the communities of Ewa Gentry and Ewa Beach. The City Department of Transportation Services (DTS) is the lead agency in charge of design and construction of the facility. Current estimates indicate the opening of the facility in the 2001 to 2005 timeframe.

The applicant will participate with other major developers in the area on the preparation and implementation of the Ewa Region Transportation Master Plan. The applicant has been coordinating its involvement through The Estate of James Campbell which is spearheading the transportation planning effort.

#### **2.4 Regional Plans**

Figure 4, Regional Framework, illustrates The Estate of James Campbell's current plans for the East Kapolei area. The plan locates the East Kapolei project in the center of the region, surrounded by The Estate of James Campbell and State-owned lands. To the east lies the 180-acre West Loch "bluffs" parcel identified for long-term residential development in the draft City Ewa DP revisions. To the north between Farrington Highway and the H-1 Freeway are lands owned by The Estate of James Campbell identified for long-term high density development related to a proposed major transit corridor. To the south lies the City's Ewa Villages redevelopment area which is in its final stages of construction. To the west and southwest lie State-owned lands presently before the State Land Use Commission for urban redesignation.

The plan shows the alignment of the proposed North-South Road and its H-1 Freeway interchange. The North-South Road will provide primary access from the freeway to Farrington Highway, the East Kapolei project and State-owned properties to the south. A City-proposed transit corridor is identified along Farrington Highway, continuing south along the North-South Road. A significant feature of the plan is the location of a major transit, community commercial and high density housing node near the intersection of North-South Road and Farrington Highway. Possible development of the University of Hawaii West Oahu campus in proximity to this node would further support transit, commercial and high density commercial and residential uses. Figure 4 also shows a proposed concept drainage plan for the Kalo Gulch basin. Runoff from *mauka* areas will be directed into wide, grassed drainageway paralleling the east side of the North-South Road as represented in the City's proposed revisions to the Ewa Development Plan. In addition, flows may also be directed along Kalo Gulch's natural drainage course through the adjacent State-owned lands, particularly if the University does not occupy this site. The East Kapolei project does not impact the Kalo Gulch drainage basin.

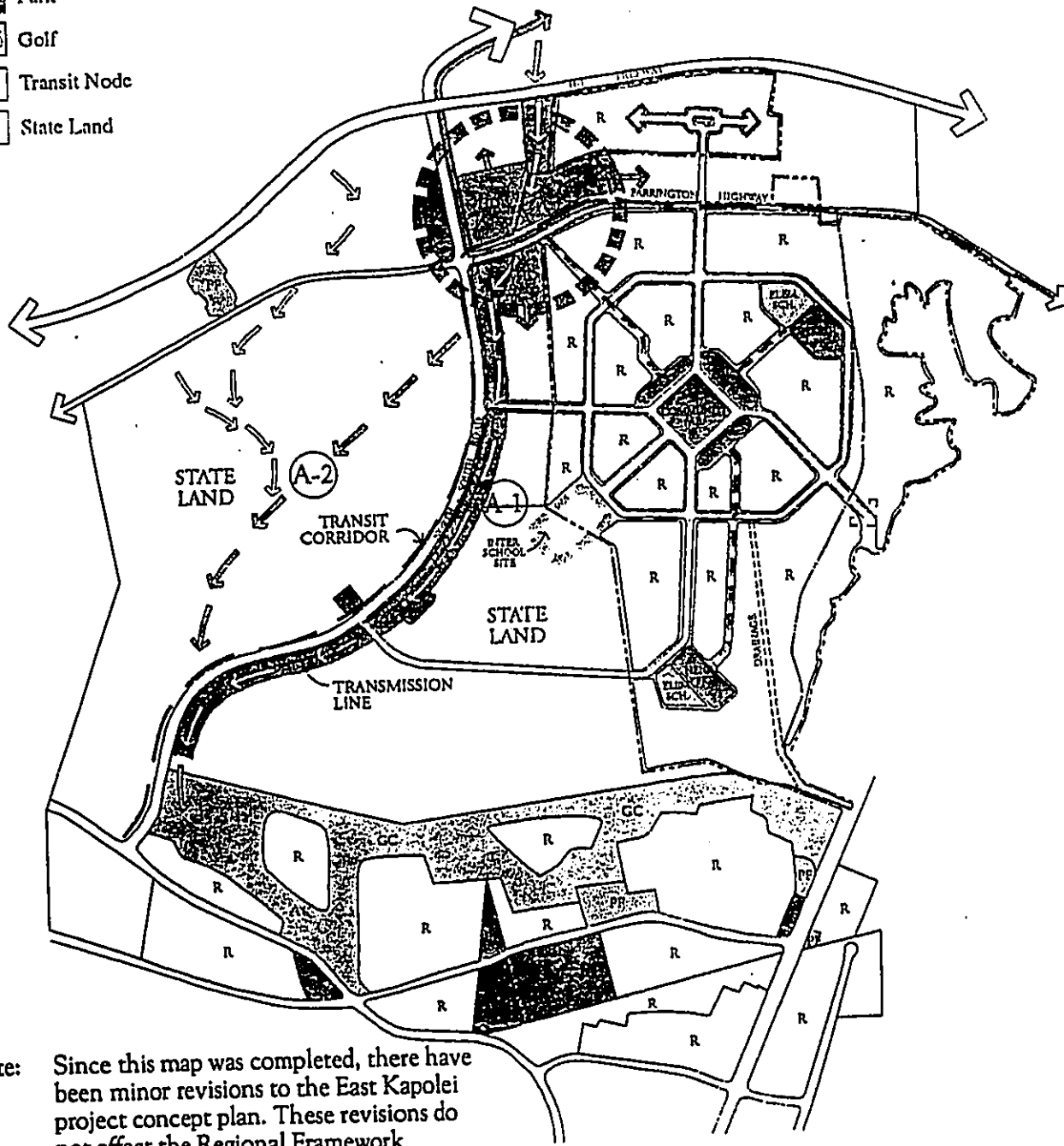
## 2.5 Project Description

The East Kapolei Project is a residential development, which will include ancillary land uses such as parks, neighborhood commercial areas and sites for elementary and intermediate schools. The proposed concept plan for the project is shown in Figure 5. The following Table 1 summarizes the proposed land uses and acreages, as designated in the plan.



**LEGEND**

- R Low and Medium Density Residential
- High Density Residential
- Community Commercial Center
- Public Institution
- Park
- Golf
- Transit Node
- State Land



**Note:** Since this map was completed, there have been minor revisions to the East Kapolei project concept plan. These revisions do not affect the Regional Framework illustrated here.

Source: The Estate of James Campbell, October 1995

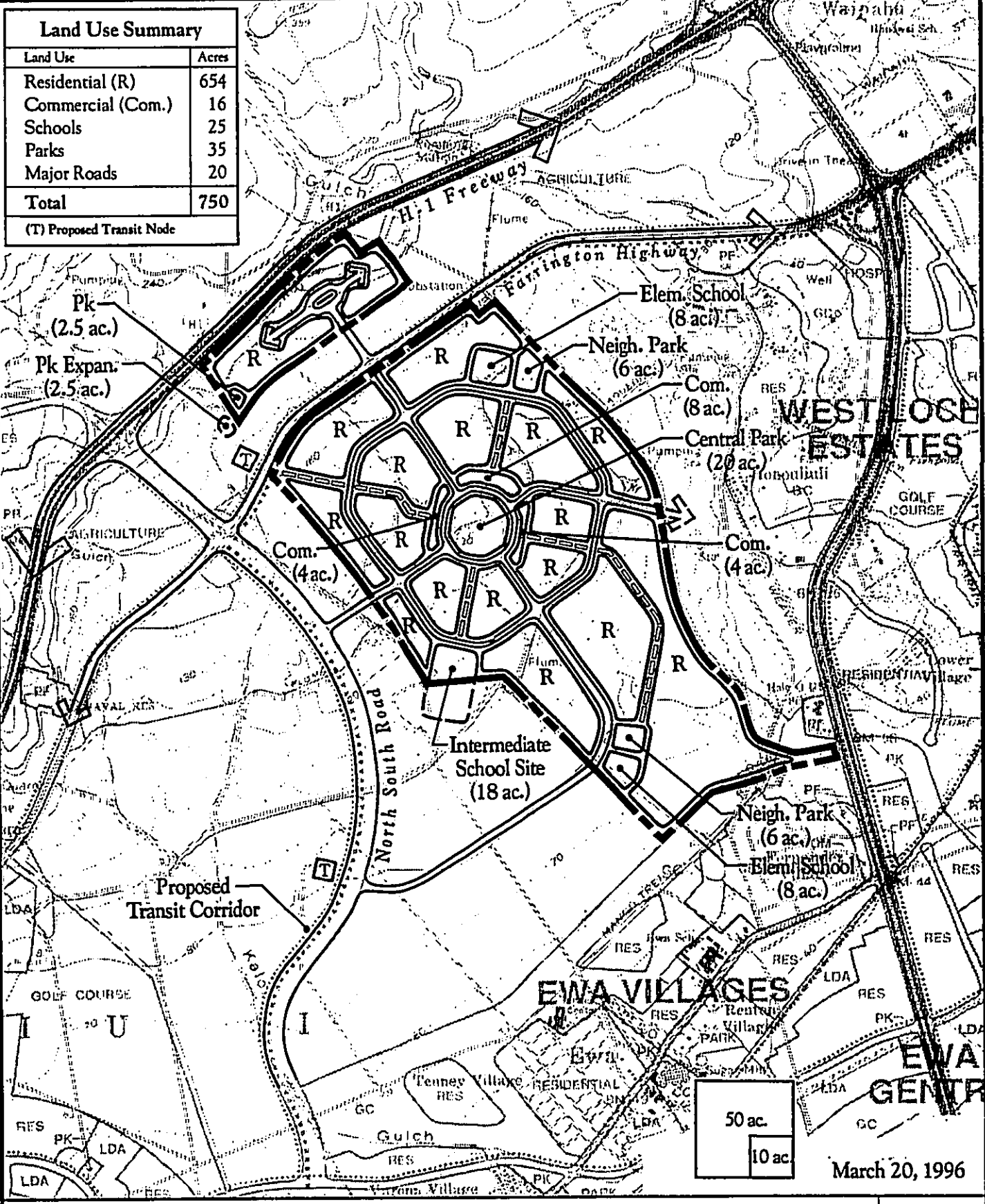
**Regional Framework**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.



Helber Hastert & Fee, Planners

**Figure**  
**4**

Land Use Summary	
Land Use	Acres
Residential (R)	654
Commercial (Com.)	16
Schools	25
Parks	35
Major Roads	20
<b>Total</b>	<b>750</b>
(T) Proposed Transit Node	



**Preliminary Concept Plan**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.

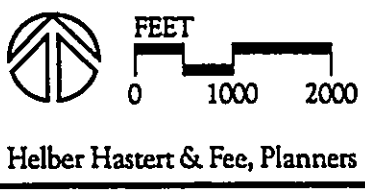


Figure  
**5**

Helber Hastert & Fee, Planners

March 20, 1996

**Table 1:  
Proposed Land Utilization**

<u>Land Use</u>	<u>Area (acres)</u>	<u>Average Density (Du/Ac)</u>	<u>Dwelling Units</u>
Residential	654	12/ac.	8,000
Neighborhood Commercial	16		
Schools	25		
Parks	35		
Major Roads	<u>20</u>		<u>          </u>
<b>SUBTOTAL</b>	<b>750</b>		<b>8,000</b>
Off-Site Infrastructure	<u>43</u>		
<b>TOTAL</b>	<b>793</b>		

The proposed plan implements neo-traditional town planning concepts articulated in the draft revisions to the Ewa Development Plan (City Planning Department, June 1995, pps. 4-1 et seq.) Consistent with sound community planning principals, a stronger emphasis has been placed on the close integration of land use and open space, and the design of the interior circulation system, than is found in conventional planned communities. The plan promotes a strong pedestrian orientation by clustering neighborhood-serving facilities (elementary schools, neighborhood parks and neighborhood commercial uses) within relatively short walking distances of the respective service areas, through the introduction of traffic calming design features (e.g., the proposed loop road around the central park), and by providing an interconnected, non-vehicular, bikeway/pedestrian linkage throughout the entire project. Over half of the project's 8,000 households will be within a five-minute walk of the central park and neighborhood commercial center. Relatively higher residential densities (12 du./ac. avg.) and a proposed wide mix of housing types (single detached and attached, town home, and garden apartments) will promote transit ridership and meet broad-based market demands. The successful synthesis of the foregoing design characteristics will lead to the creation of a strong sense of place and neighborhood identity.

Each element of the concept plan is reviewed below.

2.5.1 Residential

The applicant is proposing to develop up to 8,000 residential units over a 16-year period at the rate of about 500 units per year starting in 1998. The housing mix will consist of about 75 percent multi-family apartments and townhomes and 25 percent single family units. The concept plan identifies approximately 654 acres for residential uses. The proposed densities range from 20 units/acre for the affordable multi-family units to seven units/acre for the market-priced single family homes, resulting in average residential densities of about 12 units/acre. Of the total units, it is estimated that 30 percent will be affordable to families between 80 and 120 percent of (City and County of Honolulu) median income. Sales prices will range from about \$133,000 (multi-family affordable) to about \$285,000 (single-family market). The petitioner will be exploring the possibility of introducing residential flats over portions of the proposed neighborhood commercial uses surrounding the community park.

The following is an estimated breakdown of the number, types, sizes, and anticipated prices of homes which could be developed:

**Table 2:  
Residential Product Types**

Product Type	Density (units/ac)	Number of Units	Average Floor Area	Average Price*
Single Family-market	7.5	2,080	1,500 SF	\$285,000
Townhouse-market	12	1,440	1,200 SF	\$235,000
Low Density Type 1-market	15	1,920	800-900 SF	\$208,000
Low Density Type 2-market	20	160	800 SF	\$185,000
Low Density Type 3-affordable				
Up to 80% of median	20	800		\$133,000
Up to 120% of median	20	1,600		\$175,000
<b>Total</b>		<b>8,000</b>		

\*1996 dollars, subject to change

Source: Atwater, December 1995

### 2.5.2 Neighborhood Commercial

Three neighborhood-serving commercial parcels are shown in the preliminary concept plan: two 4-acre sites and one 8-acre site for a total of 16 acres (Figure 5). The commercial parcels are located across the loop road from the central community park (Figure 6). Typical commercial tenants would include grocery and drug stores, restaurant/fast food operations, service stations/mini marts, and professional office, such as medical, financial, insurance and real estate services. Vehicle parking is located in the rear, with access off of the four connector roadways. Storefronts fronting the park ring road sidewalk will enhance the pedestrian-orientation of the park/commercial zone. As noted above, the applicant will be exploring the potential for introducing residential flats above portions of the commercial parcels.

### 2.5.3 Parks

A primary component of the recreation plan is the 20-acre central park, which serves as the community center and focal point for the overall project. The park is surrounded by a loop road, and will include adequate automobile parking (Figure 6). Over half of the project's 8,000 households will be within a five minute walking distance of the park, making it very pedestrian accessible. Two 6-acre neighborhood parks adjacent to the two elementary schools are located within the nearby residential areas, and a 2 to 3 acre mini-park is provided in the *mauka* parcel. All parks will be readily accessible via major project roadways and a system of interconnected bikeways. Additional private park areas will be provided by project community associations.

The bikeways would be incorporated into planned residential streets where appropriate, and would also include links and short-cuts not available for automobile use. These links would be maintained by adjacent homeowner associations, and would be planned for maximum security and recreational value. The bikeway network would provide access between the major public uses of the project (schools, parks, commercial areas, etc.).

### 2.5.4 Schools

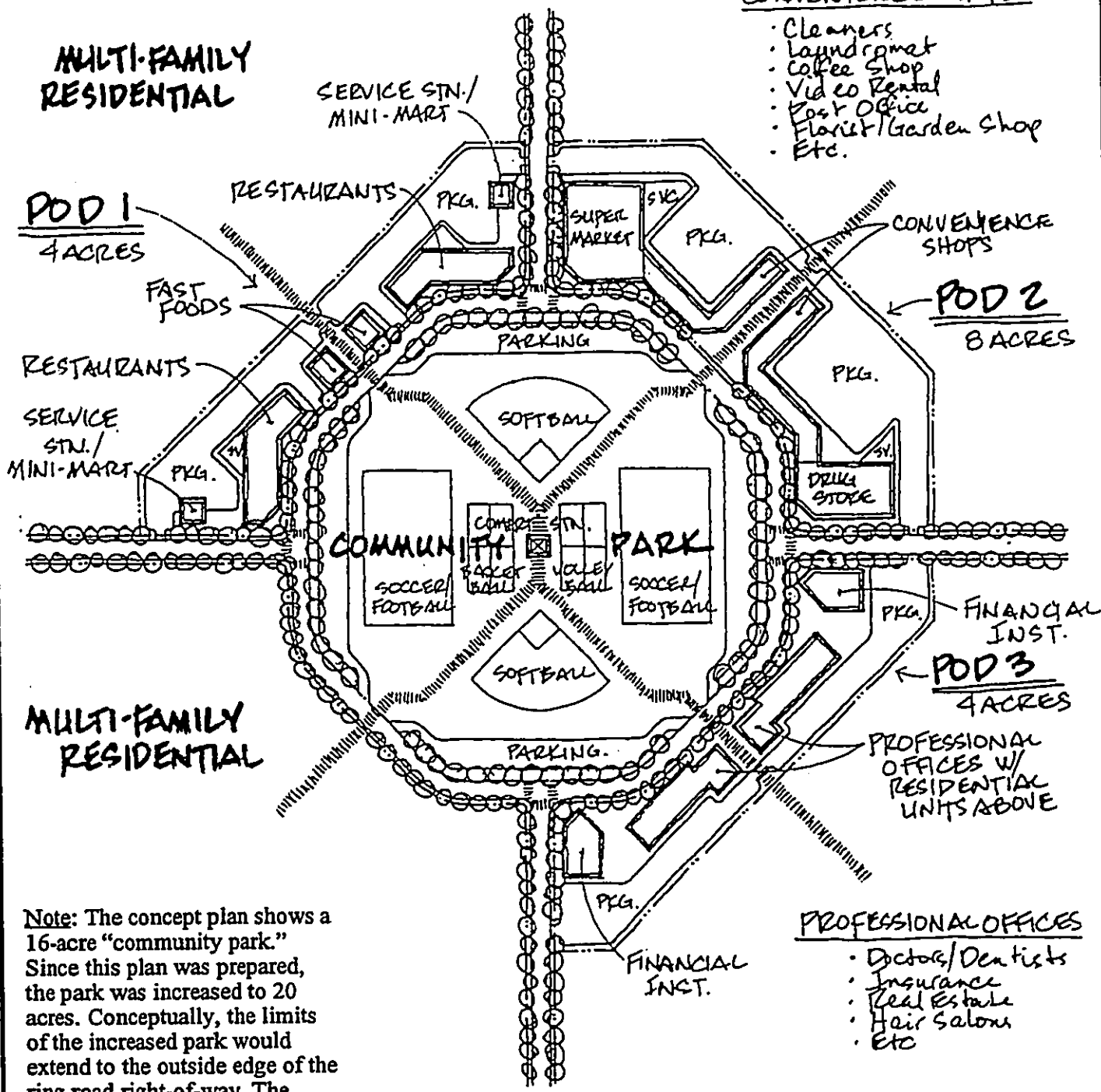
The project includes two 8-acre elementary school sites and a portion of a new intermediate school site. It is anticipated that the *makai*-most elementary school will be constructed during the initial phases of the project, with the second elementary school to be constructed in later phases. The elementary school service zones will be less than a one-mile radius. The concept plan also includes nine acres or half of a future 18-acre intermediate school. It is assumed that the adjacent landowner, the State of Hawaii, would provide an additional nine acres to allow eventual development of an 18-acre

**MULTI-FAMILY RESIDENTIAL**

CONVENIENCE SHOPS:

- Cleaners
- Laundromat
- Coffee Shop
- Video Rental
- Post Office
- Florist/Garden Shop
- Etc.

**MULTI-FAMILY RESIDENTIAL**



Note: The concept plan shows a 16-acre "community park." Since this plan was prepared, the park was increased to 20 acres. Conceptually, the limits of the increased park would extend to the outside edge of the ring road right-of-way. The overall land use configurations and relationships remain unchanged.

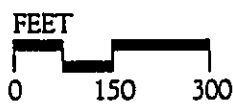
PROFESSIONAL OFFICES

- Doctors/Dentists
- Insurance
- Real Estate
- Hair Salons
- Etc.

**MULTI-FAMILY RESIDENTIAL**

**Commercial/Park Concept  
EAST KAPOLEI PROJECT**

Schuler Homes, Inc.



Helber Hastert & Fee, Planners

Figure

**6**

intermediate school. All three school sites are in centralized locations, accessible via the major project access roads and the bikeway network.

#### 2.5.5 Vehicular Circulation

A City-proposed transit corridor is identified along Farrington Highway, continuing south along the North-South Road. A significant feature of the City's proposed Ewa Development Plan is the siting of a major transit, community commercial, and high-density housing node near the intersection of North-South Road and Farrington Highway. Possible development of the University of Hawaii West Oahu campus in proximity to this node would further support transit, commercial and high-density commercial and residential uses, indirectly supporting transit usage for future East Kapolei residents.

Project access will be via Farrington Highway, until completion of the North-South Road and freeway interchange. At that time, access from North-South Road will also be available. Circulation within the project area will be via four arterials radiating to/from the outside ring road, providing access to Farrington Highway, the North-South Road, and possibly, in the future, Fort Weaver Road. The Fort Weaver Road connection is problematic in that its feasibility and precise roadway alignment has not been determined, and that, at least in the short-term, a connection to Fort Weaver would not be feasible due to significant traffic congestion on this corridor and the cost of building a grade-separated interchange with Fort Weaver Road. The connection is shown to be consistent with the City's revised Development Plan roadway circulation recommendations. The project's main ring road will serve as the primary internal collector roadway, providing access between the residential areas and the Ewa region. The central park is also surrounded by a loop road. The roadway circulation system within the central core area has been deliberately designed to minimize through traffic and "short-cutting," to provide a more pedestrian/bicycle-friendly environment. Unlike traditional planned communities, the roadway network will provide the motorist with multiple roadway choices, distributing rather than concentrating vehicular movements.

#### 2.5.6 Off-Site Infrastructure

Major off-site infrastructure parcels include:

- the 440-foot elevation reservoir site and transmission line (+/- 7 acres);
- the 228-foot elevation reservoir site (5.211 acres), and
- the 30.825-acre *makai* drainage detention area.

Total area of the off-site parcels is about 43 acres. Proposed off-site infrastructure systems are described in Chapter 6.

## 2.6 Project Rationale

In the residential sector, Honolulu continues to be one of the least affordable cities in the nation. While land prices account for some of this problem, there has been a long-term imbalance between supply and demand which has increased the cost of housing. The purpose of the East Kapolei project is to meet the need for affordable and moderately priced housing for Hawaii's residents within Oahu's second urban center at Kapolei. The development team has a proven track record in delivering high quality housing products in this critical segment of Hawaii's housing market. The City and County General Plan specifically identifies a policy to encourage development within the secondary urban center at Kapolei and the Ewa urban fringe to meet housing needs not provided in the primary urban center.

The East Kapolei project will bring population in the second city closer to General Plan population goals. The market study area for the East Kapolei project was defined as Oahu's residential market extending along the H-1 corridor, including the entire Ewa Development Plan area and Central Oahu's master planned communities of Royal Kunia and Waikale. Within this market study area, demand for an additional 38,000 to 44,000 housing units is estimated by the year 2020 (32,000 to 37,000 of these units are in the Ewa DP area). Without the East Kapolei project, there is expected to be a shortfall of 9,629 to 14,900 residential units by 2020 (Atwater 1995).

## 2.7 Project Phasing

The entire plan will be implemented over an estimated 16-year construction period. The 8,000 residential units will be developed between 1998 and 2013. Residential home production is planned to commence in the southern project area and will expand northward, at an average rate of about 500 units per year. The central park, southern neighborhood park and elementary school site and adjacent residential areas are planned to be constructed during the early phases of development. The neighborhood commercial facilities will be developed as demand dictates. Access from Farrington Highway will be constructed as part of the initial development phase. The project is expected to commence in 1998 when final regulatory approvals have been granted.

It should be noted that the overall feasibility of the East Kapolei project is not dependent on the final outcome of the proposed Kapolei land exchange between the State and The Estate of James Campbell (i.e., when the University is constructed, where the University is sited and whether the 183-acre land exchange occurs). The project, albeit perhaps 183-acres smaller, can proceed independently of the exchange.



## 2.8 Projected Development Costs

An itemization of the projected total costs is provided in Table 3 below. Total project costs are estimated at about \$233 million.

**Table 3:**  
**Itemization of Total Project Costs**  
**(\$ millions)**

<b>Off-site Infrastructure Costs</b>	
Water	\$13.435
Wastewater	\$9.49
Roads	\$15.0
Drainage	<u>\$16.85</u>
Subtotal	\$54.775
 <b>On-site Infrastructure Costs</b>	
Rough Grading	\$50.0
Roads	\$50.0
Utility fees, etc.	<u>\$78.51</u>
Subtotal	\$178.51
 Total Projected Costs	 \$233.285

## 2.9 Use of Public Funds or Lands

The proposed development will not require any new commitment of publicly supported services and facilities not compensated by increases in tax revenues. No public lands will be used with the following exception. A segment of the project's off-site drainage channel is planned to run along an abandoned cane haul road between West Loch Fairways and the future Asing Park, east of Fort Weaver Road. The right-of-way is owned by the City and under easement to Oahu Sugar Company (OSCo). The easement will terminate since OSCo is being dissolved. The petitioner intends to obtain an easement from the City to construct the off-site channel, after which it intends to dedicate the entire drainage system to the City.

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RELATIONSHIP OF THE PROPOSED PROJECT TO EXISTING  
PUBLIC PLANS, POLICIES AND CONTROLS

**CHAPTER 3**  
**RELATIONSHIP OF THE PROPOSED PROJECT TO EXISTING PUBLIC**  
**PLANS, POLICIES AND CONTROLS**

**3.1 Federal**

The Naval Air Station (NAS) Barbers Point is located about two miles southwest of the project site. NAS Barbers Point has been identified for closure by 1999 by the federal Base Realignment and Closure Commission. Presently, a Barbers Point Reuse Committee is investigating alternative uses for the station, including a State general aviation reliever airport, continued use by the U.S. Coast Guard, and a City and County regional park. The proposed East Kapolei project is not expected to have an impact on plans for reuse of NAS Barbers Point. However, development of regional, recreational or community support facilities at the former air station could have a positive impact on the project, expanding regional amenities available to project residents.

**3.2 State of Hawaii**

**3.2.1 Hawaii State Plan**

The Hawaii State Plan (Chapter 226, HRS, as amended) establishes a set of guidelines for the statewide planning system, and provides the overall theme, goals, objectives, policies and priority guidelines. The following describes the purpose of the State Plan. "...[it] shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies and priorities for the State; provide a basis for determining priorities and human resources, land, energy, water and other resources; improve coordination of federal, 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).

The goals, objectives policies and guidelines of the Hawaii State Plan are, on occasion, in competition with one another. As a result, the proposed project supports some of the goals, while it is inconsistent with others. The following analyzes the project's impacts with respect to relevant State Plan goals, objectives, policies and priority guidelines:

Section 226-5 Objectives and policies for population.

*Section 226-5(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.*

*Section 226-5(b)(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.*

*Section 226-5(b)(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.*

**Discussion:** The proposed project is located in the Ewa-Kapolei region of west Oahu, designated in State and City and County policies as Oahu's "second city." The second city concept encourages future population growth and the development of employment centers within this region. In support of further urban development in Ewa-Kapolei, the City and County of Honolulu is planning a major County facility at the Kapolei Civic Center and the provision of regional municipal services such as police and fire stations. The State of Hawaii has plans for major highway improvements, including construction of the North-South Road; and has jointly constructed over 4,000 residential housing units at Kapolei. The development of the East Kapolei project is consistent with ongoing public and private efforts to develop a new urban center in the region.

Section 226-7 Objectives and policies for the economy - agriculture.

*Section 226-7(a)(1) Continued viability in Hawaii's sugar and pineapple industries.*

*Section 226-7(a)(2) Continued growth and development of diversified agriculture throughout the State.*

*Section 226-7(b)(6) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs*

**Discussion:** The proposed project site was until recently used by Oahu Sugar Company (OSCo) for sugarcane cultivation. However, in 1995, OSCo ceased operations for reasons unrelated to the project, and therefore, the project will have no impact on plantation agriculture. Over the longer term, the project will not limit the growth of

diversified agriculture, since far more agricultural land has been released from plantation agriculture than has been absorbed by other activities. Ample prime agricultural land and water is available on Oahu and Statewide.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes and  
Section 226-16 Objectives and policies for facility systems - water.

**Section 226-15(b)(1)** *Encourage the adequate development of sewerage facilities that complement planned growth.*

**Discussion:** The City and County Department of Wastewater Management is master planning the wastewater system for a region which includes the project site, bounded by Kapolei to the west, West Loch Estates to the east, H-1 Freeway to the north and the Ewa Villages to the south. A sewer system for the project will be provided to collect and transport sewage to the Honouliuli Wastewater Treatment Plant. A wastewater collection system master plan for the East Kapolei project and vicinity is being reviewed by the City Department of Wastewater Management.

**Section 226-16(b)(1)** *Coordinate development of land use activities with existing and potential water supply.*

**Discussion:** As with the wastewater system, a water master plan, encompassing the project region was prepared and reviewed by the Honolulu Board of Water Supply in 1995. A December 1995 addendum report has been prepared specifically for the East Kapolei project, to identify the potable water system components that would be required to serve the development. That report is being reviewed by the Board of Water Supply.

Section 226-18 Objectives and policies for facility systems--energy/telecommunications.

**Section 226-18(c)(3)** *Promote prudent use of power and fuel supplies through conservation measures including education and energy efficient practices and technologies.*

**Section 226-18(c)(4)** *Promote cost-effective conservation through adoption of energy efficient practices and technologies.*

**Discussion:** The project will comply with all City and County building codes and ordinances applicable to residential structures. Energy efficient practices and technologies and energy conservation measures will be incorporated where feasible.

The transportation sector has been identified as the single largest consumer of energy in the State. The project will enhance the development of the "second city" in Ewa-Kapolei, which is intended to reduce the need for automobile commuting between downtown Honolulu and suburban Oahu. It is expected that many project residents will also work in the Ewa-Kapolei region, eliminating the need for lengthy home-work commuting. As the Kapolei region further develops its residential, commercial and other support facilities, overall automobile commuting and therefore, fossil fuel consumption will be reduced even further.

Section 226-19 Objectives and policies of socio-cultural advancement--housing.

**Section 226-19(a)(1)** *Greater opportunities for Hawaii's people to secure reasonably priced safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals.*

**Section 226-19(a)(2)** *The orderly development of residential areas sensitive to community needs and other land uses.*

**Section 226-19(b)(3)** *Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style and size of housing.*

**Discussion:** The primary objective of the proposed project is the provision of housing opportunities. At full build-out, the project will provide approximately 8,000 new homes for Oahu residents, 30 percent of which will be affordable to families earning from 80 to 120 percent of median income. The development will include a variety of housing types, including market-priced single family homes and townhomes; and both market and affordable multi-family units. The project's location in the expanding Ewa-Kapolei "second city" ensures that adequate public and community services as well as employment opportunities are accessible to residents.

Section 226-21 Objective and policies for socio-cultural advancement--education.

**Section 226-21(b)(2)** *Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.*

**Section 226-21(b)(5)** *Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.*

**Discussion:** The project will include the provision of two eight-acre sites for new elementary schools and a nine acre portion of an intermediate school to serve the project

and surrounding areas. It is assumed that the adjacent landowner, the State of Hawaii, will provide an additional nine acres to allow eventual development of the intermediate school. In addition, the State has plans to construct a University of Hawaii-West Oahu campus in the Kapolei region. These proposed projects will ensure that the community has accessible educational facilities, ranging from the primary to post-secondary higher education. The applicant intends to work closely with the State DOE to ensure adequate school facilities are developed in a timely manner to meet the needs of the East Kapolei community.

### 3.2.2 State Functional Plans

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

The plans set forth "...the policies, statewide guidelines, and priorities within a specific field of activity, when such activity or program is proposed, administered, or funded by an agency of the State" (Section 226-2 [10] Hawaii Revised Statute). Each functional plan contains objectives to be achieved and policies to be pursued within the specified areas. "...Such policies shall address major programs and the locations of major facilities" (Section 226-57 (b) HRS).

The State Functional Plans have been adopted by the Hawaii State Legislature. The State Plan mandates that these plans "...shall be taken into consideration in amending the county general plans" (Section 226-52 (a)(3) HRS). The project generally supports the objectives and policies of the following State Functional Plans:

#### State Housing Functional Plan

The Housing Finance and Development Corporation coordinated the preparation of this functional plan. The Plan includes homeownership, rental housing and rental housing for the elderly and other special need groups as issue areas.

#### Issue area: Homeownership

**Policy A(2):** *Encourage increased private sector participation in the development of affordable for-sale housing units.*

**Policy A(3):** *Ensure that (1) housing projects and (2) projects which impact housing provide a fair share/adequate amount of affordable homeownership opportunities.*

**Discussion:** The project, which is being proposed by a private developer, will include up to 2,400 units (30 percent of 8,000 units) at prices affordable to families earning up to 120 percent of City and County median income.

#### State Transportation Functional Plan

The preparation of the Transportation Functional Plan was coordinated by the State Department of Transportation.

#### Issue Area I. Congestion

**Policy LB.1.:** *Close the gap between where people live and work through decentralization, mixed zoning and related initiatives.*

**Implementing Action LB.1.a.:** *Promote the development of the Ewa Second City to provide jobs near homes.*

**Implementing Action LB.1.c.:** *Promote the development of homes near jobs.*

**Discussion:** The project will provide residential opportunities in the East Kapolei area of the second city, to support ongoing efforts to close the gap between living and work areas. Both the State and City and County have plans to develop public services and expand employment centers in Kapolei-Ewa to support the second city concept.

#### 3.2.3 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 (LUC), pursuant to Chapter 205, HRS. The majority of the East Kapolei project area is in the Agricultural district, with the exception of a small, triangular-shaped "notch" along the southern boundary of the project area (Figure 7). This 0.5 acre parcel, adjacent to Ewa Villages, is in the Urban District. A petition for a Land Use District Boundary Amendment was filed in September 1994 by the Governor's Office of State Planning which included the 183-acre State-owned portion of the project (Docket No. A94-708). This petition is still pending before the Land Use Commission, though it may be withdrawn. A petition to urbanize the Agricultural District portion of the application area will shortly be submitted to the LUC by the applicant.



# CORRECTION

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

**Policy A(3):** *Ensure that (1) housing projects and (2) projects which impact housing provide a fair share/adequate amount of affordable homeownership opportunities.*

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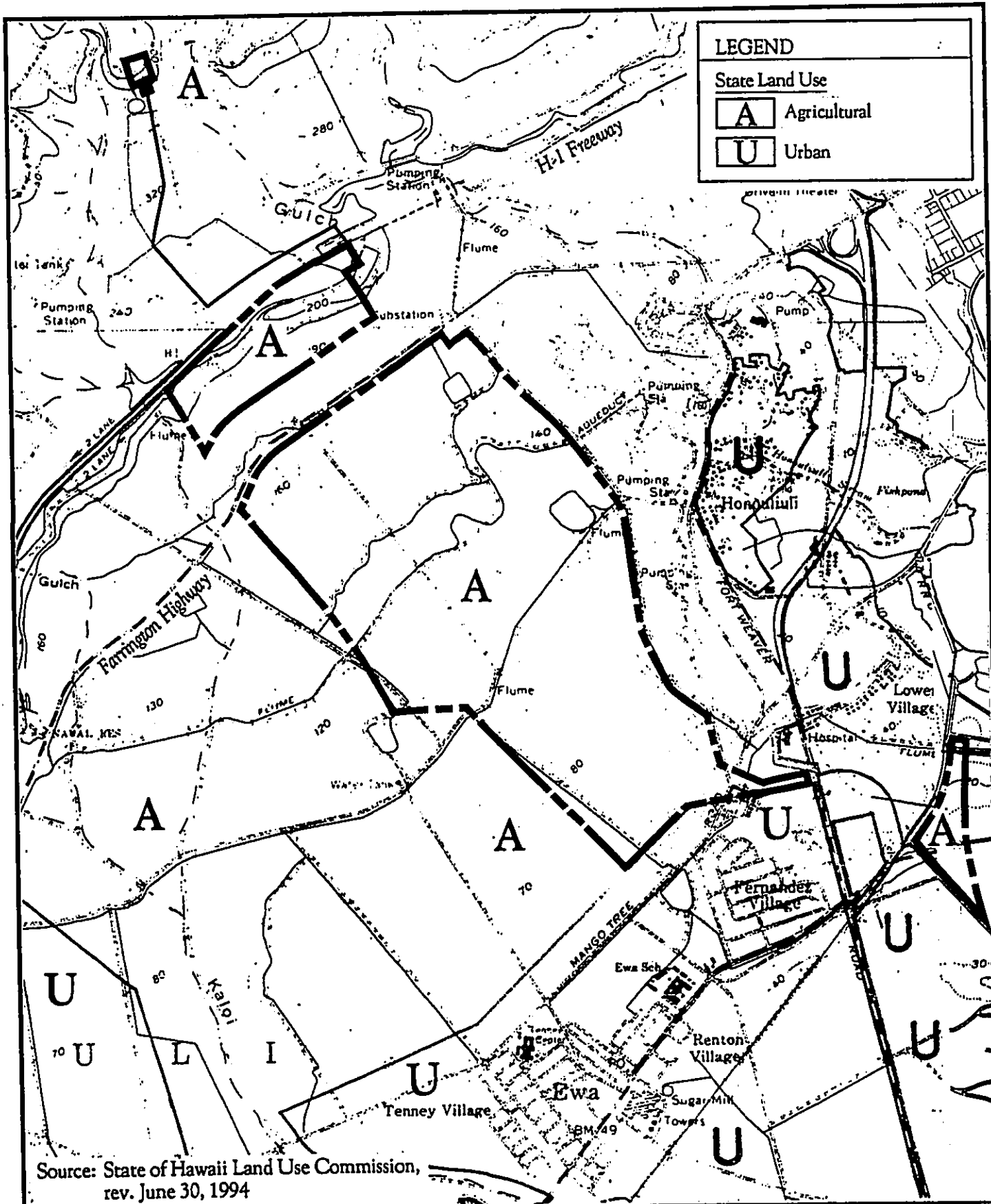
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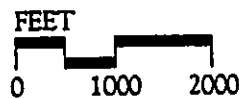
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**State Land Use District Boundary Map**

**EAST KAPOLEI PROJECT**

Schuler Homes, Inc.



Helber Hastert & Fee, Planners

Figure

**7**

The State Land Use Commission Rules, adopted October 1986 and now in the process of revision, require that an application for a boundary amendment show that it is "reasonable, not violative of Section 205-2[HRS] and consistent with the policies and criteria established pursuant to Sections 205-16, 205-17 and 205A-2, HRS." (Hawaii Land Use Commission Rules, Section 15-15-77). In reviewing petitions for reclassification of district boundaries, the Commission must specifically consider four criteria. The criteria are presented below, in italics, followed by a brief discussion of each criterion.

- (1) *The extent to which the proposed reclassification conforms to the applicable goals, objectives and policies of the Hawaii State Plan and relates to the applicable priority guidelines of the Hawaii State Plan and the adopted functional plans;"*

**Discussion:** The project conforms to most applicable goals, objectives and policies and the guidelines of the State Functional Plans. Because of their competing nature, the project is not necessarily consistent with all policy areas.

- (2) *The extent to which the proposed reclassification conforms to the applicable district standards.*

**Discussion:** The applicable standards for the Urban District are found in Section 15-15-18 of the Land Use Commission Rules. The project is consistent with the urban standards, including the proposed "city-like" concentration of people and other related land uses, and proximity to employment centers. Services such as sewers, water, sanitation, schools, parks and police and fire protection are or will be available to serve the project. The application area includes lands with satisfactory topography, drainage, which are reasonably free from danger of any flood, tsunami, unstable soil condition, and other adverse environmental effects. The project area is contiguous with existing urban areas to the south and proposed urban areas to the west. The area is indicated for future urban use by the Governor's Office of State Planning (August 1995) and proposed revisions of the City & County of Honolulu's Ewa Development Plan (Planning Department June 1995). The Ewa-Kapolei region has been designated as a primary future urban growth center on State and County General Plans.

- (3) *Impact on Areas of Statewide Concern:*
- *Preservation or maintenance of important natural systems and habitats;*
  - *Maintenance of valued cultural, historical, or natural resources;*
  - *Maintenance of other natural resources relevant to Hawaii's economy including, but not limited to agricultural resources;*
  - *Commitment of state funds and resources;*

- *Provision of employment opportunities and economic development; and,*
- *Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups.*

**Discussion:** There are no threatened or endangered species, or significant historic or archaeological resources within the project area. The Department of Land and Natural Resources, State Historic Preservation Division has concurred that the project will have "no effect" on historic sites (Hibbard 1995). Although the site is on prime agricultural land, former sugar cultivation was terminated for reasons unrelated to the project. As such, the project will have no impact on sugar operations, nor will the project have an adverse impact on the growth of diversified agriculture. (Decision Analysts Hawaii, Inc. 1995). The project is being proposed by a private development firm, and no state funds or resources are being sought. The development of up to 8,000 residential units will provide housing opportunities for all income groups. Thirty percent of the units will be affordable to families earning up to 120 percent of (City and County of Honolulu) median income.

- (4) *In establishing the boundaries of the districts in each County, the commission shall give consideration to the General Plan of the County in which the land is located.*

**Discussion:** The Honolulu General Plan, discussed in Section 3.3 below, provides a general population distribution for the year 2010 for each of the Development Plan areas on Oahu. A population policy of the General Plan is to encourage development within the secondary urban center at Kapolei and to meet housing needs not readily provided in the primary urban center. As noted by the City's Chief Planning Officer (letter dated December 29, 1995, see Chapter 12), "The project is consistent with the existing City General Plan and Development Plan policies to direct growth to Ewa and to promote development of a secondary urban center in Kapolei."

#### 3.2.4 Governor's Office of State Planning's Five-Year Boundary Review

The Governor's Office of State Planning (OSP) has recently completed an update of its 1991-92 Boundary Review entitled *2020 Growth Scenarios for Oahu* (OSP August 1995). The new study examines urban land requirements to the year 2020, ten years beyond the 1991-92 review, and reiterates State policy to direct future growth toward Ewa and Central Oahu. The Ewa District is identified as a priority area for urbanization for a number of reasons:

- Its proximity to Honolulu and surrounding employment centers (Campbell Industrial Park, Kapolei, Ko Olina) makes it a logical extension of growth from the Primary Urban Center.

- The Ewa Plain's subterranean caprock would protect groundwater supplies from being contaminated by urban-related uses.
- The City and County of Honolulu encourages development in Ewa and Central Oahu to relieve urbanization pressure from urban fringe and rural areas.

The updated study projected the need for urban land under two scenarios: "high urban" and "moderate urban." In light of the identified need for a additional urban lands, and the appropriateness of the project, the study specifically recommends the urbanization of the project area under both projection scenarios.

### 3.2.5 Environmental Impact Statements, Chapter 343, Hawaii Revised Statutes (HRS)

Section 343-5 (a)(6), HRS notes that the provisions of Chapter 343 apply to "any amendment to existing county general plans where the amendment would result in designations other than agriculture, conservation or preservation..." A State Attorney General opinion (Opinion No. 85-30) has broadened the scope of the definition of county general plans to include "...non-county initiated actions which propose amendment or change to a county's planning documents, however denominated, and development plans or otherwise, and which would result in a designation other than agriculture, conservation or preservation."

A Final Environmental Impact Statement was prepared for the previous East Kapolei concept plan in April 1995 and subsequently accepted by the Planning Department on May 11, 1995. That FEIS was in support of the previous application for an amendment to the Ewa Development Plan (DP) Land Use Map. In response to City Planning Department concerns over several issues, the East Kapolei project's boundaries and concept plan have been revised.

As with the previous application, the action requested by this current application will result in an amendment to the Ewa DP Land Use Map from the agricultural designation to the Low-Density Apartment, Parks and Recreation, Commercial and Public and Quasi-Public designations. As such, the provisions of Chapter 343 apply to the project. By letter dated November 9, 1995, the City Planning Department ("accepting agency") notified the Office of Environmental Quality Control (OEQC) that it had determined that an Environmental Impact Statement (EIS) was required for the proposed subject project. Notice of this determination was published in November 23, 1995 edition of *The Environmental Notice*. The publication of this notice began a 30-day public review period which ended on December 23, 1995.

A list of agencies, organizations and individuals consulted during preparation of the Draft EIS is found in Chapter 12 of this document. The chapter also contains reproductions of written comments on the EIS Preparation Notice and the applicants responses to the comments.

The DEIS was published in January 1996 and notice of availability was published in the January 23, 1996 edition of *The Environmental Notice*. This began a 45-day public comment period that ended March 8, 1996. Chapter 13 contains a listing of agencies, organizations and individuals who received copies of the DEIS. It also contains written comments received in the preparation of the Final EIS.

### 3.2.6 Coastal Zone Management/SMA Rules and Regulations

Objectives and policies of the Coastal Zone Management Program are described in Chapter 205A-2, Hawaii Revised Statutes (HRS), Part I. The site lies within the State's Coastal Zone Management Area, which includes all lands within the State with the exception of forest reserves. Potential impacts to the coastal zone relate to storm drainage and wastewater disposal. Impacts resulting from project storm drainage will be mitigated by compliance with National Pollutant Discharge Elimination System (NPDES) permit conditions. Wastewater generated from the project will be appropriately treated at the municipal Honouliuli wastewater treatment plant prior to deep ocean discharge.

Special Management Area guidelines are found in Part II of the same chapter. The site lies approximately 2.6 miles from the coastline (0.75 miles from Pearl Harbor) at its nearest point, and is well outside the City and County's Special Management Area. A Special Management Area use permit is not required.

The project's conformance with policies and objectives of the Coastal Zone Management Program is discussed below:

#### Recreational Resources

**Objective:** *Provide coastal recreational opportunities accessible to the public.*

**Discussion:** The project will provide two 6-acre neighborhood park sites, a 2-3 acre mini-park, and a 20-acre central park, all of which will be dedicated to the City and County of Honolulu. The total of 35 acres exceeds the City and County Park Dedication Ordinance requirements for this type of development. Additional recreation and open space areas such as bikeways and private mini-parks will be provided to meet other City and County standards. The project will have a limited, indirect impact on ocean

recreational resources (i.e., Ewa beach parks) due to the project's added residential population.

#### Historic Resources

**Objective:** *Protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.*

**Discussion:** The project area has had extensive agriculture-related land modification during the last century, and there are no known historic, cultural or archaeological resources within the area. The Department of Land and Natural Resources, State Historic Preservation Division has concurred that the project will have "no effect" on historic sites.

#### Scenic and Open Space Resources

**Objective:** *Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources.*

**Discussion:** The project will alter the visual resources along Farrington Highway, the H-1 Freeway and from the Ewa Villages and *makai* areas. Present agricultural uses and open space will diminish as new urban uses are developed. The design and landscaping of the proposed development will minimize adverse visual impact. Setbacks and landscaping will be provided along major roadways, and a bikeway network will provide direct links between the residential areas and major community facilities. The three neighborhood parks and 20-acre central park will provide additional open space. Buildings will be no higher than three stories.

#### Economic Uses

**Objective:** *Provide public or private facilities and improvements important to the State's economy in suitable locations.*

**Discussion:** The East Kapolei residential project is appropriately located in the "second city" of Kapolei, which has been identified for future urban growth and development. The project will not have a significant adverse economic impact on the coastal zone.



Coastal Ecosystems

**Objective:** *Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.*

**Discussion:** The project drainage system will not have significant adverse impact on coastal ecosystems, including the National Wildlife Refuge West Loch unit. The analysis and supporting documentation for this conclusion is provided in the Ewa by Gentry-East Offsite Drainage Plan EA and EIS (latter accepted by the City Department of Land Utilization on 10/31/95). A discussion of the environmental issues related to the regional drainage facility is provided in Section 6.4, Drainage.

Coastal Hazards

**Objective:** *Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion and subsidence.*

**Discussion:** The project structures and drainage system will comply with all flood zone criteria. The site is not within the coastal high hazard area.

Managing Development

**Objective:** *Improve the development and review process, communication and public participation in the management of coastal resources and hazards.*

**Discussion:** The project requires a Land Use District Boundary Amendment and Development Plan Land Use Map amendment. Required environmental documentation has been prepared and is undergoing public review.

Public Participation

**Objective:** *Disseminate public information on coastal issues.*

**Discussion:** As part of the environmental review process for the Land Use District Boundary amendment and DP Land Use Map amendment, information on the project's coastal impacts and mitigation measures will be available to the public for review and comment.

Beach Protection

**Objective:** *Locate structures and improvements to minimize beach erosion and minimize interference with recreational and waterline activities.*

**Discussion:** Project drainage structures will not interfere with public recreational and waterline activities, or result in beach erosion.

**3.3 City and County of Honolulu**

**3.3.1 General Plan**

The General Plan for the City and County of Honolulu was adopted in 1977 and has been subsequently amended, most recently in 1992. 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. The Plan is also a statement of broad policies which facilitate the attainment of the objectives of the plan.

Population

A population policy of the General Plan is to "encourage development within the secondary urban center at Kapolei and the Ewa and Central Oahu urban-fringe areas...to meet housing needs not readily provided in the primary urban center."

The following Table 4 compares the General Plan's population growth guidelines with population projections for Ewa, for the years 2010 and 2020. The figures are based on a projected Oahu-wide population of 1,012,100 persons in the year 2010, and 1,071,200 persons in the year 2020 (Planning Department, Preliminary Data 1995).

**Table 4:  
Year 2010 and 2020 Population in Ewa: Policy vs. Projection**

	<u>Share of Island Population</u>	<u>Population</u>
<b>Year 2010</b>		
General Plan Policy	12.0% - 13.3%	121,452 to 134,609
Planning Dept. Forecast*	10.2%	103,300
<b>Year 2020</b>		
General Plan Policy	12.0% - 13.3%	128,544 to 142,470
Planning Dept. Forecast*	11.7%	124,800

\*Preliminary Data, Honolulu Planning Department 1995. Population forecast includes DP approved and proposed projects, including East Kapolei.

Source: Planning Department

The East Kapolei project will result in about 8,000 additional residential units and up to 22,400 residents in the Kapolei/Ewa area at project build-out. As shown in the table, City planners project that even with the East Kapolei development, the population of the Ewa area is expected to fall below General Plan guidelines for the years 2010 and 2020.

#### Economic Activity

An economic activity objective is to "maintain the viability of agriculture on Oahu." A related policy is to "provide sufficient agricultural land in Ewa, Central Oahu...to encourage the continuation of sugar and pineapple as viable industries."

The East Kapolei site is comprised of fallow agricultural land which is has been removed from cultivation for economic reasons unrelated to the project. As a result, the development will not have an adverse impact on sugar cultivation or the sugar industry.

#### Housing

Housing objectives in the General Plan include the provision of decent housing for all the people of Oahu at prices they can afford and the provision of housing that is reasonably close to employment, recreation and commercial centers. The East Kapolei Project will include a mix of multi-family townhomes and condominium apartments, as well as single family homes. Approximately 30 percent of the units will be affordable to families earning up to 120 percent of County median income. The project's location in the Ewa-Kapolei

“second city” ensures that support services, commercial areas and centers of employment will be located in close proximity for residents.

### Transportation and Utilities

General Plan objectives include the provision of adequate roadways, water supplies and waste disposal, and the desire to maintain a high level of service for all utilities. Project access will be via Farrington Highway until completion of the North-South Road and freeway interchange. The new North-South Road, H-1 Freeway interchange and proposed improvements to Farrington Highway will ensure that roadways are provided to meet the area’s regional transportation needs. The project will provide adequate water, wastewater, drainage, electrical and other utility services, which will be designed and constructed to meet all City and County standards.

### 3.3.2 Development Plan

The City and County of Honolulu'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 DP areas have been established on Oahu, including the Ewa DP area where the project is located. The Ewa DP area encompasses the coral plain which stretches from the Central Oahu district boundary at Waipahu and Pearl Harbor, around the southwestern corner of the island, to Nanakuli. The Ewa Development Plan is codified as Ordinance No. 81-80, as amended, Revised Ordinances of Honolulu.

The City’s DP Program is undergoing comprehensive revisions based on amendments to the City Charter adopted in the 1992 General Election and the General Plan. The Planning Department is now finalizing the Ewa and Central Oahu DP’s, which will then be considered by the Planning Commission and City Council prior to adoption. While the applicant has closely considered the proposed recommendations for the Ewa DP, the current DP process is still being followed.

The DP Ordinance consists of four elements: Common Provisions (applicable for all DP regions), Special Provisions, DP Land Use Maps and DP Public Facilities Maps (for each DP region).

#### (1) Common Provisions

Section 24-1.3 of the DP Common Provisions describes the various land use categories found within each of the eight DP regions. The following describes the DP Common Provision land use categories requested in this application:

Low-Density Apartment

"Except as otherwise specified in the special provisions of each development plan, low-density apartment areas are for low-rise, low-density multi-family residential structures."

Parks and Recreation

"Parks and recreation include all public parks and recreational facilities, including beach parks, playgrounds, playfields, district parks, botanical gardens, zoos, golf courses and pedestrian malls as well as privately owned and/or operated park and recreational facilities which are provided as integral parts of developments."

Commercial

"Except as otherwise specified in the special provisions of each development plan, commercial areas are principally for business or commercial activities, in contrast to other types of economic activities. Limited accessory uses directly related to the principal uses may also be permitted but only on the same lot and not as a principal use."

Public and Quasi-Public

"Public and quasi-public areas include those areas designated for general governmental activities; schools, colleges and universities; airports, harbors, bus yards and other terminals; major health care facilities; major utility plants and substations; landfill sites, corporation yards and maintenance yards of public agencies; religious, social and social service institutions; and other public services."

Section 24-1.10 of the DP Common Provisions contains a set of social impact factors which are used in evaluating any proposed development as they pertain to the objectives of the general plan (see related discussion in Chapter 5).

(2) Special Provisions

The DP Special Provisions for Ewa set forth urban design considerations for development within the district for open space and public views. Open space urban design considerations state that the "visibility, preservation, enhancement and accessibility of open space areas as defined in Section 24-1.4 of the development plan common provisions shall be given high priority in the design of adjacent and nearby developments in Ewa..." The discussion of public views states "In order to promote pleasing and attractive living

environments in existing and new neighborhoods, *mauka* and *makai* views, and views of central Honolulu shall be protected whenever possible."

The proposed residential development will include landscaping and open space, and maintain views where possible. The proposed residential units will be set back from major roadways and will be no higher than three stories in height. Public open spaces including parks will be provided in accordance with Development Plan Common Provisions and Park Dedication Ordinance requirements.

Section 24-3.2(a)(3) and (4) of the Special Provisions for Ewa establish the following general residential height and density controls:

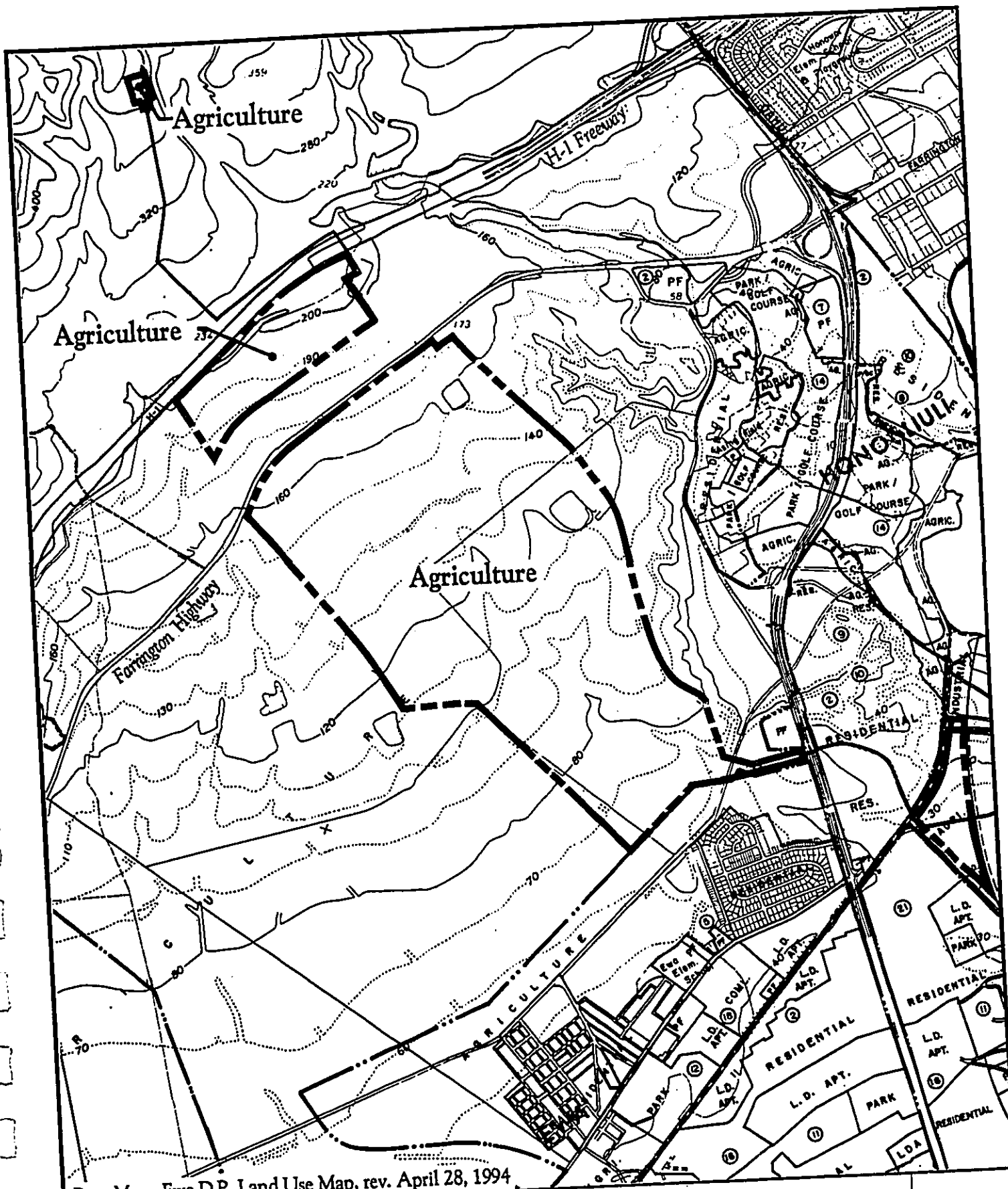
DP Land Use	Height Limit (feet)	Density Limit (units/net acre)
Residential	25	12
Low Density Apt.	30	30

As stated previously, the project will include both single family units at about 7 units/acre, townhomes at 11 units/acre and affordable multi-family homes in the 20 units/acre range. In order to maintain maximum design flexibility, the applicant has requested designation of all residential areas of the project within the Low Density Apartment category, which will allow three-story building heights and densities up to 30 units per net acre.

The applicant proposes the establishment of a new "Special Area" for the project district. Specific language is included in Appendix N.

(3) DP Land Use Map

The entire project area is designated Agricultural on the Ewa DP Land Use Map (Figure 8). The proposed DP Land Use Map designations based on the preliminary concept plan are presented in Figure 9. Requested land use designations are identified in Table 5 below.



Base Map: Ewa D.P. Land Use Map, rev. April 28, 1994

**Existing D.P. Land Use Map**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.

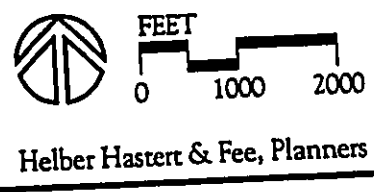
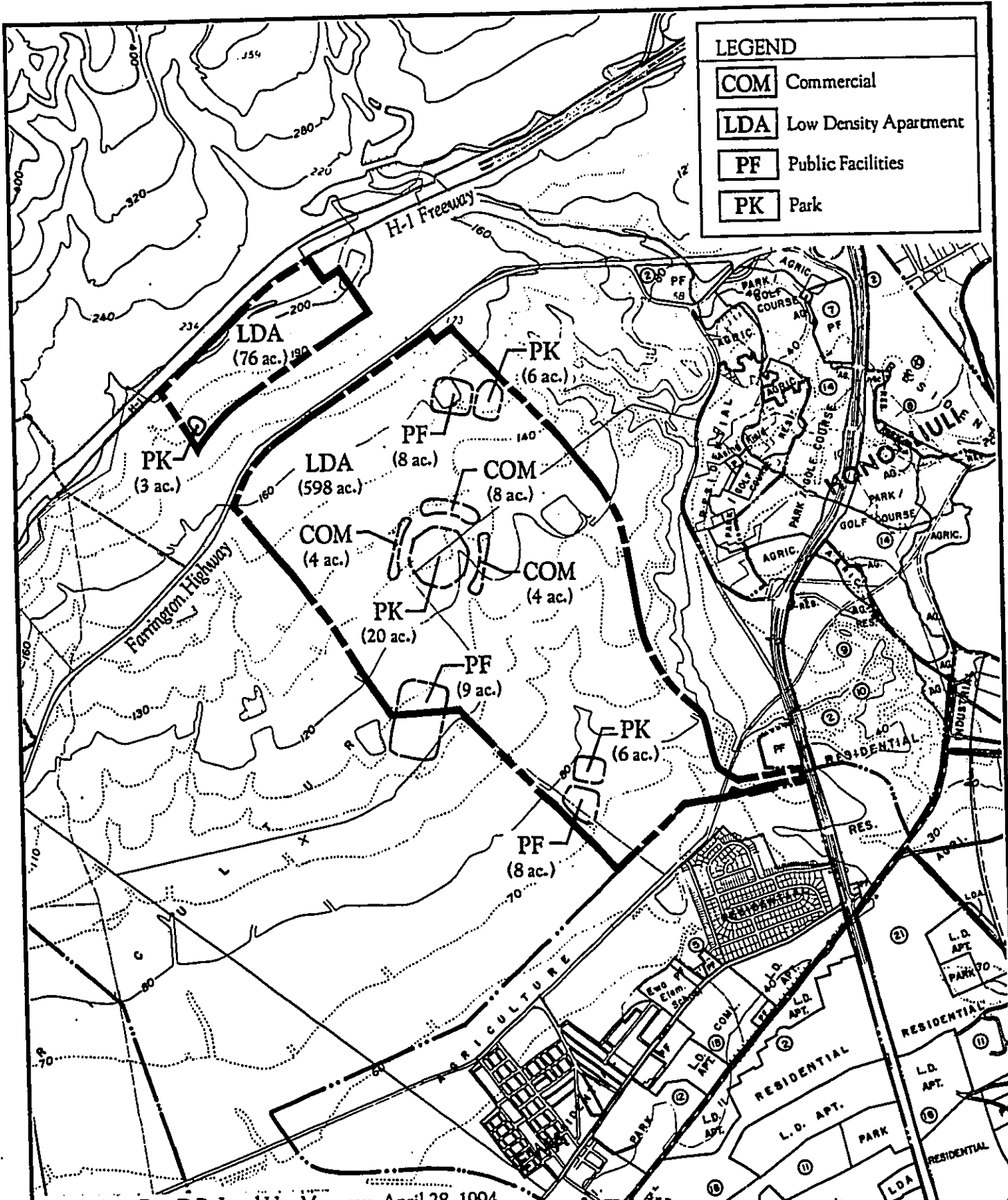


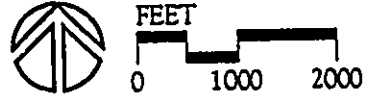
Figure  
**8**



LEGEND	
COM	Commercial
LDA	Low Density Apartment
PF	Public Facilities
PK	Park

Base Map: Ewa D.P. Land Use Map, rev. April 28, 1994

**Proposed DP Land Use Map**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.



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Figure  
**9**



**Table 5:  
Requested Development Plan Land Use Designations and Acreages**

<u>Land Use Category</u>	<u>Total Acres</u>
Low Density Apartment	674
Commercial	16
Public and Quasi-Public	25
Parks and Recreation	<u>35</u>
Total (Application Area)	750
Off-Site Infrastructure	<u>43</u>
Total (Project Area)	793

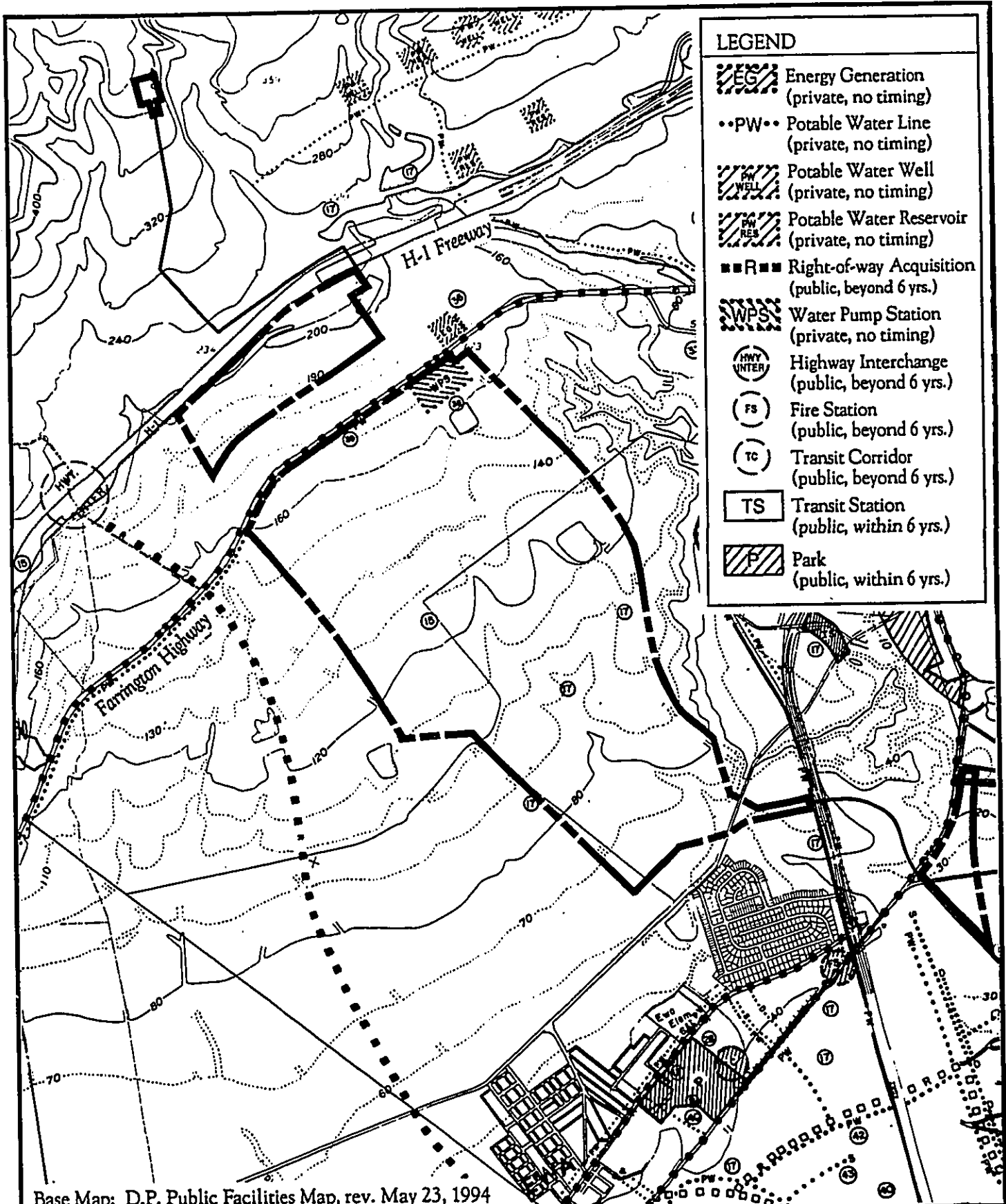
(4) DP Public Facilities Map

The DP Public Facilities Map for Ewa (Figure 10) indicates planned and ongoing improvements to roadways, water and wastewater facilities in the vicinity of the area of application area. A description of the various proposals is summarized below. Public Facility map amendments necessary to support this application will be submitted in 1996.

Public Funding, Programmed Beyond Six Years

The Public Facilities map (revised May 23, 1994) indicates a north-south access road along the western boundary of the project area; intent to acquire rights-of-way for the North-South Road/H-1 freeway interchange and widening of Farrington Highway beyond six years. Hawaiian Electric Co. has completed the Ewa Nui Substation across Farrington Highway from the northeast corner of the site, and the former Ewa substation has been removed.

The alignment of the North-South Road shown on the project concept plan varies slightly from the alignment shown on the DP Public facilities map. However, the concept plan alignment is consistent with the Department of Transportation Service's current plans for North-South Road.

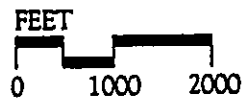


Base Map: D.P. Public Facilities Map, rev. May 23, 1994

**Existing D.P. Public Facilities Map**

**EAST KAPOLEI PROJECT**

Schuler Homes, Inc.



Figure

**10**

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Private Funding

Construction of a water pump station/booster pump has been completed by The Estate of James Campbell near the northeastern corner of the main project area. The booster pump and proposed potable water transmission line along Farrington Highway will serve the City of Kapolei.

3.3.3 Honolulu Land Use Ordinance

According to the City and County of Honolulu Land Use Ordinance and Zoning Maps, the entire project area is zoned AG-1, Restricted Agricultural. An application for rezoning the application area to support proposed residential development will be submitted to the City in 1996.

3.3.4 Resolution No. 94-296

Resolution No. 94-296 was adopted by the Honolulu City Council on December 1, 1994. The resolution established a new objective and policies for storm water management of the City and County of Honolulu. The objective of the storm water management policy is to "achieve a net decrease in the volume and rate of storm water runoff, to increase infiltration to groundwater supplies, and to improve the quality of storm water entering surface and groundwater supplies and receiving water."

Its policies include:

1. No overall increase in the peak flow level and volume of storm water runoff into receiving waters designated water quality limited segments by the State Department of Health by requiring that "other new developments" achieve, where feasible, no increase in storm water runoff;
2. To encourage all levels of government, agencies and developers to employ methods of retaining or detaining storm water for gradual release into the ground, as the preferred strategy for the management of storm water;
3. To require, where feasible, permanent best management practices and engineering controls at developments to reduce the discharge of pollutants in runoff into the municipal storm sewer systems; and

4. To utilize, where feasible, any open space, including parking lots, landscaped areas, mini and community parks, and golf courses, private and public, to detain or infiltrate storm water flows to reduce their volume and runoff rates.

The East Kapolei project is confined to the West Loch drainage basin. The project will provide an on-site drainage system and a channel connecting to an existing detention basin and the new Ewa by Gentry-East facilities south of the West Loch Fairways subdivision.

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ASSESSMENT OF EXISTING CONDITIONS,  
PROBABLE IMPACTS AND MITIGATION:  
PHYSICAL ENVIRONMENT

**CHAPTER 4**  
**ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND**  
**MITIGATION: PHYSICAL ENVIRONMENT**

**4.1 Climate**

The Ewa area is semi-arid and one of the sunniest areas on Oahu. Rainfall averages just slightly over 20 inches per year. Average low temperatures range from about 60 degrees Fahrenheit in the winter to about 70 degrees in the summer. Average high temperature ranges from just under 80 degrees in winter to just under 90 degrees in the summer. Surface winds are dominated by the northeast tradewinds. Low velocities (less than 10 mph) occur frequently, and the trades tend to break down in the fall, giving way to more light, variable wind conditions through the winter and into the early spring.

Evaporation rates on the Ewa plains have heretofore only been significant for the purposes of monitoring and estimating water needs for sugarcane crops. Evaporation rates on the Ewa plain are high and primarily driven by wind energy. Due to the fact that the tradewinds will continue to be the primary influence on the climate in the area, it is not anticipated that development of the site will significantly impact regional climatic conditions.

The change in land use from a predominantly agricultural use to a residential use in part results from the closure of Oahu Sugar Company, which has already occurred without the influence of the proposed project. The urbanization of the area will significantly alter the microclimate of the project area from one associated with agriculture to one associated with a fully-developed residential area. Changes in air temperature and/or groundwater recharge which occur when sugar operations cease are not directly attributable to the East Kapolei development.

**4.2 Geology and Topography**

The two major land forms in the Ewa region are the Ewa Plain and the Makakilo upland. The H-1 Freeway and Farrington Highway are the general boundaries of the two land areas. The cinder cones, or *pu'u* along the Waianae Mountain Range form the peaks of that region: Manawahua, Kapuai, Makakilo, Palailai and Kapolei.

The Ewa Plain is an elevated coral reef covered by alluvium. Elevations vary from about 50 feet above mean sea level (MSL) near the southern boundary at Barbers Point to 2,300 feet above MSL at Puu Manawahua, the highest peak in the Ewa region.

The topography of the project area is relatively flat to gently sloping toward the ocean. The highest elevation is at the upper water tank site, about 440 feet above MSL. The lowest elevation is at the West Loch detention basin which lies about 10 feet above MSL (see Figure 11). The developable areas of the site are generally flat with an overall *mauka-makai* grade of about 1.4 percent.

### 4.3 Soils

#### 4.3.1 U.S. Soil Conservation Service

According to the U.S. Department of Agriculture, Soil Conservation Service, soils within the project area include Kunia silty clay (KyA); Honouliuli clay (HxA and HxB); Waipahu silty clay (WzA and WzB); Ewa silty clay loam (EaB); and Molokai silty clay loam (MuB and MuC). The most extensive soil type is HxA (approximately 60 percent) followed by KyA (approximately 20 percent). The major soil types are described below and are shown in Figure 12.

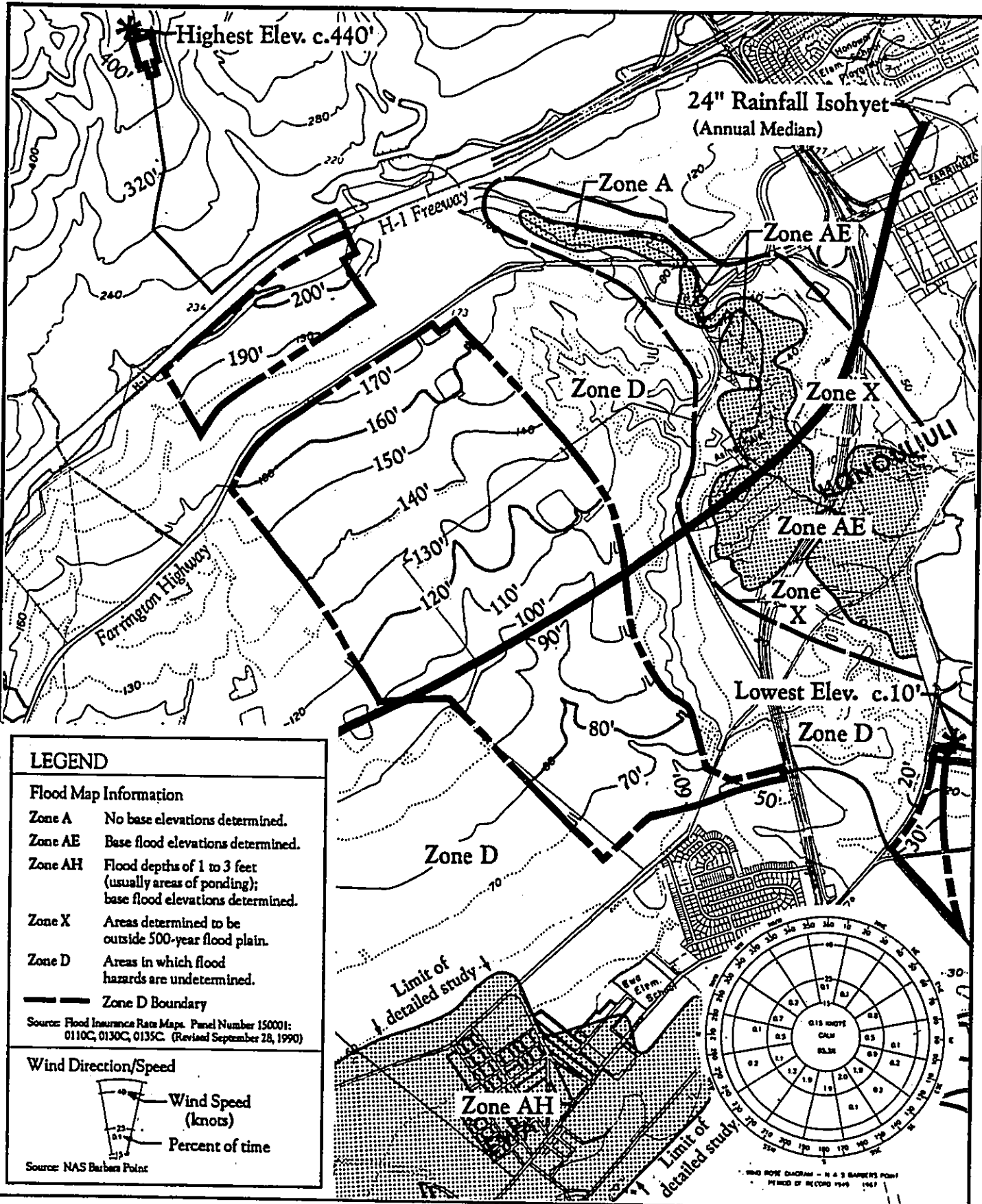
##### Kunia silty clay, 0-3% slopes (KyA)

The Kunia series consists of well-drained soils on upland terraces and fans on the island of Oahu. These soils developed in old alluvium. Kunia silty clay, 0-3% slopes occurs on broad smooth slopes.

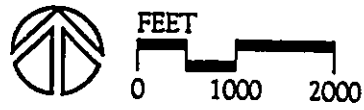
In a representative profile the surface layer is dark reddish-brown silty clay about 22 inches thick. The sub-soil, 40-71 inches thick, is dark reddish-brown silty clay and silty clay loam that has subangular blocky structure. The substratum is dark reddish-brown gravelly silty clay. Permeability is moderate, runoff is slow and erosion hazard no more than slight.

##### Honouliuli clay, 0-2% slopes (HxA) and 2-6% slopes (HxB)

This soil series consists of well-drained soils on coastal plains in the Ewa area of Oahu. This type of soil comprises the majority of the project area. Honouliuli clay soils developed in alluvium derived from basic igneous material. Permeability is moderately slow, runoff is slow and the erosion hazard no more than slight. Workability is slightly difficult because of the very sticky and very plastic clay. The shrink-swell potential is high.



**Environmental Conditions**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.

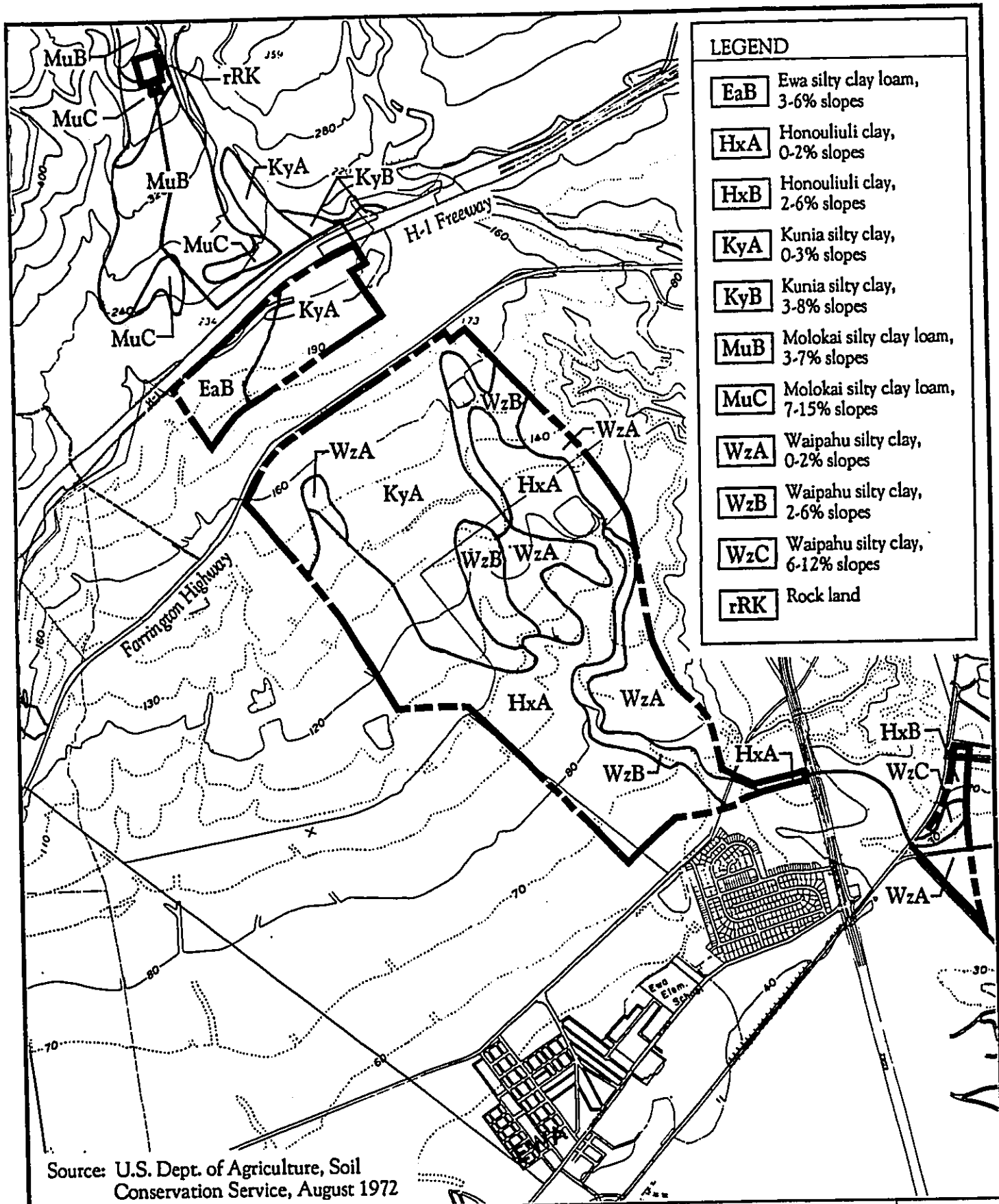


Figure

**11**

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**SCS Soil Survey Map**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.

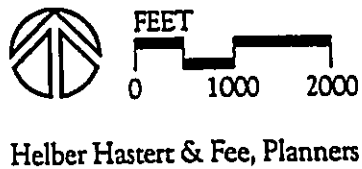


Figure  
**12**

Waipahu silty clay, 0-2% slopes (WzA) and 2-6% slopes (WzB)

This soil series consists of well-drained soils on marine terraces on Oahu. WzA occurs on dissected terraces adjacent to the ocean. Permeability is moderately slow, runoff is slow to very slow and the erosion hazard is none to slight.

Ewa silty clay loam, 3-6% slopes (EaB)

This soil occurs on alluvial fans and terraces. Permeability is moderate, runoff is slow and the erosion hazard slight.

Molokai silty clay loam, 3-7% slopes (MuB) and 7-15% slopes (MuC)

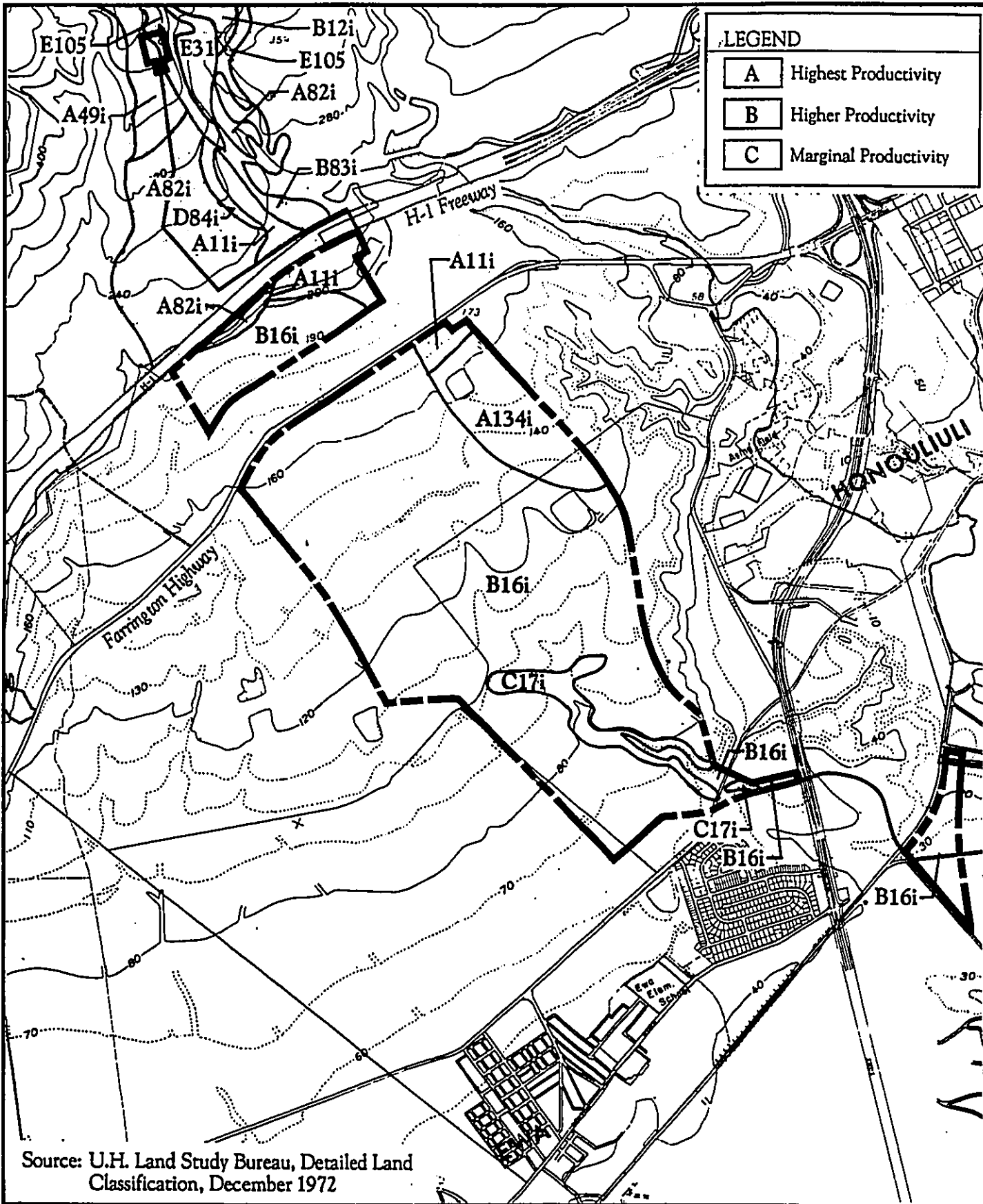
These are well drained soils on upland areas. On this soil, runoff is slow to medium and the erosion hazard is slight to moderate.

4.3.2 U.H. Land Study Bureau Detailed Land Classification

The University of Hawaii Land Study Bureau's (LSB) Detailed Land Classification classifies soils by land type in which classifications are provided for an overall crop productivity rating, with and without irrigation, and for selected crop productivity ratings for seven crops. LSB overall ratings range from A to E, with A being the best. According to the classification, most of the property is Class B or prime agricultural lands, with some Class A land near the western and eastern portions of the project area. There are patches of Class C lands within gully areas and Class E lands in the upper elevations near the water tank site. The LSB classifications are shown in Figure 13.

4.3.3 Agricultural Lands of Importance to the State of Hawaii (ALISH)

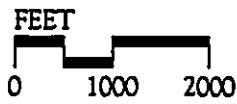
The Agricultural Lands of Importance to the State of Hawaii (ALISH) land classification system was developed by the State Department of Agriculture (1977). The ALISH system identifies three broad classes of lands, including "Prime Agricultural Land," "Unique Agricultural Land" and "Other Important Agricultural Land." As shown in Figure 14, the entire application area is designated "Prime Agricultural Land," defined as land best suited for the production of food, feed, forage and fiber crops...Prime agricultural land gives the highest yields with the lowest inputs of energy or money and with the least damage to the environment."



**UH LSB Soil Productivity Ratings**

**EAST KAPOLEI PROJECT**

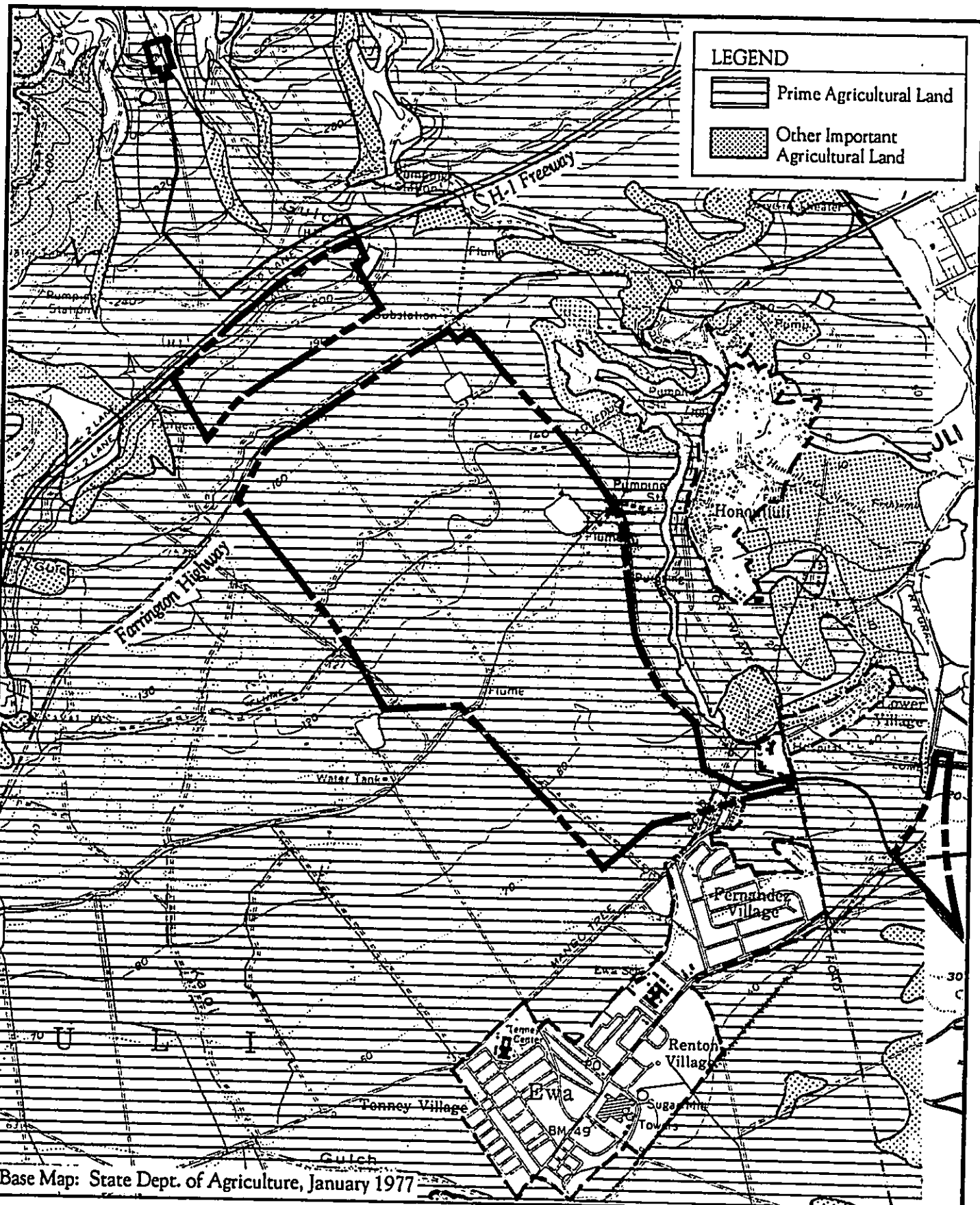
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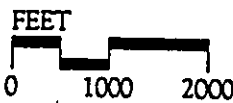
Figure

**13**



Base Map: State Dept. of Agriculture, January 1977

**ALISH Map**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.



Figure

**14**

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#### 4.4 Flooding

##### Existing Conditions

According to the Flood Insurance Rate Maps (Federal Emergency Management Agency 1990) shown in Figure 10, the project area is designated Zone D, areas in which flood hazard is undetermined. The project site is not located within the coastal high hazard area.

The entire project area lies in the West Loch watershed which drains into the West Loch of Pearl Harbor. Drainage conditions and improvements are discussed in Section 6.4.

##### Probable Impacts

As discussed in Section 6.4, Drainage, the project drainage system will be designed to minimize on-site and off-site flooding and downstream flood hazards.

#### 4.5 Water Resources

In 1987, the State enacted the State Water Code in order to protect, control and regulate the use of the State's water resources. The State Commission on Water Resource Management (CWRM) is responsible for the administration of the State Water Code, and has designated water management areas (WMAs) in those areas where water resources may be threatened by existing or proposed withdrawals or diversion. The East Kapolei project area is located within the Pearl Harbor Water Management Area (WMA), the largest groundwater body on Oahu, which supplies over 50 percent of Oahu's municipal water demand. Groundwater withdrawals within the Pearl Harbor WMA are regulated by the CWRM. The City and County Board of Water Supply (BWS) coordinates the development and allocation of potable water for urban use on Oahu.

Current City and State policies encourage the conservation of potable water resources and require the establishment of dual water systems in the Ewa area, to allow the use of non-potable water for irrigation and other appropriate uses. Non-potable systems in single family residential areas are not encouraged due to potential health and liability issues. However, current City policies require development of an adequate non-potable water supply for the project's schools, parks, commercial areas and for irrigation along major roadways. Water efficient landscaping should be used whenever and wherever possible to reduce irrigation demand. BWS has also noted that installation of a dual water system may be an option within multi-family residential areas, to further decrease potable water demand.

The project is located *mauka* of the State Department of Health's Underground Injection Control Line. Most of the project area, with the exception of the *mauka* residential parcel, is located *makai* of the Board of Water Supply's "pass-no pass" line, which runs along *makai* of Farrington Highway. As such, use of non-potable water, particularly in the *makai* parcel would not threaten potable groundwater resources.

#### 4.5.1 Potable Water

There are two primary potential sources of potable water for the East Kapolei project: 1) aquifers within the Pearl Harbor Water Management Area (WMA) and 2) other ground water sources.

##### Pearl Harbor Water Management Area (WMA)

The Pearl Harbor WMA is comprised of 3 aquifers: Waimalu, Waipahu/Waiawa, and Ewa/Kunia. These aquifers are all nearly fully allocated to existing uses with little excess capacity for new development. However, the Honolulu Board of Water Supply (BWS) has noted that excess allocation is potentially available because of the closure of Oahu Sugar Company (OSCo), formerly a major water user in the Ewa area.

OSCo's former basal groundwater allocation could now be available for diversified agriculture or municipal use. However, because of the substantial reduction of agricultural activity and its associated recharge to the underlying basal aquifer, the Pearl Harbor sustainable yield is expected to decrease from its current level of 184 mgd. A reduction in basal allocation is necessary and this will affect the amount of OSCo's allocation that will be made available to other users. The availability of this excess allocation for municipal use depends on a number of factors, including whether Waiahole Ditch water continues to be available for diversified agriculture in the Ewa plain, and CWRM approval for the water's reallocation to urban use.

If a portion of OSCo's freed-up allocation becomes available for municipal use, BWS has identified new well sites in the Pearl Harbor WMA that could utilize over 30 mgd. These municipal and private well sites include, from east to west, Mililani IV, Waiawa I-III, Waipahu III and IV, Kunia III and IV and the Ewa Shaft. (Personal communication, Barry Usagawa, Board of Water Supply).

##### Other Water Sources

If potable water from the Pearl Harbor WMA is not available for the East Kapolei project, a second option would be to develop source from other areas of Oahu, particularly the

North Sector (North Shore) and windward sector. Although additional source is available in these areas, this option is likely to involve significant development and transmission costs. Ecological and environmental issues need to be addressed prior to any regional water development plans.

#### 4.5.2 Non-Potable Water

There are several sources of non-potable water which are being investigated to meet East Kapolei's irrigation requirements. They include: 1) use of treated wastewater effluent; 2) Ewa caprock aquifer; and 3) brackish basal aquifer.

##### Use of Treated Effluent from Honouliuli WWTP

The City Department of Wastewater Management is currently planning to reclaim and make available 10 mgd of treated effluent from the Honouliuli Wastewater Treatment Plant for non-potable water requirements by the year 2001. The City's recently completed *Non-Potable Water Master Plan for Central Oahu* has proposed a 13 mgd secondary treatment facility and a transmission ditch 12,000 feet in length, extending from the Honouliuli WWTP along Geiger Road. A 12,000-foot long backup system is also proposed. The transmission system would provide water to recharge the Ewa caprock aquifer. In fiscal year 1997-98, the City will initiate a year-long pilot project to study the potential for aquifer recharge with reclaimed water, and to evaluate the resulting nearshore water quality impacts. The pilot project will have a capacity of 5 to 6 mgd. If the pilot project indicates the water quality of the Ewa caprock can be improved with effluent recharge with no detrimental effects to nearshore waters, the project will be expanded to provide 13 mgd of recharge, provided that customers can be found to pay for the capital costs of the distribution system and the cost of operating and maintaining the facility and distribution system.

##### Ewa Caprock and Basal Aquifer

Other potential sources of non-potable water include the Ewa caprock and the brackish basal aquifer. On-site wells would be utilized to tap these sources of non-potable water.

The BWS has indicated that at present, the Ewa caprock is over utilized and that salinity levels of caprock water have risen, primarily due to a reduction in recharge following the closure of OSCo, as well as over commitments of the caprock resource. The methods by which the caprock aquifer may be recharged include rainfall, irrigation and basalt leakage. Researchers such as T. Giambellucca, University of Hawaii Water Resources Research Center, have studied Central Oahu and the Ewa Plain and suggested that recharge through

residential and commercial irrigation can be significant in dry areas. In particular, recharge potential was measurable as compared to areas where no irrigation was occurring (i.e., fallow sugarcane fields). The proposed use of reclaimed wastewater for irrigation discussed above provides significant potential for recharge of the caprock aquifer. Pending the results of the City's proposed year-long pilot project, the caprock could receive recharge of up to 13 mgd, restoring it as a source of non-potable water for East Kapolei.

Use of the brackish basal aquifer is also another option for non-potable water, subject to approval by the CWRM. Potential sources of brackish basal water include OSCo wells in lower Honouliuli EP 3, 4, 5, 6, and 7 and 8; and State No. 2102-02; 04 to 22; 2202-03 to 14; and 2202-15 to 20. (Tom Nance Water Resource Engineering, October 1994). However, the commitment of basal water for non-potable uses will directly compete with basal allocation for potable needs. The utilization of a non-potable basal resource will also require an extensive regional dual water system.

#### 4.6 Flora

##### Existing Conditions

A biological survey of the former project area was conducted by Evangeline Funk, Ph.D. (July, 1994). An addendum to that study was conducted in November 1995 to include the new areas (*mauka* residential area and upper water tank site). Both studies are included as Appendix H. No proposed or listed, threatened or endangered species were found during field surveys of the site. Three vegetation types can be found in the study area: 1) ruderal or wayside vegetation, 2) Koa haole/grass, and 3) (now fallow) agricultural fields. None of these vegetation types contained endemic (native only to Hawaii) or indigenous (native to Hawaii and other places) plant species in great numbers. The three indigenous plants found on site, Ilima (*Sida fallax* L.), Popolo (*Solanum americanum* Mill.) and Akulikuli (*Sesuvium portulacastrum* L.) are still very common in the coastal lowlands of most of the Hawaiian Islands. The remaining botanical resources on the site are introduced plants, most of which are considered to be weeds.

##### Probable Impacts

The development of the site will not have a significant impact on the flora of the area. The project area has been under cultivation for many years, and as a result, the native plant community has completely disappeared. The type of vegetation found on the site is common throughout the islands.



## 4.7 Terrestrial Fauna

### Existing Conditions

Appendix H also includes a discussion of the terrestrial fauna inhabiting the site. Only one species of mammal was found during the field survey, a Mongoose (*Herpestes auropunctatus*). During the second (1995) field survey, the tracks of a single, small pig (*Sus scrofa*) were identified in the *mauka* residential site, although no pig was seen.

During the initial field survey, fourteen species of birds were found on and around the study site. No threatened or endangered species were found. The identified birds included White-eyes (*Zosterops japonicus*), house sparrow (*Passer domesticus*), common waxbill (*Estrilda astrild*), chestnut mannikin (*Lonchura malacca*), nutmeg mannikin (*Lonchura punctilata*), red crested cardinal (*Paroaria coronata*), northern cardinal (*Cardinalis cardinalis*), bulbul (*Pycnonotus cafer*), cattle egret (*Bubulcus ibis*), house finch (*Carpodacus mexicanus*), spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*), rock dove (*Columba livia*) and common myna (*Acridotheres tristis*). On the second field survey, a single lesser golden plover (*Pluvialis dominica*) was also noted; but no other plovers were seen.

Because the entire site has been extensively modified by agricultural activities, it has almost no value as native bird habitat. However, it does support a variety of non-native species. In the 1994 report, Dr. Funk noted that the two most important bird observation areas were along the flumes and water ways and in the Koa haole/grass vegetation type found along Kaloi Gulch. The current project area no longer abuts the Kaloi Gulch.

### Probable Impacts

The project will not have an impact on threatened or endangered species of terrestrial fauna.

## 4.8 Air Quality

An analysis of potential air quality impacts was conducted by J. W. Morrow, Environmental Management Consultant (October 1994) and updated in December 1995 for the current concept plan. Both the original and update studies are included as Appendix I. The purpose of the study was to assess the impact of the proposed development on air quality on a local and regional scale; particularly, the project's ability to generate traffic and the resultant impact on air quality. In the 1995 study, air quality was evaluated for the year 2010 with and without the project.

### Existing Conditions

There are no State Department of Health air monitoring sites in the immediate vicinity of the project site. The nearest monitoring stations are at Pearl City and Barbers Point, which measure particulate matter. Particulate matter levels are well below the State standard levels. Likewise, monitoring results from the Department of Health building in downtown Honolulu indicates compliance with all other standards. Air quality at the project area was expected to be comparable or somewhat better, given the site's more rural location.

### Probable Impacts

*Short-Term Impacts.* The principal source of short-term air quality impacts will be construction activity, including construction vehicle emissions and particulate emissions associated with earth moving operations. The fine soils and dry climate found in the project area suggest an increased potential for fugitive dust emissions. During construction, there will also be off-site air quality impacts due to the operation of concrete and asphalt batching plants needed for construction.

*Operational Period Impacts.* Potential operational-period impacts are limited to vehicular emissions and indirect impacts associated with electrical power generation (fossil-fuel emissions) and solid waste disposal (H-POWER combustion emissions). Air quality impact was evaluated based on traffic projections for the years 2005 and 2011, with and without the project. The analysis indicates there is some potential for exceeding the state's one-hour carbon monoxide (CO) standard in close proximity (i.e., within 10-meters) of planned intersections along the proposed North South Road during both a.m. and p.m. peak traffic hours. Even without the project, exceedances are predicted during the a.m. peak hour at the intersection with Farrington Highway. No exceedances of the federal CO standard are predicted.

Off-site, electrical power demands and solid waste disposal are not expected to have a significant impact on air quality.

### Mitigation

Appropriate dust control measures will be employed during construction activities to minimize potential for fugitive dust emissions. Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. Landscaping at the earliest time possible will also mitigate fugitive dust impacts.

As noted in the study, possible exceedances of state carbon monoxide standards are predicted for 2010 with the project. Factors which mitigate against this being a serious

concern for the project are that the predicted exceedances were found only very close to the intersection (within 10 meters of the roadway) and only at particularly receptor locations. Also, the probability of "worst case" conditions occurring and persisting for one to eight hours is low. Potential automobile CO impacts will be mitigated by setting back residential uses beyond 10 meters of the proposed North South Road intersections.

Appropriate energy conservation measures (i.e., use of solar water heaters, heat pumps, energy-efficient design, etc.) should be considered to minimize electrical power demands. Recycling and composting measures should be considered to minimize solid waste generation.

#### 4.9 Noise

##### Existing Conditions

An Environmental Noise Assessment was completed for the project by Darby and Associates (September 1994), and updated in December 1995 for the current concept plan. The original and update studies are included as Appendix F. The Noise Assessment found that the project site is currently exposed to low ambient noise levels of approximately 48 dBA, which is typical of rural areas. The dominant noise sources include traffic, wind in foliage and occasional distant aircraft flyovers.

##### Probable Impacts

*Construction Noise.* Short-term, temporary noise impacts will be generated during project construction by earth moving equipment such as bulldozers and diesel-powered trucks. This may impact nearby residential areas. The actual noise depends on the methods employed during each stage of the construction process. Blasting, if required, could also produce noise impacts.

*Traffic Noise.* The Noise Assessment estimated traffic noise increase as a result of the project. The projected future traffic noise increases during peak traffic along Farrington Highway due to the project were determined to be 2.1 dB. This noise level increase may be perceptible by some people at noise sensitive locations along Farrington Highway, but to most people, such a small increase would be imperceptible. Noise increases along the H-1 Freeway due to project-generated traffic were estimated to be 0.2 dB, which is considered insignificant.

The proposed residential areas may also be impacted by traffic noise. The Federal Highway Administration's Traffic Noise Prediction Model was used along with traffic data to predict future noise levels along the H-1 Freeway, Farrington Highway, North-South Road and interior arterials. Table 6 shows the "worst case" setback distances at various

locations required in order to meet federal Department of Housing and Urban Development's (HUD) "Acceptable" site criteria. The noted "locations" are shown in the December 1995 Noise Assessment Study (Appendix F). The estimated setback distances are "worst case" and detailed analysis may allow smaller setbacks.

**Table 6:  
Estimated Minimum Setback Distances for Residences\***

Location	Roadway	HUD	HUD		HUD
		"Acceptable" Site	"Normally Unacceptable" Site		"Unacceptable" Site
		Ldn < 65	Ldn 65-70	Ldn 70-75	Ldn > 75
1.	H-1 Freeway	>2235'	2235' to 717'	717' to 239'	239' to ROW
2.	Farrington Hwy	>291'	291' to 100'	100' to ROW	N/A
3.	Farrington Hwy	>210'	210' to 73'	73' to ROW	N/A
4.	North-South Rd.	>210'	207' to 74'	74' to ROW	N/A
5.	Interior Arterial	>39'	39' to ROW	N/A	N/A
6.	Interior Arterial	>62'	62' to ROW	N/A	N/A
7.	Interior Arterial	>57'	57' to ROW	N/A	N/A

Source: Darby & Associates, December 1995

\*For multi-story, naturally ventilated residences. Based on HUD traffic noise criteria. Noise based on distance from right-of-way (ROW) centerline and 6.5 feet HUD requirement between noise level prediction location and the building setback line.

**Aircraft.** The project site is within approximately four to eight miles of Honolulu International Airport/Hickam AFB and Barbers Point Naval Air Station. Due to the distance from the site, the overall day-night average sound level (Ldn) due to air traffic will be less than 55 dBA, which is compatible with State Department of Transportation residential guidelines. However, infrequent aircraft flyovers may at times be audible at the site.

**Sugarcane Agriculture.** All sugarcane operations in the area terminated in 1995. There should be no noise impacts from agricultural activities on the proposed residential areas.

#### Mitigation

During construction, all State Department of Health noise regulations and conditions for construction activities will be followed. Construction equipment and on-site vehicles

requiring an exhaust of gas or air will be equipped with mufflers. Construction-related blasting, if required, will utilize appropriate blast design techniques to minimize noise impacts on populated areas (i.e., using numerous small charges detonated with small time delays, and blast mats to direct the explosive energy into the rock, controlling flying debris and muffling noise).

Detailed analysis of specific building projects may allow smaller setbacks than the "worst case" distances indicated in Table 6. For example, if portions of specific roadways are elevated above the future housing, e.g., along the H-1 Freeway, a barrier may effectively shield windows of second floor units allowing substantially less setback, if optimum planning, grading and design are incorporated. In general, traffic noise level exposures vary with building setback, height of building and fenestration, local topography, foliage and possible shielding from neighboring structures.

As indicated in the table, residential units requiring the greatest noise mitigation are those that will be located closest to the H-1 Freeway (i.e., *mauka* residential area). HUD standards (for HUD/FHA financing) for housing exposed to 65 to 70 dBA require a minimum of 5 dB attenuation. A minimum of 10 dB attenuation is required for housing areas exposed to sound levels between 70 and 75 dBA.

An additional 5 dB of attenuation can usually be achieved by one of the following measures:

- Constructing a noise barrier wall which blocks the line-of-sight between the noise source and the unit's windows.
- Installing carpeting with minimum 40 oz. padding, louvered closet doors, and/or absorptive ceiling tiles in the affected bedrooms.

An additional 10 dB of attenuation can usually be achieved by implementing both measures above or providing air conditioning and using standard windows with good seals in conjunction with normal double wall construction and insulation. Jalousie windows should not be used in the impacted dwellings.

#### 4.10 Visual Resources and Open Space

##### Existing Conditions

At present, most of the project area is fallow sugar cane fields. The property is visible but not easily defined from the H-1 Freeway and Farrington Highway. When traveling northbound, the project area is visible from the Ewa Villages golf course and residential areas. Major viewplanes from the site are toward downtown Honolulu and Diamond Head to the southeast and toward the Waianae Mountain Range to the north of the site.

### Probable Impacts

Development of the project will gradually and irretrievably alter the visual resources along Farrington Highway, the H-1 Freeway, and from the Ewa Villages and *makai* areas. The present agricultural fields/open space will diminish as new urban uses are developed.

Due to the relatively flat topography of the developable areas, views of Honolulu will be obstructed by multi-story development for all parcels except those along the property's fringes. From areas *makai* of the project site, major views of the Waianae Range should not be obstructed by the development.

### Mitigation

The design and landscaping of the proposed development will minimize adverse visual impacts. Setbacks and landscaping will be provided along the major roadways and Farrington Highway. Two 6-acre neighborhood parks, a 2-3 acre mini-park and a 20-acre central park will be included to provide additional open space. Landscaped greenbelts throughout the development will allow pedestrian and bicycle access and provide open space corridors. The project will avoid visually intrusive development, with buildings no higher than three stories.

## **4.11 Historic, Cultural and Archaeological Resources**

### Existing Conditions

The entire project area is part of the Honouliuli *ahupua'a* purchased by James Campbell in 1877. The project area has been under intensive and continuous sugar cultivation since the late 1890's. No archaeological, cultural or historic resources are known to exist within the project area.

The earliest detailed map of the area shows no habitation closer than the western edge of West Loch in the vicinity of Papapahu Point (Hoaeae Peninsula). The Monsarrat survey map of 1878 documents substantial settlement at the "Honouliuli Taro Lands" in the Papapahu Point area, and it seems clear that in early historic times, that was the focus of the population of the Honouliuli *ahupua'a*. The amenities of that area, such as fishponds, taro lo'i, shellfish collecting and salt drying would have focused population there in prehistoric times, and the name of that place must have secondarily come to apply to the entire *ahupua'a*. (Cultural Surveys Hawaii, 1990).

The earliest archaeological study in Honouliuli by McAllister (1933) noted, "*The Ewa coral plains contain many sites throughout the area. The greatest extent of old stone*

walls, particularly near the Puuloa Salt Works, belongs to the ranching period of about 75 years ago [circa 1858]". The only other early documented site in the vicinity was a heiau on Puu Kapolei.

The Oahu Railway and Land (OR&L) right-of-way (ROW) is an historic resource in the general vicinity of the project area. The 40-foot wide ROW was constructed in the late nineteenth century and extends for 15 miles from near Kahe Point to just *mauka* of NAS Barbers Point, and then follows Renton Road to Honouliuli. Most of the ROW is owned by the State Department of Transportation.

#### Probable Impacts

Due to the absence of information to the contrary, no significant impact on historic, cultural or archaeological resources is anticipated. The Department of Land and Natural Resources, State Historic Preservation Division (DLNR-SHPD) has concurred that the project will have "no effect" on historic sites (Hibbard, September 22, 1994 and December 4, 1995--Appendix C).

The project will comply with all notification and stop work requirements if potentially historic or archaeological remains should be encountered during construction.

#### **4.12 Interrelationships and Cumulative Impact: Physical Environment**

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17(I)) requires a discussion of the interrelationships and cumulative impacts of the proposed action and other related projects, and of the project's secondary effects. The project will alter the physical environment of the project area, from an open, former agricultural area to an urban setting. There will no significant cumulative impact on climate, geology, soils, flood conditions or groundwater resources. The transformation of the area from an agricultural to an urban environment will alter the region's flora and fauna, but will not have any significant adverse cumulative effects on any existing species. The project will directly result in an increased number of vehicles within the project area and surrounding areas, which will have a cumulative impact on the region's air quality and traffic-related noise.

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ASSESSMENT OF EXISTING CONDITIONS,  
PROBABLE IMPACTS AND MITIGATION  
SOCIO-ECONOMIC ENVIRONMENT



**CHAPTER 5**  
**ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND**  
**MITIGATION: SOCIO-ECONOMIC ENVIRONMENT**

A Socio-Economic Impact Assessment for the former East Kapolei concept plan was completed by Community Resources, Inc. (CRI), a division of SMS Research and Marketing Services, Inc., in November 1994, and updated in December 1995 for the present plan. Both the original study and the update are included as Appendix E. The studies examined population, demographic, employment and income characteristics and project impacts. CRI's findings are discussed in the first four sections of this chapter.

**5.1 Population and Potential Impact on Surrounding Communities**

Existing Conditions

The Ewa area of the island of Oahu is comprised of many different and distinct communities, including the older communities of Ewa Beach and Ewa Villages, and the newer developments at Kapolei, Ewa Gentry and Makakilo. In 1990, 42,983 people lived in Ewa, or about 5 percent of Oahu's population. The average annual growth rate for the City and County of Honolulu's Ewa Development Plan (DP) area from 1980 to 1990 was 1.87 percent, and is forecast at about 4 percent between 1990 and 2010 (The City and County uses various projections. The State's "M-K Series" (Department of Business & Economic Development, 1988) continues to be official, but various updates are under review).

The last year has seen continuing growth in the Ewa district. Residential development continues to lead overall development, although there has also been some commercial development in the City of Kapolei.

Future Without Project

State and City population policies have called for the development of a "second city" in Ewa with increased residential and commercial development. The Population guidelines for the City and County DP areas reflect a policy of directing growth to Ewa, with slow growth or stable populations in other regions.

The Ewa Development Plan, which is currently undergoing revision by the City, presents a vision that by the year 2020, the City of Kapolei will provide work sites for 25,000 private jobs and 5,000 City and State jobs, and house over 7,000 residents. Substantial residential

growth (almost 28,000 new units by 2020) is anticipated to occur in the master planned communities of East Kapolei, the city of Kapolei, Ewa by Gentry, Ewa Marina, Ewa Villages, Laulani, Makaiwa Hills, Makakilo and the Villages of Kapolei.

The City and County Planning Department's preliminary estimate of Ewa's 2010 population, if current trends continue, is 103,300, or 10.2 percent of the islandwide population. This estimate is well below the General Plan guidelines for 2010. The projected population for Ewa for the year 2020 is 124,800, or 11.7 percent of the islandwide population. (Planning Department, Preliminary Data 1995).

While housing development has been slower than proposed, Ewa residents comment that housing development has far outstripped job creation and development of needed infrastructure and facilities. Planned public and commercial facilities will help to make Kapolei a regional center, if these are developed as scheduled.

#### Probable Impacts

*Residential Population.* The project will provide a mix of multi-family and single family housing and will increase the resident population of the area. At full build-out, the total population would be about 22,400 (assumes 2.8 persons per household)<sup>1</sup>. The project will contribute toward relieving the limited supply and increasing cost of housing on Oahu.

The project will house Oahu residents, and will not attract potential residents from off-island. Even with the project, the population of the Ewa DP area will be well within General Plan guidelines. This was indicated previously in Table 4, and shown again here as Table 7:

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<sup>1</sup> Projected household size for the project was estimated by CRI using projected 2010 household size estimates for West Loch Estates and Ewa by Gentry master-planned communities, prepared by the City Planning Department (Planning Department 1993).

**Table 7:  
Year 2010 and 2020 Population in Ewa: Policy vs. Projection**

	<u>Share of Island Population</u>	<u>Population</u>
<b>Year 2010</b>		
General Plan Policy	12.0% - 13.3%	121,452 to 134,609
Planning Dept. Forecast*	10.2%	103,300
<b>Year 2020</b>		
General Plan Policy	12.0% - 13.3%	128,544 to 142,470
Planning Dept. Forecast*	11.7%	124,800

\*Preliminary Data, Honolulu Planning Department 1995. Population forecast includes DP approved and proposed projects, including East Kapolei.

By helping to achieve the General Plan population guidelines for Ewa, the project will also help to limit population growth in other areas.

Continuing population growth will bring to Ewa a customer base for proposed commercial developments and a citizenry needing planned improvements. Development of the project will add to the number of residents needing public facilities and services. In the short run, this may mean increased frustration over such problems as traffic congestion. In the long run, the greater the regional population, the more justification will exist for expensive infrastructure (such as the North-South Road) and for locating public services in Ewa.

*De Facto Population.* The project will have no effect on visitor population, as it has no facilities to attract persons from other areas.

## 5.2 Housing

### Existing Conditions

As Oahu's designated "second city," the Ewa area is experiencing a boom in housing development. In the mid 1980's, new residential construction began with the first phases of these projects: Ewa by Gentry, Villages of Kapolei and West Loch. In 1990, there were 11,734 housing units. By mid-1993, 15,301 units had been built (Honolulu Planning Department, September 1994).

Section 2.3 of this document presented a brief description of several major residential areas within the Ewa-Kapolei region, including older, established communities as well as

newer planned communities which are still expanding. The plantation-era Ewa Villages is located immediately south of the project area. Two thirds of the households are owner-occupants, with one-third renters. Ewa Beach, just further south, was developed in the 1940's and had 3,426 housing units in 1990. The Naval Air Station (NAS) Barbers Point is a Navy aviation facility which had 2,218 residents in 1990. Although the air station is scheduled to close in 1999, the existing Navy housing units, as well as recreation areas will be retained. The residential area of Makakilo is located *mauka* of the H-1 Freeway. Up to 6,174 homes are anticipated at Makakilo at build-out.

More recent residential development in Ewa includes Ewa by Gentry, which in by mid-1994 had over 3,000 homes. The West Loch project was developed by the City and County of Honolulu, and encompasses 491 acres in Honouliuli, on the western edge of Pearl Harbor's West Loch. A total of 1,421 units were completed through the middle of 1994, with a total of 1,600 residential units planned by buildout. The Villages of Kapolei is being developed by the State Housing Finance and Development Corporation. The first homes were completed in 1990, with up to 5,000 units planned at buildout. As of the end of 1994, there were about 1,400 units completed at the Villages of Kapolei.

#### Future Without Project

Between 1993 and 2010, an estimated 23,075 new units will be built for Hawaii residents in Ewa.

#### Probable Impacts

At full build-out, the East Kapolei project will provide approximately 8,000 new homes for Oahu residents, with about 75 percent of the units consisting of multi-family apartments and townhomes and 25 percent single family homes. Of the 8,000 units, 30 percent will be affordable to families earning up to 120 percent of median income.

The project will result in a significant addition to the housing stock in the region. The new homes will expand the range of available housing choice, and will address the needs of gap and moderate income households. Other factors contributing to the project's social impact include:

- The project will provide thousands of units of affordable housing in response to islandwide need;
- The increased population associated with the project will serve as a catalyst for regional infrastructure, including the North-South Road, needed to support regional institutions and other housing areas; and

- The project could reinforce the existing development trend, of housing development in advance of employment centers and community facilities.

### 5.3 Employment

#### Existing Conditions

For most of this century, agriculture, specifically sugar cane, has been the primary source of employment in the Ewa-Kapolei area. Another major employer has been the Naval Air Station (NAS) Barbers Point, which in 1990 provided 56 percent of the jobs in the Ewa Development Plan area. The anticipated closure of NAS Barbers Point in 1999 will result in the loss of most civilian jobs in support of existing military operations. Other major employers in the Ewa region include the James Campbell Industrial Park, the new State-owned Barbers Point Harbor, and the Ko Olina Resort, a planned resort community at the southwest end of the Ewa region.

#### Future Without Project

One-third of Oahu's projected employment growth by 2010 is expected to occur in the Ewa area. By the year 2010, about 7 percent of all jobs on Oahu will be in the Ewa Development Plan area (Planning Department, June 1995). These projections anticipate successful relocation of government offices to the Kapolei Civic Center, formation of a strong employment base by light and heavy industrial uses, fully operational maritime activity at Barbers Point Deep Draft Harbor, and replacement of the Barbers Point military base with new job centers. At build-out, the Ko Olina Resort, is expected to employ 9,000 persons.

#### Probable Impacts

The project's employment impacts involve short-term construction related jobs, as well as long-term jobs associated with continuing operations. Employment impacts for both construction and operations are of three types:

- Direct jobs; immediately involved with construction of a project or its operations;
- Indirect jobs; created as businesses directly involved with a project purchase goods and services in the local economy;
- Induced jobs; created as workers spend their income for goods and services.

*Construction.* The development of the East Kapolei project is expected to support a large number of construction jobs from 1998 through 2013. The project will support some 700

full-time direct construction jobs annually, and support another 1,600 indirect and induced jobs per year during the construction phase.

*Operations.* Development of the project will also result in direct on-site operations jobs, primarily at the neighborhood commercial areas of the project. As stores are built, the number of permanent on-site jobs would eventually grow to more than 700 jobs. These in turn would support an additional 420 indirect and induced jobs statewide supported by spending by direct operations enterprises and workers.

The project will provide housing for Oahu residents who will patronize local stores and shops wherever they live. Therefore, most of the operations jobs associated with the project would exist somewhere on Oahu, even without the project, and are not "created" by the project. The operations jobs do not create an "impact" on islandwide employment; although the project causes these jobs to be located in Ewa.

#### **5.4 Fiscal Impacts**

##### **5.4.1 Income**

Personal incomes of work force associated with the project (direct, induced and indirect) would reach a high of about \$90 million annually (1994 dollars) after the year 2000, when construction remains at a high pitch but some operations jobs will have begun at the site. After build-out in 2013, the on-site jobs would support some \$10 million in payrolls. Indirect and induced jobs would support another \$10 million annually. (Community Resources, 1995).

##### **5.4.2 Public Costs and Revenues**

The project will generate revenues for the City and County of Honolulu, primarily from real property taxes on developed land and buildings. By project build-out, property tax revenues would climb to about \$5.2 million annually. The cumulative increases in revenues by 2015 would reach \$56 million.

Revenues will accrue to the State of Hawaii from project construction (excise taxes, corporate income taxes, personal income tax). State revenues associated with construction are projected to reach about \$85 million over the entire construction period.

Because the project will not attract new residents to the City and County, it will have little or no impact on City and County operating costs. Some concerns have been expressed by the City that new development such as the project will increase public costs due to

demand for capital improvements and added costs in delivering services to out-of-the-way locations. However, because the project is located in Ewa, it will contribute to the funding of already-planned capital improvements. In addition, by helping to bring the planned population to Ewa (in keeping with City and State policies), the provision of public services in Ewa will likely become more cost effective.

As a participant in planning and development of infrastructure in central Ewa, the project is likely to *lower* government costs. This is due to the developer's participation in regional roadway improvements, which the State is committed to, in order to support its proposed West Oahu university campus.

### 5.5 Market Analysis

A Market Assessment for the project was prepared by Gail W. Atwater, AICP (October 1994) and a Limited Scope Update was completed in December 1995. Both the original Market Assessment and the 1995 Update are included as Appendix D.

The objectives of the Market Assessments were to analyze existing site conditions, evaluate market potential via supply and demand for residential development, estimate residential absorption and pricing for residential development and evaluate the market potential for neighborhood commercial development on the subject property. The analysis included extensive interviews with brokers, builders and landowners in 1994 and limited follow-up in 1995. The market study area for residential development on the project site was defined as the master planned communities in the Ewa Development Plan Area and along the western H-1 corridor including the Central Oahu communities of Waikele and Royal Kunia.

Key findings of the Market Assessment include:

- There is demonstrated demand for an additional 38,000 to 44,000 units within the market study area by 2020 (of which 32,000 to 37,000 are in the Ewa Development Plan area). The East Kapolei Project is expected to capture 25 to 30 percent of the market study area demand, which compares favorably with similar projects in the region.
- An imbalance will occur between overall supply and demand within the market study area, indicating a shortfall of approximately 9,600 to 15,000 units by 2020.
- Demand for an additional 43 acres of neighborhood-serving retail uses is expected to be generated by 2010 on the parcel. More than adequate demand is demonstrated for

this use because the property is subject to a deed restriction which limits commercial to 16 acres (two acres per 1,000 units). (See Section 5.5.3).

#### 5.5.1 Site Characteristics and Area Review

The subject site is well-positioned for development by virtue of its location within the second urban center in Ewa. Development of the site is consistent with governmental population allocation policy, specifically General Plan guidelines indicating 12.0 to 13.3 percent of Oahu population in Ewa in 2010. The site's relatively flat terrain will facilitate residential and commercial development. The project has good access to the Primary Urban Center from Farrington Highway and its nearby H-1 interchanges. Further, the project developer, Schuler Homes, Inc., has been a key contributor to the success of other master planned communities, such as Waialeale in Central Oahu.

Macro and microeconomic conditions examined in the "area review" of the Market Assessment and Update indicate that continued long-term support is expected for the project through moderate but steady growth. Furthermore, demand is expected to continue for lower end, market-priced and affordable residential product. More specific conclusions of the area review include the following:

- The State of Hawaii, especially the island of Oahu, has demonstrated substantial growth in all sectors of the economy over time, with a continuing expansion expected.
- The overall outlook for Hawaii's economy is for steady growth of about 2.5 percent per year, which is close to the projection for the nation as a whole. This growth will result in sustained demand for additional residential development.
- Pent-up demand and documented overcrowding of Oahu families will continue to drive the need for additional affordable and moderately priced housing.
- Inflation and cost of living factors in Hawaii have been declining in recent years, along with relatively sustained low interest rates. These factors will continue to increase the purchasing power of potential homebuyers.
- Home pricing is expected remain relatively stable on Oahu, with no major "spikes" in prices foreseen.
- Hawaii's pattern of real estate "peaks and plateaus" is favorable to "peaks and valleys" experienced in other markets. For example, local economists interviewed for the



analysis noted that several locations on the Mainland have seen a 20 to 30 percent decline in real estate values in the last few years.

- The new home market is currently experiencing a slow-down that appears to be more related to consumer confidence in the economy than a lack of demand. Since early 1995 when events such as the announcement of the State of Hawaii's budget shortfall occurred, sales of market-priced homes dipped and were sustained at lower levels than in early 1995. It appears that some buyers are holding back on large purchases, exhibiting a "wait and see" attitude.
- According to a September 1995 interview with Dr. Michael Sklarz of Prudential Locations, Inc., the next Hawaii real estate market peak is now expected in 1998, which is the targeted timeframe for early market entry of the East Kapolei Project.

#### 5.5.2 Residential Market Assessment

The Market Assessment included an analysis of the residential market forces which will determine the viability of the East Kapolei project. The analysis concluded that there is sufficient demand for the residential units proposed for the East Kapolei project based on economic conditions and the expected growth in population within Oahu's second city.

- An additional 38,329 to 43,600 units are expected to be needed by 2020 (of which 32,200 to 36,600 are located in the Ewa Development Plan Area);
- There is estimated to be a shortfall of 9,629 to 14,900 residential units within the market study area by the year 2020.
- The East Kapolei project's capture rate of 25 to 30 percent of the market study area compares favorably with past performance of other projects with similar pricing and product mix. The project's capture rate of Oahu's total new home market is expected to be in the range of 13 to 14 percent.
- The expected absorption rate of 500 to 550 units per year is consistent with sales history of similar developments in the region and conservative compared to the developer's own sales record.

The above conclusions were based on analysis of supply and demand conditions and other market forces within the designated market study area. Total adjusted demand for the market study area (Ewa Development Plan Area plus H-1 corridor developments of Royal Kunia and Waikele) was estimated at 57,690 to 62,961 units by the year 2020, including

existing homes. Of these, approximately 48,500 to 52,900 are estimated within the Ewa Development Plan Area. This demand is based on expected population growth and a five percent vacancy factor to provide a healthy real estate market.

The Planning Department has issued a forecast for the year 2020, referred to as "an interim replacement for the [State of Hawaii] M-K projections (*Issue Paper on General Plan Population Distribution Policies*, Planning Department, 1995). This forecast was utilized in the Market Assessment Update as the basis for estimating future population and housing units. These Oahu-wide estimates were allocated to the study area based on accepted population distribution policy. Consistent with the 1994 Market Assessment methodology, the General Plan allocation factor for the Ewa Development Plan Area was expanded to include future population projections for Waikele and Royal Kunia.

The 1994 Market Assessment contained a small (300 unit) upward adjustment to future residential demand to recognize the expected impact of the University of Hawaii West Oahu campus. This small adjustment is not expected to materially affect the market viability of the project because it represents less than one percent of the estimated additional demand for the market study area. Based on the lack of certainty regarding the location and timing of the university, and its immaterial impact on project demand, the adjustment for university-related demand was excluded from the updated analysis.

Total adjusted supply for the market study area, including existing units, was estimated at 48,061 units by 2020 in the 1995 Update. Of these, 31,546 are expected in the Ewa Development Plan Area. Expected additions to the supply of residential units within the market study area were based on construction schedules reported to the Planning Department by 13 relevant master planned communities. Updated adjustments to developer-provided unit estimates were based on (1) the history of chronic delays in certain projects, (2) level of "committed" versus "proposed" units, (3) recent City Council initiatives toward a "use it or lose it" policy on Development Plan-approved projects, and (4) recent market conditions. A further adjustment to future supply was made to reflect the impact of non-resident (resort) occupancy of residential units within resort areas such as Ko Olina and Ewa Marina.

The result of total adjusted supply versus demand is an estimated shortfall of 9,629 to 14,900 residential units within the market study area by the year 2020.

Market capture of future demand within the market study area will be shared by the East Kapolei project and other area developments. In order to assess the development's potential to capture future residential demand, a comparative analysis was conducted using seven-year sales performance of master planned communities within the market

study area. Projects included in this analysis were Ewa by Gentry, West Loch, Makakilo, Waikele and Royal Kunia. The results of this investigation showed average project capture rates during active sales periods ranging from approximately 15 to 44 percent of new home sales within the market area.

The Market Assessment and Update assume a 25 to 30 percent market capture rate for the East Kapolei project within the market study area by 2020. This capture reflects a hypothetical annual absorption of 550 units during the most active sales periods or an average of 500 units per year over the 16-year buildout period ending in 2013.

Anticipated residential offerings, pricing and market performance of the East Kapolei project were based on an analysis of target markets and the actual sales performance of similar developments in the market study area offering affordable and moderate-priced residences. The project developer has demonstrated a commitment to providing well-designed housing to this segment of the market.

Approximately 75 percent of the units will be multi-family. The price range for market units is \$185,000 to \$285,000. Multi-family market-priced homes are expected to attract both first-time and move-up buyers, aged 25 to 40. Single family market-priced homes will be targeted primarily to the move-up market, aged 30 to 45. Affordable offerings are in keeping with the City and County rules for unilateral agreements requiring affordable housing.

### 5.5.3 Retail Market Assessment

The Market Assessment's retail analysis concluded that the proposed development appears to be well positioned to serve a variety of community retail needs. Demand for an additional 43 acres or 468,300 square feet of neighborhood commercial space was estimated. Tenants drawn to the neo-traditional commercial core of the subject property will primarily provide goods and services for its residents through neighborhood shopping center facilities. Potential retail users which could be included in the project's neighborhood commercial area include supermarkets, drug stores, restaurants, apparel shops and dry cleaners.

The Market Assessment noted that a deed restriction in the purchase agreements between Schuler Homes, Inc. and The Estate of James Campbell limits commercial use within the project to two acres for every 1,000 residential units. The resulting 16 acres of allowable commercial space are well within the estimated demand of 43 acres.

## 5.6 Agricultural Impacts

An agricultural impact study (September 1994) and update (December 1995) was conducted for the project by Decision Analysts Hawaii, Inc. The studies are included as Appendix G.

### Existing Conditions

The soils within the project are well suited for agricultural activities. In addition, the area is serviced by high quality dirt roads, a drip irrigation system and electrical power to drive large-volume pumps used for irrigation. The site is in a highly desirable location, with relative proximity to consumer markets and suppliers. Historically, the central Ewa plain was referred to as the "golden triangle," due to its relatively high sugarcane yields and low farming costs. (Decision Analysts Hawaii, Inc., September 1994).

The project site was formerly leased to Oahu Sugar Company, Ltd. (OSCo), and was used for the cultivation of sugarcane. However, Amfac/JMB Hawaii, owners of OSCo, closed this unprofitable plantation after its 1995 harvest. The fields are now fallow.

### Probable Impacts

*Sugarcane Operations.* Because OSCo closed for reasons unrelated to the proposed project, the project will have no impact on sugar operations. The project may precipitate the development of 63 additional acres of agricultural land which separates the main project area from the *mauka* residential area. Although not a part of this project, this land, which fronts Farrington Highway, could eventually be utilized for commercial development.

*Growth of Diversified Agriculture.* The project will not have an adverse impact on the growth of diversified agriculture. Ample prime agricultural land and water is available to accommodate diversified agriculture, as much land on Oahu and Statewide has been recently freed from sugar and pineapple production. Moreover, the limiting factor in the growth of diversified agriculture is not land supply but the size of the market for those crops that can be grown profitably in Hawaii. The proposed project involves far too little land to impact the diversified agriculture industry.

Mitigation

No mitigation measures are required, as the project will not have an adverse impact on sugar production or diversified agriculture. Overall, the project is consistent with State and County plans and policies concerning agriculture, population growth and housing.

**5.7 Interrelationships and Cumulative Impact: Socio-Economic Environment**

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17(I)) requires a discussion of the interrelationships and cumulative impacts of the proposed action and other related projects, and of the project's secondary effects. The availability of the East Kapolei residential units will contribute toward relieving the limited supply of affordable housing on Oahu. The project is expected to include a total population of about 22,400 persons at full-buildout, bringing the Ewa area population closer to General Plan population guidelines. Cumulatively, the increased population in the Ewa region will provide additional justification for already-proposed regional infrastructure improvements, public services and commercial development. Although the project will not result in a net "increase" in Oahu's population or employment, it will cause population and jobs to be located in Ewa. This growth of the Ewa region is consistent with City and State population policy objectives.

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ASSESSMENT OF EXISTING CONDITIONS,  
PROBABLE IMPACTS AND MITIGATION:  
PUBLIC FACILITIES AND SERVICES

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**CHAPTER 6**  
**ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND**  
**MITIGATION: PUBLIC FACILITIES AND SERVICES**

**6.1 Transportation**

Transportation impacts for the former East Kapolei concept plan were addressed in a Traffic Impact Assessment completed by Pacific Planning and Engineering, Inc. (October 1994). The study was updated for the current concept plan (December 1995). Both the original Traffic Impact Assessment and the 1995 update are included in Appendix K. The update report identifies and describes study describes the probable impact of traffic generated by the proposed development in the year 2010.

Existing Conditions

The project area is located west of Fort Weaver Road in Ewa, and east of the proposed North-South Road. The majority of the project area is located south of Farrington Highway. The balance of the project area is located between Farrington Highway and the H-1 Freeway. The project area is presently fallow sugar cane fields with no existing traffic. The site is currently served by Farrington Highway, a two-lane highway connecting Waipahu and Kapolei. Just north of Farrington Highway, the H-1 Freeway provides major east-west access.

Probable Impacts

Vehicular access to the project will be provided by three intersections, which were the primary focus of the traffic impact assessment. The first intersection will be located on Farrington Highway when a major access road is constructed. Two other intersections will be connected to the proposed North-South Road at points serving the proposed University site (to the west)<sup>1</sup> forming four-legged intersections. If the University is not located west of North-South Road, the intersections would be T-intersections with higher levels of service, since there would be no conflicting movements into and out of the University roadway. Traffic movement (from project area) at those T-intersections would then be right turns onto North-South Road instead of straight throughs in the AM, and left turns instead of straight throughs in the PM.

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<sup>1</sup> Since the Traffic Impact Assessment was completed, there has been a proposal to relocate the university to a site *mauka* of the H-1 Freeway. However, because these plans are still not firm, the original site west of the project area was retained in the analysis.

*Study Methodology.* The Traffic Impact Analysis and update identify and describe the probable impact of the traffic generated by the proposed development in the year 2010. The analysis primarily focuses on the following intersections:

- Farrington Highway and Project Access Road
- Proposed North-South Road at Secondary Project Road
- Proposed North-South Road at Project Access Road
- Ramps at H-1 Freeway interchange with proposed North-South Road

Traffic was forecasted for the year 2010 at the study intersections and freeway ramps by:

- adjusting trips for current development absorption rates as calculated based on the City Planning Department population estimates for areas within the Ewa region;
- updating land uses and roadway plans for the year 2010 prepared for the Ewa Region Highway Master Plan;
- preparing aggregated zonal trip tables for the year 2010 for the morning and afternoon peak hours;
- estimating traffic assignments to study roadways and balancing volumes for capacity restraints;
- forecast traffic generated by proposed commercial areas and University;
- estimating traffic generated by the project and assigning traffic to study roadways; and
- adding the traffic forecasts for the project and other developments.

The analysis indicated that the proposed project will significantly change the traffic flow quality at the study intersections when the project is completed. Major road improvements have been identified in the Ewa Region Highway Master Plan and adopted by the Oahu Metropolitan Planning Organization (OMPO). These improvements (Farrington Highway improvements, construction of North-South Road, Kapolei Parkway) are assumed as part of the roadway network by 2010 in the traffic assessment.

#### Project's Relationship to Proposed Regional Transportation Improvements

The Oahu Regional Transportation Plan (ORTP) identifies various highway improvements for Oahu for different time periods. The major arterials (and scheduled improvement timeframes) that would be impacted by the East Kapolei Project are North-South Road (Year 2001-2005), Farrington Highway (Year 1995-2000) and Kapolei Parkway (Year 1995-2000). These are all County facilities, under the jurisdiction of the Department of Transportation Services (DTS).



Farrington Highway widening is occurring in several phases. The State Housing Finance and Development Corporation (HFDC) is taking a lead role in widening the segment between the Makakilo Interchange and the proposed North-South Road; the Makakilo Interchange to Kapolei Villages Golf Course Access Road segment is in final design with construction expected to begin around the end of this year. A Legislative funding request for the Golf Course Road to North-South Road intersection segment has been made with construction expected by 2000. The North-South Road to Fort Weaver Road segment of Farrington Highway (a segment of which fronts the project site) is identified in the ORTP as being widened in the 1995-2000 timeframe.

To compare anticipated project-generated vehicular demand levels with ORTP highway capacities, selected highway segments were considered. The critical capacity impact on the ORTP improvements would occur at the intersection of the North-South Road with Farrington Highway. An estimate of the ratio of project-generated trips to North-South Road Intersection capacity is provided below (Table 8), based on the following assumptions:

- Project-generated vehicular demand is based on a best-guess project absorption schedule (see Exhibit 7, *Limited Scope Update of the East Kapolei Market Assessment*, Atwater, December 1995).
- Capacity of the North-South Road/Farrington Highway intersection is based on build-out laneage as determined in the traffic impact report, and expressed in vehicles per hour. (Intersection capacity is a function of roadway and operational variables, and thus, the estimate is approximate).
- Project trip estimates are based on typical weekday afternoon peak hour since this period would generate the largest number of trips.

Currently, the City and State are undertaking an EIS for the North-South Road. Subject to funding, the road would likely be completed before the year 2005. Assuming the North-South Road construction starts in 1998 and takes four years, the project's absorption schedule indicates that the project traffic would consist of about 12% of the intersection's capacity during the afternoon peak hour when the North-South Road is completed (see year 2002 below).

**Table 8:  
Ratio of East Kapolei Trips to Intersection Capacity  
(Assuming Intersection Exists Today)**

<u>Year</u>	<u>% of Intersection Capacity</u>
1998	1%
1999	3%
2000	6%
2001 (Farr. Hwy & Kap. Pkwy completed*)	9%
2002	12%
2003	15%
2004	18%
2005 (N-S Rd. completed*)	22%
2006	25%
2007	29%
2008	33%
2009	37%
2010	41%
2011	45%
2012	46%
2013 (project buildout)	52%

\*ORTP Estimate  
Pacific Planning & Engineering, 1996

#### Mitigation

The following actions were recommended by Pacific Planning and Engineering, Inc. by the year 2010 to minimize the impact of the project and provide for smoother traffic operating conditions (see December 1995 update report, included as Appendix K):

- Two left-turn lanes westbound at the intersection of Farrington Highway and the North-South Road.
- Addition of an extra through lane from the project's Farrington Highway access road intersection west to the western edge of the project.
- Two left-turn lanes entering and exiting two of the project access roads along the proposed North-South Road.

Sufficient rights-of-way will be reserved along the entire Farrington Highway frontage to allow for future widening as proposed in the Ewa Region Highway Master Plan. Traffic signals will be planned. Exact implementation dates depend on when traffic volumes meet established signal warrants.

A comprehensive plan, including both Transportation System Management and Transportation Demand Management concepts should be developed for the area. Integrated transit services, roadway plans and construction schedules, computer controlled traffic lights, remote parking areas, shuttle services, paratransit, bicycle and pedestrian ways and some form of exclusive way transit should be considered in a comprehensive plan.

In addition to the improvements recommended above, the project concept plan itself mitigates potential traffic impacts. The incorporation of convenience retail and commercial, schools and parks within the project area will eliminate the need to travel on external roads for those activities. The project's extensive bikeway network will facilitate pedestrian and bicycle access within the project area.

The Pacific Planning and Engineering, Inc. studies also note that plans for reuse of Naval Air Station Barbers Point will have regional traffic impacts, and that 2010 impacts should be reevaluated when more information is available. In fact, much of the future growth in traffic demand will be due to other developments in the interim period. State and City agencies have considered roadway improvements throughout the Ewa region, as the City of Kapolei and its environs grow over time. The OMPO has incorporated specific highway improvements in its long range development plan, and member agencies are continuing to evaluate the changes in land use plans and effects on the future road network. Elements of the roadway plans are still preliminary, for example, the final planning for the proposed North-South Road paralleling Fort Weaver Road has not yet been completed.

The approved land use schedule and access points for the East Kapolei project will be incorporated into these long range plans. Public transit and other transportation management plans would need to be developed in concert with the highway long range plans for the region.

The applicant is participating in the preparation and implementation of the Ewa Regional Transportation Master Plan and is coordinating its involvement through The Estate of James Campbell, which is spearheading the master plan effort.

## 6.2 Water Supply

A Potable Water Master Plan for the area bounded by the H-1 Freeway, Ewa Villages, Kapolei and West Loch has been prepared by Tom Nance Water Resource Engineering (*Addendum Report for the East Kapolei Potable Water Master Plan*, December 1995) and was recently approved by the Honolulu Board of Water Supply (BWS) (see letter from BWS dated April 17, 1996 in Chapter 13). The original water master plan for East Kapolei and surrounding areas was prepared in October 1994. This master plan included areas outside of the East Kapolei project area, including the proposed University of Hawaii site, a high school site, Department of Hawaiian Home Lands and remainder lands owned by The Estate of James Campbell (EJC). The addendum report was prepared to identify the potable water system components required to serve the current land use plan of the East Kapolei project and addresses the water system requirements to serve the East Kapolei project exclusively. The water master plan identifies source, storage and major transmission requirements to provide potable water to the planning area (Figure 15).

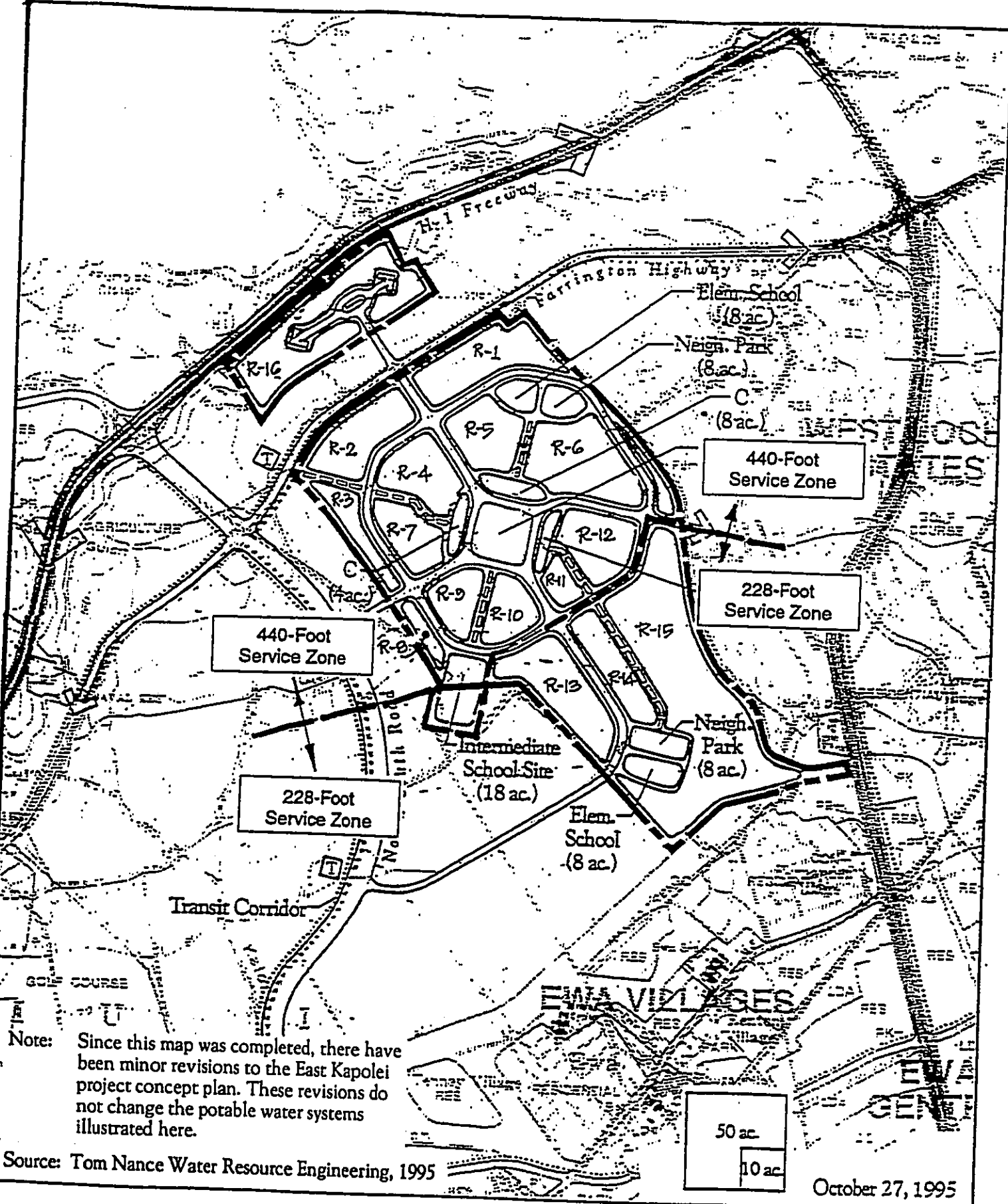
### Existing Conditions

The project area is presently served by an agricultural water system formerly maintained by Oahu Sugar Company.

### Proposed Potable Water System

Estimated average water demand for the entire project is 3.7 million gallons per day (mgd), with a peak of 11.2 mgd. The project site will be served by two separate water service zones: a 440-foot service area and a 228-foot service area. About two-thirds of the project site would be served by the upper, 440-foot service zone. The 440-foot system features a tank (or tanks) *mauka* of the H-1 Freeway and a distribution main into the project site. The required storage for this zone is 3.6 million gallons with average and peak daily demand of 2.4 mgd and 7.2 mgd, respectively.

The 228-foot system will serve the lower third of the project area and adjacent lands. The reservoir site features a tank (or tanks) located on the promontory on the *makai* side of the freeway east of the *mauka* residential area. The required storage for the 228-foot zone is 2.0 million gallons. The primary distribution main follows the eastern boundary of the East Kapolei project site along "Pipeline Road." The average and peak daily demand is 1.3 mgd and 4.0 mgd, respectively.

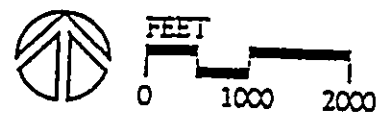


Note: Since this map was completed, there have been minor revisions to the East Kapolei project concept plan. These revisions do not change the potable water systems illustrated here.

Source: Tom Nance Water Resource Engineering, 1995

October 27, 1995

# Potable Water Systems



Figure

15

### Water Source

At present, firm commitments for water source have not been obtained, and water source remains an unresolved issue. The applicant is diligently working to secure sufficient water source for the project, and is confident water commitments will be obtained. Once a source commitment has been obtained, it will be the applicant's responsibility to design, construct, and dedicate the water system to the BWS in accordance with its standards and requirements. Although a specific source cannot be committed at present, several options for potable water exist, as discussed in Section 4.5 Water Resources. Potential sources of water include aquifers within the Pearl Harbor Water Management Area and development of ground water sources in the North Shore area and/or Windward Oahu (or a combination of the above).

### Non-Potable Water System

Current City policies require developments to establish non-potable (dual) systems for irrigation and other appropriate uses in non-residential areas. These areas include the project's schools, parks, commercial areas and along major roadways.

Using a BWS demand estimate of 4,000 gallons per acre, the non-potable water requirements for the project's schools and park sites (60 acres total) would be 240,000 gallons per day. Requirements for commercial area and roadside landscaping would be additional. BWS has also noted that installation of a dual water system may be an option for the multi-family residential areas, to further decrease potable water demand. This possibility will be investigated further.

The design of the non-potable water system will depend largely on the source of non-potable water available to the project. Optional sources of non-potable water include 1) use of treated effluent from Honouliuli WWTP; 2) Ewa caprock aquifer; and 3) brackish basal aquifer, discussed in Section 4.5, Water Resources.

The applicant will continue to work with the State and City and County agencies (i.e., Board of Water Supply, Planning Department, Department of Wastewater Management) to implement the best and most feasible system.

### **6.3 Wastewater**

A wastewater collection system master plan has been prepared by Gray Hong Bills & Associates, Inc. (February 15, 1996) and is now being reviewed by the Department of Wastewater Management and The Estate of James Campbell. This document is included

as Appendix L. An analysis of the wastewater infrastructure and mitigation is summarized below.

#### Existing Conditions

There is currently no wastewater collection system within the project area to serve the East Kapolei Project. The greater Ewa-Kapolei area is served by the City and County's Honouliuli Wastewater Treatment Plant (WWTP), adjacent to the NAS Barbers Point. The Honouliuli WWTP also services Central Oahu and the Primary Urban Center areas west of Red Hill, with the exception of military installations and facilities. Wastewater currently receives advanced primary treatment and is disposed via the Barbers Point Ocean Outfall.

The secondary treatment system at Honouliuli is currently under construction and is scheduled for completion by December 1996. It is designed to accommodate 13 mgd of sewage for secondary treatment. The City plans to reclaim and distribute this wastewater effluent, provided that paying customers can be found for the non-potable water. This is consistent with current policies requiring that treated effluent be used for irrigation and other uses where feasible. In fiscal year 1997-98, the Department of Wastewater Management will conduct a pilot project at Honouliuli to study the potential of using the reclaimed water for Ewa caprock aquifer recharge. The pilot project will have a capacity of 5 mgd. If the effluent can successfully be used to recharge the caprock aquifer with no adverse effects to near shore waters, the pilot project will be expanded to provide the full 13 mgd of recharge, provided that customers can be found to pay for the capital costs of the distribution system and for operating and maintaining the facility. (This issue was also discussed in Section 4.4, Water Resources).

#### Probable Impacts

As with the water system, the area bounded by Kapolei to the west, West Loch Estates to the east, H-1 Freeway on the upper side and Ewa Villages on the lower side is being master-planned. This will ensure that the Department of Wastewater Management (DWM) does not have to accept numerous interceptors from the unsewered area defined in the Wastewater Master Plan. The project engineers have consulted with the DWM which has indicated its general concurrence with the Wastewater Master Plan.

The East Kapolei Project will ultimately generate an average daily flow of 1.98 mgd and design peak flow of 6.27 mgd of sewage. The entire master-planned area, including the East Kapolei Project, will generate an average daily flow of 8.0 mgd and a design peak flow of 19.9 mgd.

A sewer system will be provided to collect and transport project-generated sewage to the Honouliuli Wastewater Treatment Plant. Figure 16 shows the major off-site interceptor sewer which would deliver sewage to the Honouliuli Treatment Plant. This system is identified as the proposed 42-inch east Kapolei ultimate sewer connection.

The City and County Department of Wastewater Management will include the project-generated sewage to the Honouliuli Wastewater Treatment Plant in the West Mamala Bay Facilities Plan, currently being prepared. (Correspondence from Felix B. Limtiaco, Director, Department of Wastewater Management, December 29, 1994).

#### 6.4 Drainage

A drainage study for the project area was conducted by Gray Hong Bills & Associates, Inc. (December 1, 1995) and is now being reviewed by the City Departments of Public Works (DPW), Housing and Community Development (DHCD), Parks and Recreation (DPR), and The Estate of James Campbell and Gentry Homes, Ltd. The Drainage Study is included as Appendix M. The study discusses drainage improvements proposed for the East Kapolei project and adjacent Estate of James Campbell property, as illustrated in Figure 17. The findings are summarized below.

##### Existing Conditions

The East Kapolei Project is contained within the West Loch drainage basin. The entire West Loch drainage basin extends from below the H-1 Freeway to the West Loch shoreline, encompassing approximately 2.6 square miles and several different developments. The areas west of Fort Weaver Road and north of Ewa Villages (including the project site and adjacent property owned by the State of Hawaii and The Estate of James Campbell) presently contribute very low flows because they are undeveloped. However, upon development of these areas, storm runoff will increase substantially.

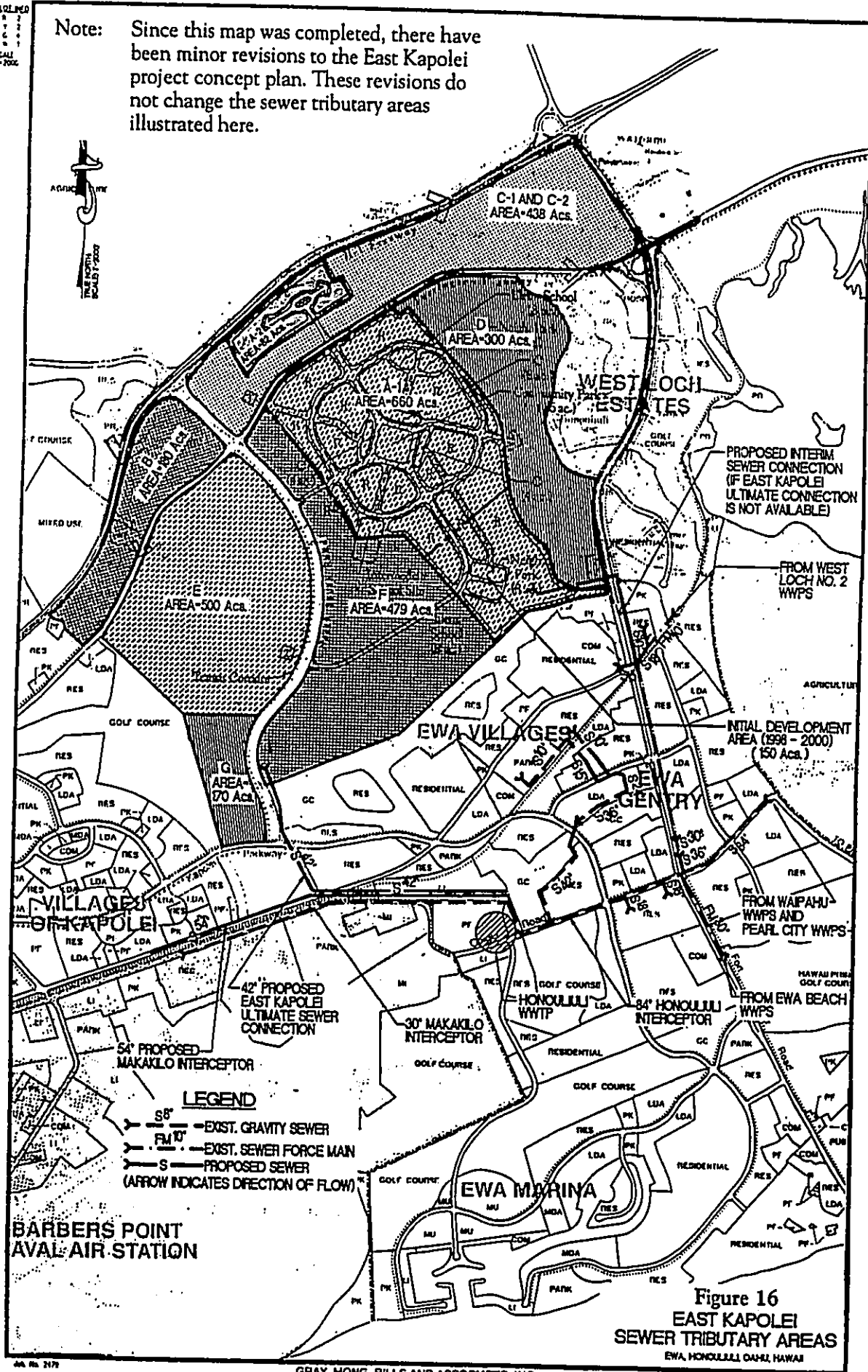
Existing runoff from the upper limits of the drainage area flows from the H-1 Freeway, across Farrington Highway, through the project site and to the northeast Ewa Village boundary. Storm runoff then flows either along the cane haul road (Balfour Boulevard), which crosses under Fort Weaver Road or over Fort Weaver Road in the vicinity just *mauka* of the West Loch Elderly Housing project.

To the east of Fort Weaver Road, Balfour Boulevard lies within easement no. 2680 which runs around the periphery of the future Asing Park site. The roadway passes under Fort Weaver Road 30 or more feet below surrounding grades, and gradually rises to grade as it



30 Lined  
 18 2  
 17 2  
 16 1  
 15 1  
 14 1  
 13 1  
 12 1  
 11 1  
 10 1  
 9 1  
 8 1  
 7 1  
 6 1  
 5 1  
 4 1  
 3 1  
 2 1  
 1 1  
 SCALE  
 1" = 200'

**Note:** Since this map was completed, there have been minor revisions to the East Kapolei project concept plan. These revisions do not change the sewer tributary areas illustrated here.



**Figure 16**  
**EAST KAPOLEI**  
**SEWER TRIBUTARY AREAS**  
 EWA, HONOLULU OAHU, HAWAII

GRAY, HONG, BILLS AND ASSOCIATES, INC.

Source: Gray, Hong, Bills & Associates, Inc.  
1995

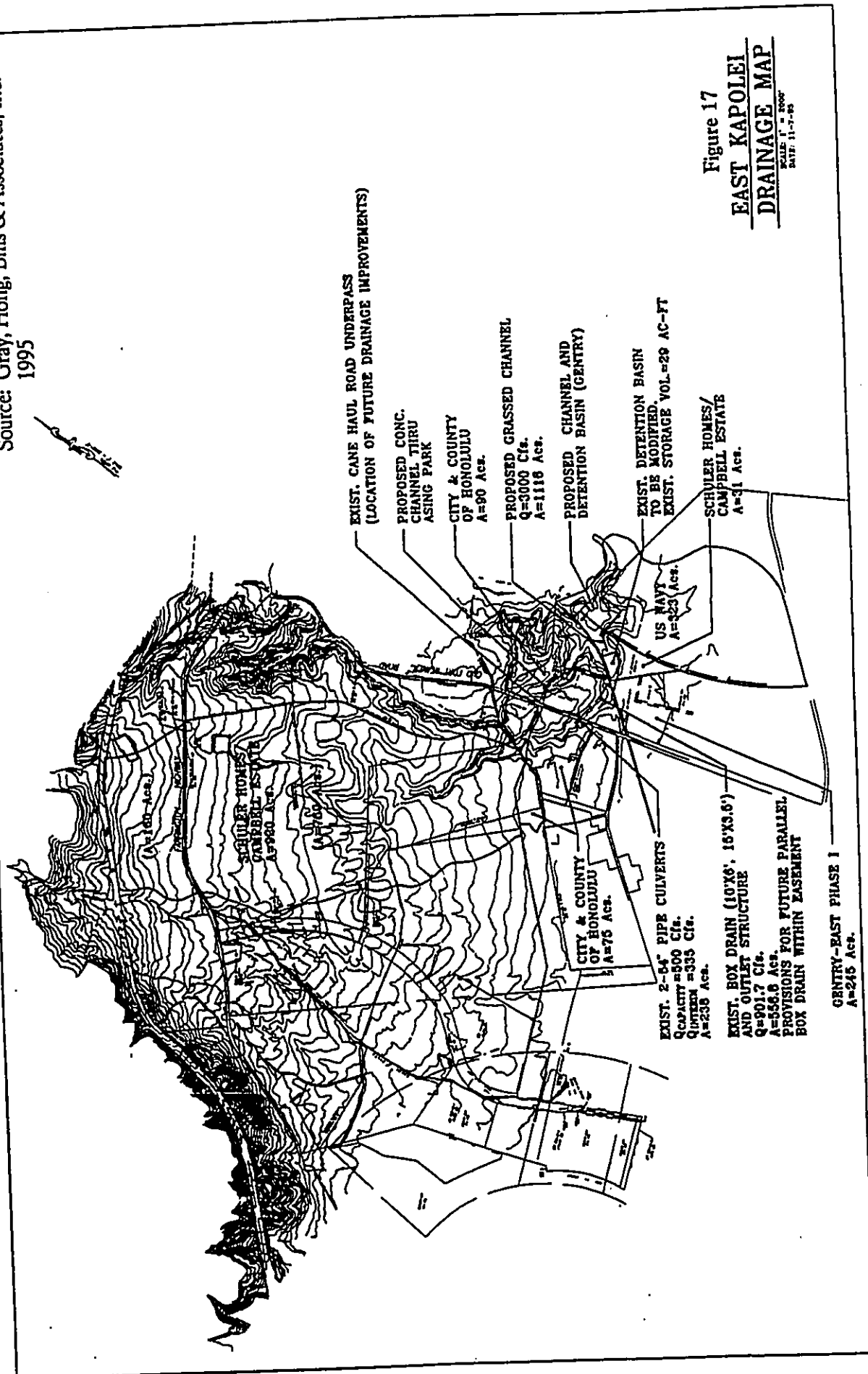


Figure 17  
**EAST KAPOLEI  
DRAINAGE MAP**  
SCALE: 1" = 200'  
DATE: 11-7-95

nears the OR&L right-of-way (ROW). Approximately 25 homes within West Loch Fairways back onto this segment of the Balfour Boulevard ROW. The main subdivision collector road, Aawa Drive, terminates in a cul-de-sac abutting the Balfour Boulevard ROW. There is no vehicular access between Balfour Boulevard and the existing homes, subdivision roadway network or the proposed park site due in part to the significant grade differential between the roadbed and adjacent areas. Balfour Boulevard and the park are owned by the DHCD and DPR, respectively. Although Oahu Sugar Company has an easement for the cane haul road, the easement will probably be terminated since the Oahu Sugar Company is being dissolved. Any runoff presently collected by the road passes through an inlet structure at the low point of the road and then into the West Loch Fairway's drainage system.

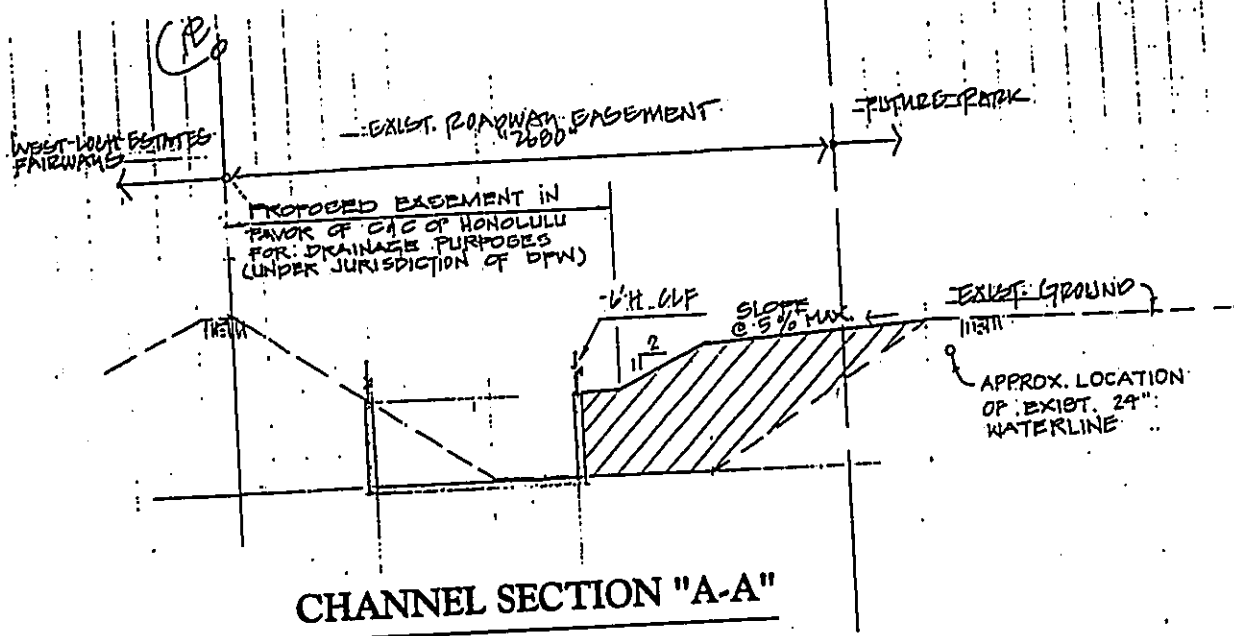
Currently, storm runoff from the West Loch Elderly Housing site, a portion of the Ewa Villages site (via two 54-inch pipe culverts under Fort Weaver Road), the East Kapolei site, and adjacent State of Hawaii and Estate of James Campbell land flows into an existing 29-acre-foot siltation/detention basin constructed by DHCD. This basin was built just southeast of the West Loch subdivision in conjunction with the West Loch Estates project. Overflow from the basin sheet-flows toward the West Loch of Pearl Harbor. The DHCD basin is located within a 31-acre parcel (TMK 9-1-10:por 2) east of Fort Weaver being purchased by Schuler Homes, Inc. from The Estate of James Campbell as part of the East Kapolei project, and is considered part of the "project area."

#### Proposed Drainage Improvements

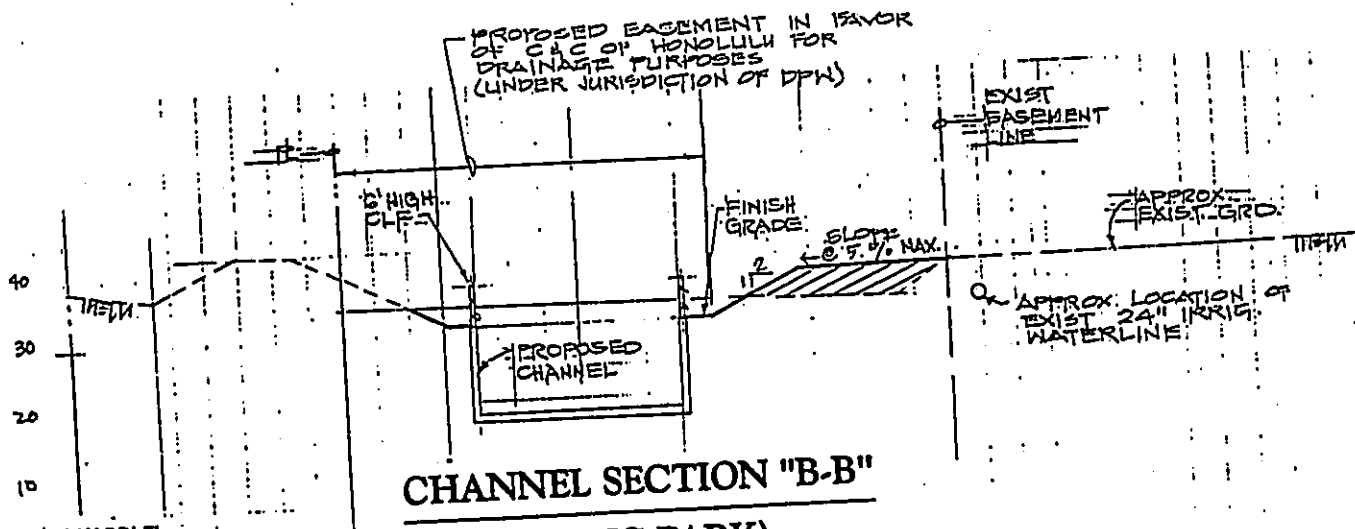
Onsite drainage improvements include catch basins, underground drain lines, culverts and channels. All improvements would be designed in accordance with applicable drainage standards of the City and County of Honolulu.

The major offsite improvement consists of a new transmission channel connecting the project to a new regional drainage control facility being planned by Gentry Homes, Ltd. adjacent to the West Loch of Pearl Harbor, referred to as the Ewa by Gentry-East Drainage Facility. The transmission channel would follow the Balfour Boulevard ROW under Fort Weaver Road and around the periphery of the proposed Asing Park. The reinforced concrete, rectangular channel (approximately 30 feet wide by 15 feet tall) will be sized to carry the 100-year peak flow from the West Loch watershed west of Fort Weaver Road (see Figure 18). A six-foot high chain link fence will be installed along both walls, and the ground alongside the channel will be graded to drain towards the channel.

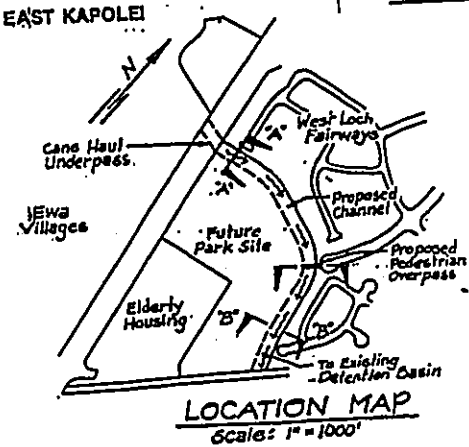
The City Department of Parks and Recreation reviewed the drainage channel proposal fronting the proposed Asing Park (DPR letter dated December 27, 1994). It requested



**CHANNEL SECTION "A-A"**  
(ASING PARK)



**CHANNEL SECTION "B-B"**  
(ASING PARK)



Source: Gray, Hong, Bills & Associates, 1995

**Drainage Channel Sections**  
**EAST KAPOLEI PROJECT**  
Schuler Homes, Inc.

Helber Hastert & Fee, Planners

Figure  
**18**

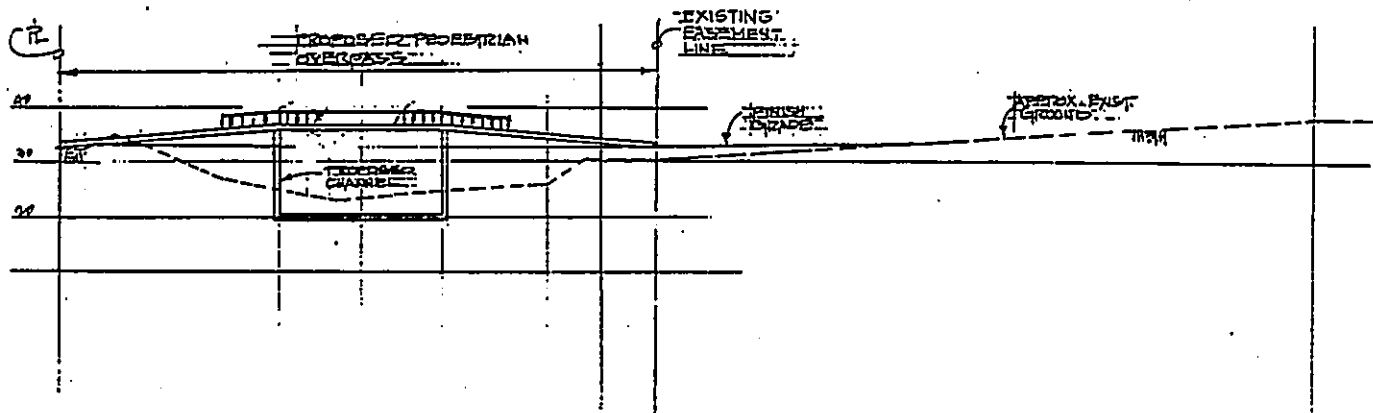
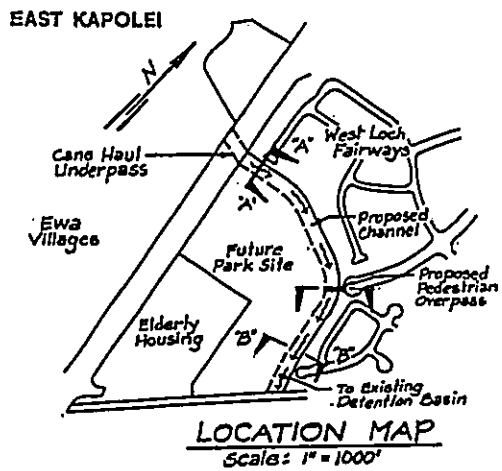
that the area between the channel and the park be graded level, thereby creating new useable park land. Due to the grade differences involved, a level grade would be cost prohibitive. Changes in the design were made however, to provide for a gradual slope down to the edge of the channel which will make this area easier to maintain this area as part of the adjacent park. Comments from the City Department of Public Works (June 5, 1995) provide the following direction: The land adjacent to the channel fronting the proposed Asing Park would need to be improved to enable the City Department of Parks and Recreation to maintain the area (addressed in preceding discussion). Concurrence from the City Department of Transportation Services and the State Department of Transportation will be required to use the Balfour Boulevard ROW.

A pedestrian bridge over the proposed transmission channel linking the West Loch Subdivision Phase 2 to the proposed Asing Park is recommended (see Figure 19). Without the overpass, access from the West Loch subdivision to the park is currently not possible due to elevation differences discussed earlier.

A box culvert will be constructed under the OR&L right-of-way to connect the transmission channel to the existing DHCD detention basin. The DHCD detention basin is proposed to be enlarged and modified to meet City Department of Public Works detention requirements and will serve to link the proposed transmission channel with the proposed Ewa by Gentry-East detention basin and outlet.

As reported in the *Drainage Report for Ewa by Gentry-East, Phase 1* (Park Engineering, 1995), the Gentry-East drainage facility has always been conceptually designed to accommodate runoff from the entire West Loch watershed, which includes the East Kapolei project (see letter from Gentry Homes, Ltd. dated April 16, 1996 in Chapter 13). As discussed in the *Addendum to the Preliminary Drainage Study, West Loch Drainage Basin* (Gray Hong Bills & Associates, April 18, 1996), Schuler Homes, Inc. and Gentry are currently negotiating terms for a joint detention basin, constructed to accommodate the runoff from the total West Loch watershed. Additional storage will be provided within the 31-acre site, which when combined with the proposed Gentry detention basin will accommodate the total runoff. Schuler Homes, Inc. is working with Gentry to confirm the limits to the watershed and hydraulic grade line (HGL). The berm proposed by Gentry for protection of the Wildlife Refuge and the berm proposed in the 31-acre parcel will have one-foot minimum freeboard above the HGL. The portion of the 31-acre site used for the drainage improvements will be dedicated to the City and County of Honolulu.

The proposed drainage channel along the Balfour Boulevard ROW will be constructed within property owned by DHCD and maintenance would be under the jurisdiction of the



**PEDESTRIAN OVERPASS  
(ASING PARK)**

Source: Gray, Hong, Bills & Associates, 1995

**Pedestrian Overpass Over Drainage Channel**

**EAST KAPOLEI PROJECT**

Schuler Homes, Inc.

Helber Hastert & Fee, Planners

Figure

**19**

City and County of Honolulu. It is proposed that the entire onsite and offsite drainage system be dedicated to the City and County of Honolulu.

Probable Impacts

*Direct Impacts*

Construction of the transmission channel will commit the former cane haul roadway ROW (Balfour Boulevard) to drainage purposes. The transmission channel will pass under the OR&L ROW, and will not impact its potential future use as a transportation corridor.

The proposed channel alignment between the proposed Asing Park and West Loch Fairways subdivision will not significantly decrease the already poor connection between the two properties due to the topographical constraints imposed by the depressed Balfour Boulevard roadbed and the "backyard" condition along the 25 or so homes which front the ROW.

Improvements to the existing DHCD detention basin and connection to the Ewa by Gentry-East basin within the 31-acre parcel are consistent with established uses.

*Indirect Impacts*

Indirect impacts include the project's contribution to the proposed Ewa by Gentry-East drainage facility which were analyzed in the latter's environmental assessment and final EIS (Environmental Communications, December 1994, and September 1995, respectively). The Final EIS for the Gentry project was accepted by the City Department of Land Utilization on October 31, 1995. A review of key issues discussed in the referenced environmental documents is presented below.

**Impact on the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge.** The U.S. Fish & Wildlife Service (USFWS) maintains the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge located on the West Loch shoreline, immediately *makai* of the proposed Ewa by Gentry-East drainage facility. The Refuge provides important year round nesting and foraging habitat for four endangered Hawaiian waterbirds. It also provides foraging and loafing habitat for numerous species of migratory shorebirds and waterfowl. The USFWS has expressed concern that unexpected flooding associated with the Ewa by Gentry-East drainage facility and proposed East Kapolei project improvements may alter habitat conditions and adversely affect the reproductive success of the above-mentioned bird species.

Planning and design of the proposed Ewa by Gentry-East drainage project has been coordinated with the USFWS, which is currently undergoing an informal Section 7 Endangered Species Act consultation with the project developer, Gentry Homes, Ltd., as part of the Department of Army permit process. By letter to the U.S. Navy dated February 24, 1994 regarding the *Drainage Report for Ewa by Gentry-East, Phase I* (Park Engineering, May 1995), the USFWS indicated it had "no objections with the concept plan which attempts to provide flood protection to the Refuge..." In comments to the East Kapolei Project DEIS (letter to Cheryl D. Soon, dated March 29, 1996), the USFWS raised a concern that the East Kapolei Project was "not initially included in the study, and that the overall holding capacity of the proposed Ewa by Gentry-East drainage system may not be sufficient to accommodate the additional runoff from the East Kapolei Project." As noted earlier, the entire West Loch watershed (which includes the East Kapolei Project) was included in the basis of design for the Ewa by Gentry-East drainage facility. Schuler Homes, Inc. and Gentry are negotiating terms for the construction of a joint detention basin, incorporating the 31-acre parcel into the design for additional storage. As noted, the present intent is to maintain a minimum one-foot freeboard over the HGL to protect the adjacent Wildlife Refuge from inundation by the 100-year flood.

hydraulic  
grade line

**Impact on West Loch Marine Environment.** An environmental assessment of chemical and biological effects of the proposed regional drainage facility on the West Loch marine environment was conducted as part of the Ewa by Gentry-East drainage facility EA conducted by O.I. Consultants, Inc. (December 1993). The comprehensive study found the proposed improvements will "have no negative impacts on the adjacent nearshore marine environment. In fact, the proposed drainage improvements will result in a significant decrease in sediment discharge to West Loch from the project drainage basin. However, because West Loch is impacted primarily from drainage basins to the north of the project, no change in water quality from the proposed site improvements is likely" (p.16).

**Other Environmental Issues.** Other major environmental areas examined in the environmental documents included flora, fauna, archaeology and land use compatibility. Each subject is briefly reviewed below.

The botanical survey (Funk, August 1993) concluded as follows: "The flora of the proposed Ewa by Gentry-East facility is composed entirely of introduced species. There are no endemic or indigenous plants in the area except for *Alena* which is very common. Similar vegetation is to be found on many other sites in the Islands, and except for the sugarcane, vegetation of this type is frequently treated with herbicides. Therefore, nothing of botanical significance would be lost should this development go forward."



The faunal survey (Bruner, September 1993) concluded that the proposed improvements were not a significant concern to avifauna and could, in fact, provide additional foraging and feeding areas, especially after periods of heavy rain. The consultant reiterated the USFWS concern that the wildlife refuge may suffer a potentially adverse impact if sufficient grading and a protective berm of adequate size were not provided.

An archaeological inventory survey of the site was conducted (Sinoto, 1993). The study determined that no further archaeological work was recommended prior to the start of construction, based on the high degree of disturbance in the area and the negative results of previous archaeological investigations in the vicinity. Archaeological monitoring during construction was recommended with emphasis on the low-lying shoreline areas.

The site lies within the Navy's West Loch blast zone emanating from the West Loch Naval Magazine, and is therefore unsuitable for urban uses such as housing and commercial uses. Development of the grass-lined detention basin would preserve the open space character of the area which would be periodically subject to flooding.

#### Mitigation

The proposed project will provide a safe and efficient means of conveying runoff from the undeveloped areas west of Fort Weaver Road to West Loch, as originally master planned. The improvements will reduce the risk of injury, disease and property damage resulting from inadequate drainage facilities.

A new pedestrian bridge is recommended to connect the Aawa Drive cul-de-sac with the future Asing Park. This will provide a safe, all-weather pedestrian connection between the West Loch Fairways subdivision and the park at its most appropriate and useful location.

During construction, the contractor will be required to mitigate potentially adverse effects as part of the National Pollutant Discharge Elimination System (NPDES) permit "Best Management Practices." On a long term basis, the project's detention basin and the Ewa by Gentry-East detention basin are the primary mitigating features to be used to minimize water quality impacts to receiving waters.

#### **6.5 Solid Waste**

##### Existing Conditions

Refuse collection from residential areas in the Ewa-Kapolei area near the project site is provided by the City and County of Honolulu. Non-residential uses and multi-family

residential areas are serviced by private refuse collection companies. Residential waste is transported to the City and County of Honolulu's H-POWER (Honolulu Program of Waste Energy Recovery) waste-to-energy combuster, located at the James Campbell Industrial Park. Ash residue and nonprocessable waste are then disposed of at the Waimanalo Gulch Landfill in west Oahu.

#### Probable Impacts

The East Kapolei project will ultimately generate approximately 63 tons of solid waste per day, based on a generation factor of 4.2 pounds/person/day. The City and County of Honolulu will provide curbside refuse pickup service to single-family residences. Multi-family areas will typically hire a private waste company to collect and ultimately dispose of refuse.

The primary site of disposal will be the H-POWER facility. To accommodate future disposal requirements, the City plans to stress recycling efforts followed by physical expansion of existing facilities such as H-POWER.

#### Mitigation

During construction, project contractors will be encouraged to reduce waste generation to minimize waste disposal activities. Waste generation can be reduced by reusing or recycling certain construction materials such as ground cover and silt fences. Contractors will be encouraged to use secondary resources such as use of crushed glass in pavement base course and locally-produced greenwaste compost such as a soil amendment in landscaping as allowed by City specifications.

The developer will comply with all requirements of the City and County Department of Public Works (DPW) related to solid waste disposal facilities, and with waste diversion programs initiated by the DPW.

#### **6.6 Schools and Libraries**

The Social Impact Assessment conducted by Community Resources, Inc. prepared in 1994 and updated in 1995 also analyzed schools and libraries. The 1994 study described existing conditions and estimated project demand for these facilities, as summarized below.

Existing Conditions

*Primary and Secondary Schools.* The project is located within the State Department of Education's (DOE) Leeward School District and is within the Ewa Elementary School service area. According to the DOE, the rapid development in the Ewa-Kapolei area has created a pressing need for additional schools and classroom space. The proposed and projected Capital Improvements Program (CIP) budgets for the next three bienniums are already severely strained by the lack of CIP funds to build adequate classrooms. (Correspondence from Herman M. Aizawa, Superintendent of Education, December 29, 1994).

The Ewa area is currently served by one high school (Campbell High School); one intermediate school (Ilima Intermediate School) and five elementary schools (Ewa, Mauka Lani, Ewa Beach, Makakilo and Kapolei). The recently opened Kapolei Elementary School is still under construction, and will be completed by Fall 1997. For the 1994-95 school year, Kapolei Elementary had an enrollment of 350 students, with a projected enrollment between 800 and 850 when the school is completed. A new elementary school within the Ewa by Gentry project, Holomua Elementary, is scheduled to open in August 1996.

The Department of Education has plans to open a new Kapolei Intermediate School and Kapolei High School on a 20-acre and 45-acre site, respectively, in the Villages of Kapolei. Other elementary schools planned for the Leeward District (e.g., Ko Olina, Waikele, Royal Kunia) will also accommodate the increasing regional population.

*Post-Secondary Education.* The nearest post-secondary educational facility is the University of Hawaii West Oahu, located in temporary quarters at the Leeward Community College in Pearl City. The location of a permanent university is still uncertain, with the State's most recent proposal being construction on a 900-acre site north of the H-1 Freeway. That site, which the State would acquire through a land exchange with The Estate of James Campbell, has been approved by the University Board of Regents, but is still pending approval by the Legislature. As a condition of the land exchange, The Estate of James Campbell would require a 2011 start-up deadline on the project.

*Library Services.* Ewa Beach Public Library serves approximately 40,000 residents within the Ewa area. The combination school and public library is a full-service library situated on the Campbell High School campus. There are currently plans to construct a major new Kapolei Library within the City of Kapolei, to serve as a "second anchor" to Honolulu's Downtown library. There are also long-term plans to separate the Ewa Beach School and public library into two facilities.

Probable Impacts and Mitigation

*Primary and Secondary Schools.* The project will significantly increase demands on public educational facilities in the Ewa area, which are already insufficient to meet the growing population in the region. Based on the student ratios per 100 dwelling units provided by the DOE for the East Kapolei project in November 1994, it is estimated that at buildout (year 2013), the project would generate a total enrollment of 2,386. In a subsequent January 1996 letter (see Chapter 10), the DOE provided slightly different ratios per 100 dwelling units, resulting in a total enrollment of 2,950.

The revised (1996) DOE projections utilize student/dwelling unit ratios which are between 13 percent (elementary school) and 50 percent (intermediate school) higher than those cited in their previous correspondence. Although the reason for the higher ratios was not explained, it can be estimated that total student population at build-out will be somewhere between 2,386 and 2,950.

Table 9 provides projections of school enrollment at project build-out, using both the November 1994 and January 1996 ratios. Using either ratios, the table shows elementary school pupil counts greater than the total enrollment of a single school, and counts of intermediate and high school students that are nearly half the enrollment of such schools.

When the ratios shown are used with the project construction schedule, estimated enrollments for various years can be derived (see Community Resources, 1995; Appendix E). This analysis notes that project enrollments could well justify construction of an elementary school before the year 2000, and a second school in 2005 or soon afterwards. Project residents would significantly contribute to intermediate and high school populations.

**Table 9:  
Projected School Enrollment at Buildout  
(8,000 residential units)**

Facility	11/94 Ratio	Projected Enrollment	1/96 Ratio	Projected Enrollment
Elementary (Grades K-6)	17.72	1,418	20.0	1,600
Intermediate (Grades 7-8)	5.00	400	7.5	600
High (Grades 9-12)	7.10	<u>568</u>	9.4	<u>750</u>
Total		2,386		2,950

The two planned elementary schools will accommodate the elementary school demands of the proposed project. Table 9 indicates the project will generate a need for between 400 and 600 intermediate school "seats," about one-third to half the size of a "desirable" enrollment per school of 1,200 students (Draft Ewa DP Report, Planning Department, June 1995, p. 8-3). Based on this demand, the concept plan provides half of an intermediate school site or 9 acres of an 18-acre site (upper range of school size per Ewa DP Report, p. 8-2), with the other half of the school site extending into the adjacent land area owned by the State and also planned for residential uses. This "sharing" of responsibility for providing the intermediate school assumes the adjacent property will be developed for residential uses, and thereby generate additional needs for intermediate school facilities. The applicant has committed to working with DOE to ensure that adequate intermediate school facilities are developed to serve the needs of future East Kapolei residents, in a timely and efficient manner.

It is recognized however, that the actual provision of the school facilities is DOE's ultimate responsibility, and is subject to a number of factors outside the applicant's control including, the number of students generated by other residential developments in the area and the allocation of DOE planning and construction funds.

*Post Secondary Education.* The East Kapolei project will contribute to the development and operation of the proposed University of Hawaii West Oahu by participating in regional infrastructure development (lowering overall costs to the State and other landowners) and by providing convenient housing for university students, faculty and staff. The feasibility of the East Kapolei project will not be affected by the proposed university's location or timing, or even if it is not constructed at all.

*Libraries.* Current plans to expand the Waipahu Library, to build the Kapolei Library and to separate the Ewa School and Public Library are expected to accommodate any additional demand generated by the proposed project.

## 6.7 Recreational Facilities

### Existing Facilities

Existing public parks in the project region include Ewa Mahiko Neighborhood Park, Puuloa Neighborhood Park, Makakilo Community Park, Geiger Park Gentry, and the new Kapolei Park. In addition, the City is planning a new district park at either Ewa Mahiko or near Ewa Villages. The City also expects to acquire a major new regional beach park within the Barbers Point Naval Air Station upon closure of the base in 1997.

Probable Impacts

The proposed project will increase demands on existing public recreational facilities. A review of the City and County of Honolulu's Park Dedication Ordinance Requirements indicates a need for 31 acres of park based on the proposed single vs. multi-family mix. This is illustrated in Table 10 below.

**Table 10:  
Park Dedication Ordinance (PDO) Calculation**

<u>Unit Type</u>	<u>Estimated Mix</u>	<u>Proposed Dwelling Units (du)</u>	<u>Ratio (sf/du)</u>	<u>Estimated PDO Reqt. (acres)</u>
Single-Family	25%	2,000	350	16
Multi-Family	<u>75%</u>	<u>6,000</u>	110*	<u>15</u>
<b>Total</b>	100%	8,000		31

\*Alternate PDO method (10% of floor area) would result in reduced requirements, given projected size of multi-family units.

The Development Plan Common Provisions require that "Suburban and new development areas shall include land for open space and recreation purposes at a minimum of two acres per thousand persons" (Section 24-1.5(a)(2)(c)). Given a projected ultimate residential population of approximately 22,400 residents (8,000 dwelling units x 2.8 persons per household), a minimum of 45 acres of open space and recreation areas will ultimately be required.

By increasing the population in the Ewa region, the project will increase the use of public beaches in that region. The project will not bring additional people into the City and County of Honolulu, but rather "redistribute" the existing population. Therefore, while the project may increase the overall use of Ewa beaches, there should be a corresponding drop in the use of beaches these individuals currently utilize.

Mitigation

The project provides a 20-acre central park, two 6-acre neighborhood parks and a 2-3 acre mini-park in the *mauka* parcel, for a total of 35 acres, exceeding the 31 acre PDO

requirement. Additional acreage will be provided in the form of private recreational areas within the various condominium projects, thus meeting the DP park standard.

## 6.8 Police Protection

### Existing Conditions

The area is presently served by the Pearl City Police Station in the Honolulu Police Department's District 3. The Pearl City station services the area from Red Hill to Kahe Point. There are five beats in the Ewa area with one officer per beat, 24 hours a day, seven days a week. The police officers assigned to the Ewa area work with the community through two channels: the volunteer Neighborhood Security Watch and the Community Policing Team, the latter an effort to directly involve the community with crime prevention efforts.

### Future Without Project

Because of the anticipated growth in the Ewa area, in 1995-1996, the number of police beats in Ewa will increase from five to nine, and the officers on duty will increase to 22. A Kapolei regional station is planned as the headquarters for a new District 8. Although the Kapolei regional station will meet the Police Department's *facility* needs, the Department continues to be concerned about adequate *staffing*. The Department notes that police protection for the area is already barely adequate, and that staffing shortfalls will continue to be a concern as new development is proposed. (Correspondence from Eugene Uemura, Assistant Chief, Administrative Bureau, December 18, 1995 and March 5, 1996).

### Probable Impacts

The addition of up to 8,000 residential units and up to 22,400 new residents over a 16-year period will increase the demand for police services--officers on call--but is not expected to create demand for new facilities (i.e., stations).

It is estimated that the East Kapolei project will require less than two Police Department personnel per 1,000 residents, or up to 45 Police Department personnel (in all branches of the Department) after the project is fully occupied. The East Kapolei project will not attract additional people to the island; but will provide new homes in a new community for Hawaii's growing population. Therefore, the need for police services in the project area is not an impact of the project, but simply a consequence of expected population growth.

The developer will support the Honolulu Police Department in its ongoing efforts to provide adequate police protection for the project and for the greater Ewa area.

## 6.9 Fire Protection

### Existing Conditions

The Ewa area is served by four fire stations: Makakilo Station, serving Makakilo, upper Kapolei and Ko Olina Estates; the Waipahu Station, serving lower Kapolei, Ewa by Gentry and Ewa area to Renton Road; the Ewa Beach Station, serving all of lower Ewa Beach up to Renton Road; and the recently completed Kapolei Fire Station. The Waipahu Station, which has 23 firefighters, assists the Ewa Beach Station when necessary.

### Future Without Project

A new fire station has been completed in the Kapolei Business Park (approx. 3.5 miles southwest of the project site) to serve the Ewa plain. The fire station currently has an engine company, with a ladder company to be added in 1996 to serve the Kapolei and Nanakuli areas. (Correspondence from Chief Richard R. Seto-Mook, December 14, 1994; and updated personal communication by Community Resources, 1995).

### Probable Impacts

The project will increase demand on existing fire protection facilities. If the new ladder company is added at the Kapolei Fire Station, it will be adequate to serve the project area. Fire protection services provided from Kapolei and Waipahu engine companies with ladder service from Waipahu are adequate to serve the project. (Correspondence from Chief Anthony J. Lopez, Jr., November 29, 1995).

## 6.10 Power, Communications and Civil Defense

A consolidated duct system consisting of ducts, manholes, handholes, pullboxes, and equipment pads will be installed for the electric, telephone, cable television and street lighting systems. It is anticipated that there will be two major trunks for the duct system to serve the East Kapolei Project. One trunk will start from Farrington Highway and go south through the center of the development along the main collector road, and the second trunk will go south from Farrington Highway along the North-South Road. Duct lines branching off the main trunks will extend along the collector and smaller roadways to serve the individual facilities.



### 6.10.1 Electrical System

The new Ewa Nui Substation has been constructed on the north side of Farrington Highway, replacing the former Ewa substation. New aerial 138 kV transmission lines have been installed between the Ewa Nui Substation and Campbell Industrial Park. These lines run southwest along Farrington Highway from the new substation and then go south along the proposed North-South Road Energy Corridor.

It is anticipated that HECO's Ewa Nui Substation will serve the East Kapolei Project. Distribution circuits will originate from the substation and enter the new development from Farrington Highway, and will be routed along the major corridors to serve the development. Underground duct systems will be required along all the roadways, and easements for the installation of switches and transformers will also be required.

All roadways which will ultimately be dedicated to the State of Hawaii or the City and County of Honolulu will be illuminated in accordance with their standards. Generally, street lighting luminaries of the "cobra-head" design will be installed on galvanized steel poles.

### 6.10.2 Communications

*Telephone System.* GTE Hawaiian Telephone Company intends to serve the development by bringing its cable system in from Farrington Highway. GTE Hawaiian Tel must construct a new central office building to serve the development, and have requested a 150' x 150' lot for this purpose. The central office building will house new switching and related equipment.

Telephone cables will originate from the central office and will be installed in underground duct systems to serve the development. In addition to the underground duct line system, the telephone company requires easements for their cross-connect equipment. One cross-connect easement will be required for each ground of about 500 homes and for each commercial area.

*Cable Television System.* Oceanic Cablevision will serve the new development by installing its cables in an underground duct system which parallels the electrical and telephone duct systems. They will require easements for their equipment power supplies throughout the subdivision. At the writing of this report, they had not determined where cable service will enter the development.

### 6.10.3 Civil Defense

At the present time, one civil defense siren located near Ewa Elementary School provides marginal coverage for a portion of the project area. The Oahu Civil Defense Agency has recommended that the East Kapolei project include two 115 dB solar powered sirens and the necessary support infrastructure, to provide emergency warning for residents and workers in the area. The sirens should be located within the park sites.

The Oahu Civil Defense Agency has also recommended that hurricane mitigation design considerations be included in any multi-use buildings in schools, parks or community centers, to provide local emergency shelter capabilities.

The applicant will work closely with civil defense officials to ensure that adequate civil defense measures are included in the project.

## 6.11 Health Care Facilities

### Existing Conditions

Saint Francis-West Medical Center is the full-service hospital closest to the proposed project. The hospital is approximately five to 15 minutes from the site, depending on traffic conditions. St. Francis-West provides a full range of hospital services, including emergency care, outpatient treatment, laboratory and x-ray facilities and medical offices. The hospital has 79 licensed beds available and has plans to expand capacity to 84 beds. Ambulance service is coordinated with the City and County and the hospital has a helipad for medivac transport. Saint Francis-West is currently operating at 80 to 85 percent of capacity.

Other medical facilities within a 20 to 30 minute drive include the Waianae Coast Comprehensive Health Center, Pali Momi Medical Center at Pearlridge, and Wahiawa General Hospital.

Non-emergency services are provided by local general physicians.

### Probable Impacts

The increased population associated with the project will increase demand on existing medical care facilities. According to St. Francis-West staff, the demand for hospital service by project residents can be accommodated by the hospital. This is due the increase in managed care, the fact that the facility can be readily expanded and that the length of

stay by traditional hospital users (e.g., women giving birth) has declined in recent years and is projected to decline even further in the future. (Community Resources, Inc., November 1994, updated 1995).

#### **6.12 Interrelationships and Cumulative Impact: Public Facilities and Services**

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17(I)) requires a discussion of the interrelationships and cumulative impacts of the proposed action and other related projects, and of the project's secondary effects. The increase in population and vehicular trips associated with the project will have a cumulative impact on regional traffic. The project, together with other proposed developments in Ewa, provide justification for currently-proposed, regional roadway improvements, including the H-1 Freeway interchange, Kapolei Parkway, North-South Road and Farrington Highway improvements. The proposed reuse of Naval Air Station Barbers Point will also contribute to the region's cumulative traffic conditions, although specific plans for the air station are unknown. East Kapolei's proposed traffic mitigation recommendations will minimize the project's direct impact on roadway conditions. The Ewa Region Highway Master Plan, being prepared by Ewa-area developers and the State DOT takes specific development projects, including East Kapolei, into consideration. The applicant, along with other area developers, is participating in the preparation of this transportation master plan, in an effort to address these interrelationships and cumulative traffic impacts.

The project's water demand will have a cumulative effect on water resources in the area, and wastewater flows will affect the Honouliuli Wastewater Treatment Plant. The project's impact is being considered by the City Department of Wastewater Management in its facilities planning. East Kapolei, cumulatively with other proposed developments, may provide a viable market for treated effluent (for irrigation), ultimately supporting the City's efforts to reuse up to 13 mgd Honouliuli's reclaimed wastewater. Cumulatively, this could also have a positive effect in recharging the Ewa caprock aquifer. Drainage from the project area is a component of the overall flow into the planned Ewa by Gentry-East detention basin and into West Loch. The project's drainage contribution has been considered in plans for the Ewa by Gentry-East facilities, and the proposed drainage structures will, in the long term, reduce the risk of injury, disease and property damage from flooding in the area.

East Kapolei residents will increase local demand for schools, libraries, parks, public services (police, fire protection, etc.) and utility service. The project will provide schools and parks to serve its residents, and therefore, will not have an adverse cumulative impact on existing facilities and services. However, the Police Department's existing staffing shortfalls will grow more acute as the Ewa area continues to develop.

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ALTERNATIVES TO THE PROPOSED ACTION

## CHAPTER 7 ALTERNATIVES TO THE PROPOSED ACTION

Chapter 200 of Title 11, Environmental Impact Statement Rules, 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 environmental quality or the avoidance or reduction of adverse environmental effects. As stated in Section 2.4, the objective of the action (Ewa DP Land Use Map amendment) is to allow the development of up to 8,000 residential units and associated commercial, school and recreational facilities.

Several alternatives were analyzed including: no-action, commercial development and major public facilities development. A review of each alternative is presented below.

### 7.1 No-Action

The no-action alternative analyzes the impacts of taking no-action; which for purposes of this EIS, simply assumes that the East Kapolei project is not proposed on the present site. As previously discussed, a 183-acre portion of the site is owned by the State of Hawaii with the remainder of the site owned by The Estate of James Campbell. The former lessee, Oahu Sugar Company, has completely ceased its operations, leaving the land fallow and available for alternative uses. Without the present East Kapolei project, the landowners would need to assume direct management control of the lands. In the mid- to long-term, in view of the closure of the sugar plantation, State and City plans to develop Kapolei as Oahu's second city, and the strategic location of the site relative to the proposed University, North-South Road and the existing Farrington Highway, it is clear that the site has significant urban development potential. Thus, if no-action is taken by the applicant, it is likely that new developers will take the applicant's place and make similar proposals to develop the site.

The no-action alternative would therefore only delay the urbanization of the site. It would not return the land to former sugarcane cultivation. The loss of the site for agricultural purposes resulting from its urbanization has been fully discussed in Section 5.6 and it is concluded that the impact to agriculture would be not be significant.

### 7.2 Commercial Development

Commercial development is an alternative which was considered but eliminated. Regional retail commercial use would have similar, but somewhat greater environmental impacts in

terms of urbanization and infrastructure demand. Traffic impacts, in particular, would be greater than the proposed project. Although the Ewa-Kapolei region is experiencing much population growth which could possibly support commercial/retail development, a condition of the sale of the subject property by The Estate of James Campbell was that commercial acreage would be limited to two acres for every 1,000 housing units constructed. In addition, EJC is developing the nearby City of Kapolei, which includes a large retail commercial area, to support the growing regional population. The City of Kapolei provides a more centralized location for regional commercial development which is consistent with the long range land use plans for the second city. Development of major commercial uses on the site would place undue and perhaps destructive competitive pressures on the new City of Kapolei, possibly jeopardizing State and County policies to support the growth of the second city. As a result, the alternative for extensive commercial development of the site was discarded.

### 7.3 Major Public Facilities

The University of Hawaii Board of Regents has been seeking a site for a West Oahu campus to support the growing population in the Central Oahu and Ewa regions. The university development would also likely include associated residential and support facilities. Although the subject site provides sufficient acreage and an accessible location for a university, two other sites are being considered. In 1994, the State identified a parcel located to the west of the site for development of the university campus. Subsequently, in 1996, the Governor proposed an alternate 900-acre site, *mauka* of the H-1 Freeway. The alternate site has recently been approved by the University Board of Regents, and is awaiting formal approval by the Legislature.

Other regional public facilities and civic uses such as police and fire stations, libraries, government and commercial offices, etc., are being planned within the City of Kapolei. According to the EJC's Long Range Master Plan, the City of Kapolei is to be the primary commercial and civic center for the Ewa area, providing regional support to the surrounding residential communities. The development of public facilities at the subject site would be contrary to the concept of consolidating public services and facilities in the City of Kapolei. Therefore, development of major public facilities on the project site was perceived as being inconsistent with the Long Range Master Plan and was eliminated as an alternative.

### 7.4 Conclusion

Three alternative development scenarios were analyzed, including a no-action scenario. All three alternatives had the potential for equal or greater adverse environmental impact

compared to the recommended plan of constructing 8,000 homes on the site. Furthermore, and perhaps most importantly, none of the alternatives supports the State and County policies to develop Kapolei as the second city more than the recommended plan. The No-Action alternative would only delay the eventual development of the site and would not reinstate the former agricultural use of the site. The Commercial Development scenario would threaten the success of the City of Kapolei with undue competitive pressures and could significantly increase regional traffic impacts. The development of Major Public Facilities on the site such as a university, regional library, police and fire stations, etc., is not feasible as these facilities are already being planned or constructed in nearby areas.





**CHAPTER 8**  
**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 construction of the proposed project will result in an irreversible and irretreivable commitment of capital, land, labor and energy for the design and development of the project. The commitment of these resources, however, should be evaluated in light of expected benefits to the community accruing from the project.

The development of the project will transform the subject property from its present fallow agricultural/open state to an urban environment. However, the termination of active cultivation of the site occurred independent of the proposed development. There is ample prime agricultural land in other locations for diversified agriculture on Oahu. The housing opportunities provided by the project, the associated employment created and public tax revenues generated appear to justify the loss of agricultural land.

The development of up to 8,000 residential units will create a demand on potable water source and will contribute to regional demands on wastewater and other infrastructure systems.

The project will not require any new commitment of publicly supported services and facilities that will not be compensated by increases in tax revenues.

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

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**CHAPTER 9**  
**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 (11-200-17(j)) 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..."

Short-term tradeoffs related to the proposed action are associated with the development of urban uses on the property. The project area consists of undeveloped, sugar cane fields, and provides open space and the potential for alternative future uses. The proposed action will commit the site to a particular urban use thereby potentially "narrowing the range of [potential] beneficial uses" and possibly foreclosing future options. However, the project will provide a significant number of affordable housing units, addressing an acknowledged existing and projected shortfall in the Ewa area.

Long-term impacts associated with the project are expected to be favorable, given that the project is consistent with State and City growth policies to establish a secondary urban center in Ewa. Any short-term construction-related impacts will be mitigated by the enhancement of long-term productivity of the site.



**CHAPTER 10  
REFERENCES**

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PREPARERS OF THE FEIS

**CHAPTER 11  
PREPARERS OF THE FEIS**

The East Kapolei Project Final EIS (April 1996) was prepared for the applicant, Schuler Homes, Inc. by Helber Hastert & Fee, Planners. The following list identifies individuals and organizations involved in the preparation of this report and their respective contributions.

**Schuler Homes, Inc.**

Mr. Michael Angotti, Director of Land Services

**Helber Hastert & Fee, Planners**

Thomas A. Fee, AICP (Principal-in-charge and Project Manager)

Leslie Kurisaki (Principal Author)

**Technical Consultants**

<u>Consultant</u>	<u>Technical Area</u>
Gail W. Atwater, MBA, MURP, AICP	Market Assessment
Community Resources, a division of SMS Research & Marketing Services, Inc.	Socio-Economic/Fiscal Assessment
Darby and Associates	Acoustical Engineering
Decision Analysts Hawaii, Inc.	Agriculture
Evangeline Funk, Ph.D.	Biological Resources
Gray Hong Bills & Associates, Inc.	Drainage, Wastewater, Electrical, Solid Waste and Civil
J.W. Morrow, Environmental Management Consultant	Air Quality
Tom Nance, Water Resources Engineering	Potable Water Master Plan
Pacific Planning and Engineering, Inc.	Traffic Impact Assessment

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CONSULTED PARTIES AND PARTICIPANTS IN THE DEIS PREPARATION PROCESS

**CHAPTER 12  
CONSULTED PARTIES AND PARTICIPANTS IN THE  
DEIS PREPARATION PROCESS**

The City and County of Honolulu Planning Department (accepting authority) determined that the proposed project may have a significant effect on the environment. On November 9, 1995, the Planning Department notified the Office of Environmental Quality Control (OEQC) that it had determined that an EIS was required for the subject project. This notice of determination is reproduced in this chapter. An EIS Preparation Notice (EISPN) was subsequently published in the November 23, 1995 edition of *The Environmental Notice* (formerly the *OEQC Bulletin*). The publication of the EISPN began a 30-day public review period which ended on December 23, 1995. A copy of the EISPN and/or notice of the project was mailed to the agencies and organizations listed below. The list contains parties believed to have an interest in the project.

A total of 20 agencies, organizations or individuals provided written comments on the EISPN. The parties who responded to the EISPN are identified by an asterisk (\*) and their respective comments are reproduced in the following pages.

Federal Agencies

Army Engineer District

\*Department of the Interior, U.S. Geological Survey  
Commander, Naval Base Pearl Harbor

State Agencies

Department of Land and Natural Resources

-Director

\* -State Historic Preservation Division

\*Housing Finance and Development Corporation

Department of Business, Economic Development and Tourism

-Director

\* -Energy Division

\* -State Land Use Commission

\*Department of Labor and Industrial Relations

\*Department of Accounting and General Services

State Public Works Engineer

Department of Hawaiian Home Lands

Department of Defense

\*Department of Transportation

April 1996

East Kapolei Project FEIS

\*Department of Education

University of Hawaii

Senior V.P. for Administration

City and County of Honolulu

Building Department

\*Department of Transportation Services

\*Board of Water Supply

\*Department of Parks and Recreation

\*Planning Department

Department of Land Utilization

\*Department of Public Works

\*Department of Wastewater Management

\*Department of Human Resources

\*Director of Housing and Community Development

\*Police Department

\*Fire Department

Other Agencies, Organizations and Individuals

Haseko (Ewa), Inc.

\*Gentry Homes, Ltd.

Senator Brian Kanno

Representative Annelle C. Amaral

Councilman John DeSoto

Ahahui Siwila Hawaii O Kapolei

Chevron USA, Inc.

Ewa Beach Community Association

Ewa Neighborhood Board

Ewa Village Community Association

Friends for Ewa

Friendship Bible Church

Hawaiian Electric Company, Inc.

Honokai Hale/Nanakai Gardens Community Association

Hui Aloha Senior Citizens

Kaleopuu Elementary School PTA

Kapolei Elementary School PTA

April 1996

East Kapolei Project FEIS

- Makakilo Elementary School
- Makakilo School PTA
- Makakilo Senior Citizens Club
- Palehua Community Association
- Puuloa Hawaiian Civic Club
- Village Park Community Association
- West Oahu Employment Corporation
- Westloch Estates Community Association



**United States Department of the Interior**

U.S. GEOLOGICAL SURVEY

**WATER RESOURCES DIVISION**  
677 Ala Moana Boulevard, Suite 415  
Honolulu, Hawaii 96813

December 5, 1995

DEC - 8 1995

Ms. Leslie Kurisaki  
Project Planner  
Helbert Hastert and Fee  
733 Bishop St., Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

**Subject: Environmental Impact Statement Preparation Notice  
East Kapolei Project**

The staff of the U.S. Geological Survey, Water Resources Division, Hawaii District, has reviewed the Environmental Impact Statement, Preparation Notice (EISPN), and we have no comments to offer at this time.

Thank you for allowing us to review the EISPN.

Sincerely,

  
William Meyer  
District Chief



Helber Hastert  
Planners

January 5, 1996

Mr. William Meyer, District Chief  
U.S. Geological Survey  
Water Resources Division  
U.S. Department of the Interior  
677 Ala Moana Blvd., Suite 415  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 5, 1995**

Dear Mr. Meyer:

Thank you for your letter dated December 5, 1995 in response to the East Kapolei Project EISPN. We note that the USGS Water Resources Division has no comments at this time. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

December 4, 1995

MICHAEL D. WILSON, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY  
GILBERT COLOMA-AQARAN

AQUACULTURE DEVELOPMENT  
PROGRAM

AQUATIC RESOURCES  
CONSERVATION AND

ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES

FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
DIVISION

LAND MANAGEMENT  
STATE PARKS

WATER AND LAND DEVELOPMENT

Leslie Kurisaki  
Project Planner  
Helber Hastert & Fee  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

DEC 6

LOG NO: 16007 ✓  
DOC NO: 9511TD31

Dear Ms. Kurisaki:

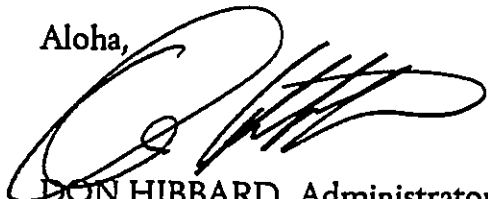
SUBJECT: East Kapolei Project  
Honouliuli, `Ewa, O`ahu  
TMK: 9-1-17: por. 4; 9-1-18: por. 1; 9-2-2: por. 1; 9-2-4: por. 5; 9-1-10: por. 2

Thank you for the opportunity to review the revised concept plan for this development with the new project boundaries. A review of our records shows that the new project boundaries take in old sugar cane lands. Thus, our original review of this project is adequate.

A review of our records shows that there are no known historic sites at the project location shown on your map. These lands were commercially cultivated with sugar cane for many years and it is unlikely that significant historic sites will be found on them. We believe that this project will have "no effect" on historic sites.

If you have any questions please call Tom Dye at 587-0014.

Aloha,

  
DON HIBBARD, Administrator  
State Historic Preservation Division

TD:jk

Helber Hastert  
Planners

January 5, 1996

Mr. Don Hibbard, Administrator  
State Historic Preservation Division  
Department of Land and Natural Resources  
State of Hawaii  
33 S. King St., 6th Floor  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 4, 1995**

Dear Mr. Hibbard:

Thank you for your letter dated December 4, 1995 in response to the East Kapolei Project EISPN. We note your comment that your original review of this project was adequate, and that this revised project will have "no effect" on historic sites. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

BENJAMIN J. CAYETANO

GOVERNOR



ROY S. OSHIRO

EXECUTIVE DIRECTOR

STATE OF HAWAII  
DEPARTMENT OF BUDGET AND FINANCE  
HOUSING FINANCE AND DEVELOPMENT CORPORATION

677 QUEEN STREET, SUITE 300  
HONOLULU, HAWAII 96813  
FAX (808) 587-0600

IN REPLY REFER TO:

95:PPE/7002

December 22, 1995

JAN - 2

Ms. Leslie Kurisaki  
Helber Hastert & Fee  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

Subject: Environmental Impact Statement Preparation Notice  
(EISPN) for East Kapolei Project, Ewa, Oahu

We have reviewed the subject EISPN and have the following  
comment to offer:

Additional information is needed to describe the housing  
component, such as the number and types, targeted income  
groups, and development timetable.

Policies A(3) and B(3) of the State Housing Functional Plan  
seek to ensure that (1) housing projects and (2) projects  
which impact housing provide a fair share/adequate amount  
of affordable homeownership or rental housing  
opportunities. We believe that the proposed housing  
project should address the affordable housing policies of  
the State housing plan. The EIS should fully address this  
issue.

We look forward to working with the applicant to formulate  
an affordable housing program for the proposed project.

Thank you for the opportunity to comment on the EISPN.

Sincerely,

A handwritten signature in black ink, appearing to read "Roy S. Oshiro".

ROY S. OSHIRO  
Executive Director



Helber Hastert  
Planners

January 8, 1996

Mr. Roy S. Oshiro, Executive Director  
Housing Finance and Development Corporation  
Department of Budget and Finance  
State of Hawaii  
677 Queen Street, Suite 300  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 22, 1995**

Dear Mr. Oshiro:

Thank you for your letter dated December 22, 1995 in response to the East Kapolei Project EISPN. We have reviewed your comments and offer the following responses:

The DEIS will provide an estimated development timetable of the units by type of housing and targeted income group and will discuss the project's relationship to the affordable housing policies of the State housing plan.

We appreciate your comments. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

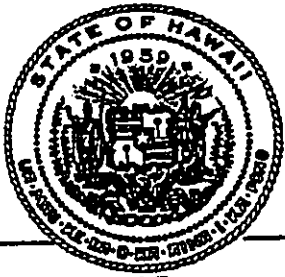
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050



DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT, AND TOURISM

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813 PHONE: (808) 587-3800 FAX: (808) 587-3820

BENJAMIN J. CAYETANO  
Governor

SELI F. NAYA  
Director

RICK EGGER  
Deputy Director

089 Fee

December 6, 1995

DEC 12 1995

Mr. Tom Fee  
Vice President  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Mr. Fee:

SUBJECT: East Kapolei Project, Environmental Impact Statement Preparation  
Notice (EISPN)  
Tax Map Key: 9-1-17:04 (por); 9-1-18:01 (por); 9-2-02:01 (por);  
9-2-04:05 (por); and 9-1-10:02 (por)  
9-1-17:04 (por); and 9-1-18:01 (por)

We wish to inform you that we have no comments regarding the subject East  
Kapolei Project, EISPN.

Thank you for the opportunity to submit any comments or recommendations.

Sincerely,

Maurice H. Kaya  
Energy Program Administrator

MHK:aw

Helber Hastert  
Planners

January 5, 1996

Mr. Maurice H. Kaya  
Energy Program Administrator  
Energy Division  
Department of Business, Economic Development and Tourism  
State of Hawaii  
335 Merchant St., Rm. 110  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 6, 1995**

Dear Mr. Kaya:

Thank you for your letter dated December 6, 1995 in response to the East Kapolei Project EISPN. We note that the Energy Division has no comments regarding the EISPN. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

BENJAMIN J. CAYETANO  
GOVERNOR



ESTHER UEDA  
EXECUTIVE OFFICER

STATE OF HAWAII  
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM  
LAND USE COMMISSION  
Room 104, Old Federal Building  
335 Merchant Street  
Honolulu, Hawaii 96813  
Telephone: 587-3822

December 8, 1995

DEC 12 1995

Ms. Leslie Kurisaki  
Helber, Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

Subject: Environmental Impact Statement Preparation Notice  
(EISPN) for the East Kapolei Project

We have reviewed the EISPN for the East Kapolei project transmitted with your memorandum of November 22, 1995, and have the following comments:

- 1) As represented on the location map, the majority of the project area is located within the State Land Use Agricultural District. It appears that a small portion of the project area above Ewa Villages is located within the State Land Use Urban District. We have enclosed a copy of the State Land Use District Boundaries Map O-6, Ewa, with that portion of the project area in the Urban District highlighted.

We note that Page 2 of the EISPN incorrectly references the Agricultural District as "Agriculture."

- 2) Based on the location of the project's boundaries, the project area appears to include portions of the petition area in LUC Docket No. A94-708/Office of State Planning, which is currently before the Commission. This docket proposes the reclassification of approximately 1,300 acres from the Agricultural District to the Urban District for land exchange, the University of Hawaii-West Oahu campus, housing, and public facility uses. Clarification on the relationship between the East Kapolei project and the above docket should be provided.
- 3) We note that on the location map, the project area includes a triangular portion east of Ewa Villages.



Ms. Leslie Kurisaki  
December 8, 1995  
Page 2

However, this site does not appear to be included in the preliminary concept plan and proposed DP Land Use map.

- 4) We understand that a land use district boundary amendment petition for this project will be filed with the Commission in the future. In light of the Office of State Planning's boundary amendment petition, clarification should be provided as to what portion of the project area will be the subject of the boundary amendment.

We have no further comments to offer at this time. We appreciate the opportunity to comment on this matter.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,



ESTHER UEDA  
Executive Officer

EU:th

encl.

cc: OSP (w/o encl.)

# LAND USE DISTRICT BOUNDARIES

DISTRICT MAP

**0-6**

STATE OF HAWAII  
 LAND USE COMMISSION  
 DEPT. OF PLANNING & ECONOMIC DEVELOPMENT  
 EFFECTIVE DATE: DEC 20 1974

**DISTRICTS**  
 U = URBAN  
 R = RURAL  
 A = AGRICULTURAL  
 C = CONSERVATION

EWA QUADRANGLE  
 HAWAII-HONOLULU CO.  
 ISLAND OF OAHU  
 7.5 MINUTE SERIES (TOPOGRAPHIC)

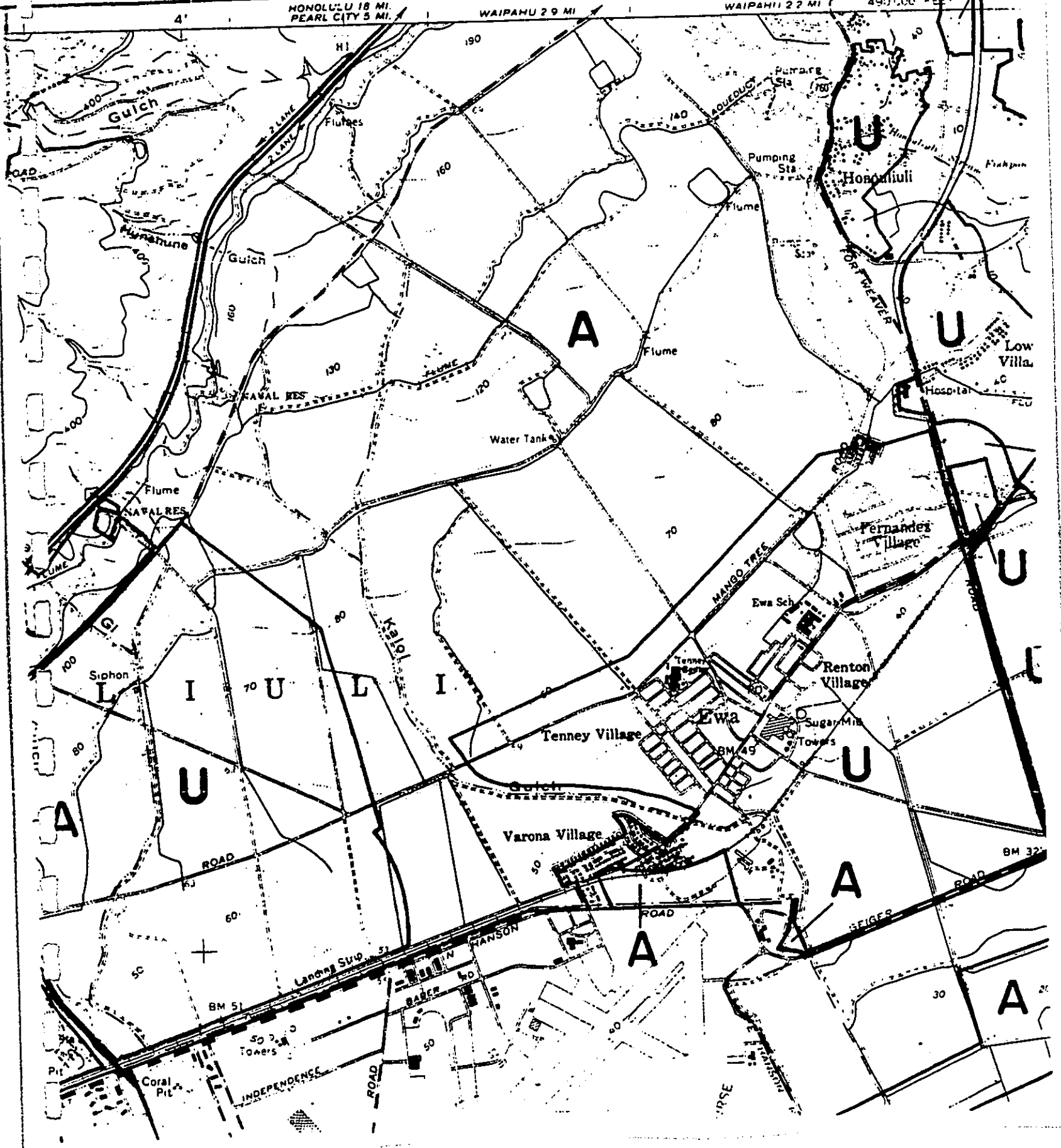
HONOLULU 18 MI.  
 PEARL CITY 5 MI.

WAIPAHU 2.9 MI

WAIPAHU 2.2 MI

490,000 FEET

15



Helber Hastert  
Planners

January 5, 1996

Ms. Esther Ueda, Executive Officer  
State of Hawaii  
Department of Business, Economic Development and Tourism  
Land Use Commission  
Room 104, Old Federal Building  
335 Merchant Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 8, 1995**

Dear Ms. Ueda:

Thank you for your letter dated December 8, 1995 in response to the East Kapolei Project EISPN. We have reviewed your comments and offer the following responses:

1. As you stated, a small portion of the southern project area above Ewa Villages may be within the State Land Use Urban District. As discussed with Bert Saruwatari of your staff, we will request a boundary interpretation for this area to determine the exact Urban-Agricultural boundary. All references to "Agriculture District" will be replaced with "Agricultural District."
2. The 183-acre, State-owned portion of the project area is included in the LUC Docket No. A94-708/Office of State Planning, which is currently before the Commission. Authorization to include the parcel was granted by DLNR by letter dated November 21, 1995 (copy of letter to be included in Draft EIS). Schuler Homes will request Urban District redesignation for the remainder of the application area.
3. The 31-acre triangular portion of the project area east of Fort Weaver Road is one of several small parcels to be used only for off-site infrastructure. These "off-site" parcels, comprising a total of 48 acres, are not shown in the concept plan. The triangular parcel will be used for drainage purposes only. None of these off-site infrastructure parcels are included in the application for Development Plan amendment, although they are discussed as part of the Chapter 343 HRS process.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Helber Hastert  
Planners

Ms. Esther Ueda  
January 5, 1996  
Page 2

4. A land use district boundary amendment petition for the non-urban portions of the project area (exclusive of the off-site infrastructure parcels mentioned in (3) above) will be filed with the Commission in the near future. As mentioned in (1) above, consultation with your staff regarding the boundary interpretation will occur prior to submittal of the petition.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS  
OFFICE OF THE DIRECTOR  
830 PUNCHBOWL STREET, ROOM 321  
HONOLULU, HAWAII 96813

LORRAINE H. AKIBA  
DIRECTOR  
DAYTON M. NAKANE  
DEPUTY DIRECTOR

December 7, 1995

2

Ms. Leslie Kurisaki  
Project Planner  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

The Department of Labor and Industrial Relations has received the Environmental Impact Statement Preparation Notice (EISPN) for the East Kapolei Project. We have reviewed the notice and have no comments to offer.

Thank you for the opportunity to review the document. If you have any questions, please call Naomi Harada, Chief of our Research and Statistics Office, at 586-8999.

Very truly yours,

  
Lorraine H. Akiba  
Director

Helber Hastert  
Planners

January 5, 1996

Ms. Lorraine H. Akiba, Director  
Department of Labor and Industrial Relations  
State of Hawaii  
830 Punchbowl St., Rm. 321  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 7, 1995**

Dear Ms. Akiba:

Thank you for your letter dated December 7, 1995 in response to the East Kapolei Project EISPN. We note that the your department has no comments to offer at this time. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
P. O. BOX 119, HONOLULU, HAWAII 96810  
DEC 19 1995

SAM CALLEJO  
COMPTROLLER

MARY PATRICIA WATERHOUSE  
DEPUTY COMPTROLLER

LETTER NO. (P) 1879.5

Helber Hastert & Fee, Planners  
733 Bishop Street, Suite 2590  
Grosvenor Center, Makai Tower  
Honolulu, Hawaii 96813

Attention: Mr. Tom Fee

Dear Sirs:

Subject: East Kapolei Project  
EIS Preparation Notice

We have reviewed the EIS Preparation Notice for the subject project and have the following comments:

1. The Department of Education (DOE) has experienced difficulties with the respective counties relative to dual usage of park sites adjacent to their schools. These difficulties are in the areas of construction timetables, times of park use, equipment types, etc. Therefore, the eight acres set aside for elementary schools should be increased to twelve and likewise, the area set aside for intermediate schools should be increased to 18 acres.
2. Location of schools on street corners and curves is less than desirable due to limitations on sight distances for vehicles leaving the school site.
3. Developer should coordinate closely with DOE's staff when projecting utility requirements for school sites.
4. Discussions between the developer and DOE should continue in order to address the above concerns.

Thank you for the opportunity to comment on the subject project. If there are any questions regarding the above items, please have your staff call Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,

A handwritten signature in black ink, appearing to read "John Matsuoka".  
GORDON MATSUOKA  
State Public Works Engineer

RY:jk  
cc: Mr. Lester Chuck

Helber Hastert

*Planners*

January 8, 1996

Mr. Gordon Matsuoka, State Public Works Engineer  
Department of Accounting and General Services  
State of Hawaii  
P.O. Box 119  
Honolulu, Hawaii 96810



**East Kapolei Project**  
**Environmental Impact Statement Preparation Notice (EISPN)**  
**Your Letter dated December 19, 1995**

Dear Mr. Matsuoka:

Thank you for your letter dated December 19, 1995 in response to the East Kapolei Project EISPN. Your comments are addressed below:

1. In previous discussions between Schuler Homes, Inc. and the Department of Education, the DOE has indicated that elementary schools may be collocated with a public park. The draft Ewa Development Plan Report (City Planning Department, June 1995) advocates the collocation of elementary schools with neighborhood or community parks (p. 8-5). From the community planning perspective, the collocation of neighborhood-serving park and school facilities makes a lot of sense. It provides an important focus for neighborhood-based activities, and becomes an important organizing land use element for each of the major neighborhoods within the project. Stand-alone facilities will increase the overall land requirement (as you note), reduce residential densities (by directly displacing homes), and increase the relative distances between the facilities, reducing the pedestrian orientation of the project.

The applicant appreciates your concern about coordinating the development and operation of these facilities as the timely and coordinated delivery of these facilities is vital to overall project success. The applicant looks forward to working closely with the various government agencies to ensure the timely and coordinated delivery of these important community facilities.

2. The applicant will work with your Department to assure safe ingress/egress to the school sites.
3. The Draft Environmental Impact Statement will include various utility master plans with projected time schedules, in part to allow coordination with agencies such as the Department of Education (Planning Branch and Facilities Branch).

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

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Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050



Helber Hastert  
Planners

Mr. Gordon Matsuoka  
January 8, 1996  
Page 2

4. Discussions between the developer and DOE will continue in order to address the concerns expressed in your letter.

We appreciate your interest in the project and comments. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097

KAZU HAYASHIDA  
DIRECTOR

DEPUTY DIRECTORS  
JERRY M. MATSUDA  
GLENN M. OKIMOTO

IN REPLY REFER TO:

STP 8.7161

January 8, 1996

JAN 10 1996

Ms. Leslie Kurasaki, Project Planner  
Helber Hastert and Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurasaki:

Subject: East Kapolei Project  
Environmental Impact Statement Preparation Notice

Thank you for your memorandum dated November 22, 1995, requesting our review on the subject project.

Our comments of March 22, 1995, (STP 8.6656) to the Planning Department are still applicable (copy attached).

We defer further comments until we have had the opportunity to review updates to the Traffic Impact Assessment and Traffic Operations Analysis.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Kazu Hayashida".

KAZU HAYASHIDA  
Director of Transportation

Enc.

DIRECTOR'S OFFICE  
DEPT. OF  
TRANSPORTATION

Mar 22 11 37 AM '95

DIR 2069  
DIR 0133  
STP 8.6656

March 22, 1995

Ms. Cheryl D. Soon  
Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: East Kapolei Project  
Draft Environmental Impact Statement (DEIS)  
To Amend the Ewa Development Plan Land Use Map

Thank you for your transmittal requesting our review of the subject DEIS. We have the following comments:

1. Schuler Homes, Inc. should be required to participate with the other major developers in the area on the preparation and implementation of the Ewa Region transportation master plan. This is a combined effort between the developers and all levels of government to identify and implement the transportation improvements required for the entire Ewa Region.

The roadway requirements for this proposed project should be contingent upon the results of the master plan.

The applicant should coordinate their involvement through Campbell Estate, who has been spearheading the master plan effort.

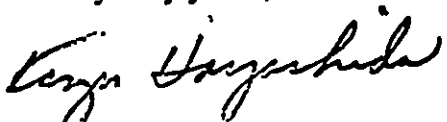
2. The State is proposing to acquire a portion of the Barbers Point Naval Air Station for a future general aviation reliever airport that will also serve the U.S. Coast Guard and the Hawaii National Guard. Consequently, the proposed development may be subject to potential aircraft overflights in and out of the airport.

Ms. Cheryl D. Soon  
Page 2  
March 22, 1995

STP 8.6656

We appreciate the opportunity to provide comments.

Very truly yours,



KAZU HAYASHIDA  
Director of Transportation

EKT/JT/KH:sy

c: Mr. Mike Angotti - Schuler Homes, Inc.  
Ms. Leslie Kurisaki - Helber Hastert & Fee  
Mr. Gary Gill - OEQC

bc: HWY-P (EIS 95-17)  
AIR-EP  
STP (EKT)

Helber Hastert  
Planners

January 17, 1996

Mr. Kazu Hayashida, Director  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii 96813-5097



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated January 8, 1996**

Dear Mr. Hayashida:

Thank you for your letter dated January 8, 1996 in response to the East Kapolei Project EISPN. We note your previous comments of March 22, 1995 to the Planning Department are still applicable.

Regarding your previous comment that Schuler Homes should participate in the Ewa Region Transportation master plan, as noted in our March 27, 1995 response, Schuler Homes is currently a participant, with other major developers, in the preparation and implementation of the master plan. The developer has been coordinating its involvement through the Estate of James Campbell which is spearheading the master plan effort.

You also noted that the development may be subject to aircraft overflights if a general aviation reliever airport is developed at the Barbers Point Naval Air Station. The developer is monitoring the status of current plans and proposals for Barbers Point Naval Air Station, particularly as they may impact the East Kapolei Project.

Thank you for your comments. Your letter will be included in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Benjamin J. Cayetano  
GOVERNOR

HERMAN M. AIZAWA, PH.D.  
SUPERINTENDENT



STATE OF HAWAII  
DEPARTMENT OF EDUCATION  
P. O. BOX 2360  
HONOLULU, HAWAII 96804

JAN 16 1996

OFFICE OF THE SUPERINTENDENT

January 8, 1996

Ms. Leslie Kurisaki  
Project Planner  
Helber Hastert & Fee, Planners  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

SUBJECT: Environmental Impact Statement Preparation Notice  
East Kapolei Project

We have reviewed the subject preparation notice and have determined that the proposed project will have a severe impact on the schools in the area. The proposed 8,000 residential units in East Kapolei will generate the following number of students:

<u>School</u>	<u>Grades</u>	<u>Projected Students</u>
Elementary School	K-5	1600
Intermediate School	6-8	600
High School	9-12	750

Based on the number of students projected from this development, the Department of Education (DOE) will require the developer to make a fair-share contribution in the form of land dedication for future school sites and/or cash contributions for the construction of school facilities.

The developer proposes to set aside 25 acres for two elementary school sites and part of an intermediate school site. The DOE estimates that the developer's fair-share contribution should be approximately 62.66 acres or a cash contribution of \$850 per residential unit developed or combination of land and cash.

The DOE requires elementary school sites to be 8-usable acres next to a County park or 12 acres if a County park is not available. It is our understanding that the City and County Department of Parks and Recreation prefers not to locate a park next to the schools. Hence, both elementary school sites should be 12 usable acres.

An intermediate school site should be at least 18 acres of usable land. The site plan shows only 9 acres within the project.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

Page 2  
January 8, 1996

It has been represented that the State, through the Department of Budget and Finance, has agreed to provide 9 acres within State lands for the intermediate school. However, the DOE has been unable to substantiate this claim. Therefore, all 18 acres should be located within the project.

The DOE envisions a high school in the vicinity due to the plans of the State to utilize the area for housing. The developer should expect to provide a fair share for the high school site since 710 students represents a sizable portion of a high school generally designed for 1,500 students. The fair share can be in the form of cash or construction of facilities for the complex.

All proposed school sites should have the necessary infrastructure such as water, sewer, electrical, and roads up to the school site at no cost to the State. The site should also not have any fill which cannot support buildings and should contain no hazardous wastes or historic or archaeologically significant remains which must be mitigated. The appropriate water allocations for the sites should be provided at no cost to the DOE. The DOE will request a topographic map of the proposed sites and will require that we approve the sites prior to subdivision approval or we will oppose the subdivision request. The shape of the sites should also be more square in shape not to exceed a 1.5 to 1 length to width ratio. The sites are appropriately located away from any commercial areas.

On the preliminary concept plan, the school sites should not be located on the curved portions of any roads due to line of sight safety concerns for students. The sites must also have more than one access road and the main access should be on a road of at least a fifty-six (56) feet right of way to address concerns of the Department of Transportation Services, City and County of Honolulu.

We reserve the right to make additional comments upon development of the Draft Environmental Impact Statement.

Should there be any questions, please call the Facilities Branch at 733-4862.

Sincerely,



Herman M. Aizawa, Ph.D.  
Superintendent

HMA:hy

cc: A. Suga, OBS  
A. Maeda, Leeward  
C&C, Planning Department  
D. Griffin, DPR  
A. Mitsuda, OSP  
G. Matsuoka, PW, DAGS

Helber Hastert  
Planners

January 17, 1996

Dr. Herman M. Aizawa  
Superintendent  
Department of Education  
State of Hawaii  
P.O. Box 2360  
Honolulu, Hawaii 96804



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated January 8, 1996**

Dear Dr. Aizawa:

Thank you for your letter dated January 8, 1996 in response to the East Kapolei Project EISPN. Your estimate of the anticipated number of students generated by the project will be incorporated into the Draft EIS. We note that the student/dwelling unit ratios have increased between 13 percent (elementary schools) and 50 percent (intermediate school) from your December 29, 1994 letter to Helber Hastert & Fee (see following table). So even though the project has reduced in size from 10,000 to 8,000 units (20 percent reduction), the demand for classrooms remains about the same (2,950 students).

**Students per 100 Dwelling Units (d.u.)**

	<u>12/29/94 letter</u>	<u>1/8/96 letter</u>
Elementary	17.7	20.0
Intermediate	5.0	7.5
High School	7.1	9.4

We will contact your office to determine how the estimated fair-share contribution of approximately 62.66 acres to serve the projected student demand was calculated. An important point to remember is that the school age population in the community will grow gradually over the 16-year build out period, and will gradually decrease as the community matures. This dynamic process requires flexibility and strategic planning to optimize investment in public educational resources.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050



11/11/95  
1/17/96

Dr. Herman M. Aizawa  
January 17, 1996  
Page 2

### **Elementary Schools**

The developer understands that DOE requires elementary school sites to be eight usable acres if next to a County park of at least four acres. The project's two elementary school sites are both located next to a County neighborhood park, each eight acres in size. Contrary to your comment, we have not received any indication from the City Department of Parks and Recreation that it objects to locating a park adjacent to the elementary schools. The applicant's position, as stated in our letter to the State Public Works Engineer (January 8, 1996, copy attached), is that the collocation of neighborhood-serving school and park facilities makes a lot of sense. It provides an important focus for neighborhood-based activities, and becomes an important organizing land use element for each of the major neighborhoods within the project. Stand-alone facilities will increase the overall land requirement, reduce residential densities (by directly displacing homes) and increase the relative distances between the facilities, reducing the pedestrian orientation of the project.

### **Intermediate School**

The project includes nine acres of an 18-acre intermediate school site. The developer does not intend to imply that the State has formally agreed to provide the remaining nine acres to complete the school. However, it is Schuler Homes' position that the intermediate school is a regional need, not solely a result of this project. It is believed that the nine acres provides an adequate contribution toward meeting this regional need, and it is hoped that the State (current owner of the adjacent lands) will likewise contribute its share.

### **High School**

Regarding the high school, as stated in its position paper to the DOE dated January 6, 1995, Schuler Homes is willing to participate in and be subject to fairly imposed impact fees. However, the developer strongly believes that a State-wide standard needs to be established regarding "fair share" contribution for high school impact.

### **Timing and Coordination**

The developer will work with the DOE to provide school sites which have adequate infrastructure; appropriate configurations and topography, and meet sound planning criteria.

Helber Hastert  
Planner

Dr. Herman M. Aizawa  
January 17, 1996  
Page 3

The applicant is concerned about the timely and coordinated delivery of schools and other community facilities serving this project. For example, the availability of an operational elementary school in the early phase of the project is seen as essential to project success. The applicant looks forward to working closely with the various government agencies (including DOE) to ensure that high quality schools and other facilities are readily available to East Kapolei residents.

Thank you for your comments. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

enclosures

cc: Ms. Cheryl Soon, Planning Department

Helber Hastert  
Planners

(Attached to response to DOE)

January 8, 1996

Mr. Gordon Matsuoka, State Public Works Engineer  
Department of Accounting and General Services  
State of Hawaii  
P.O. Box 119  
Honolulu, Hawaii 96810



East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 19, 1995

Dear Mr. Matsuoka:

Thank you for your letter dated December 19, 1995 in response to the East Kapolei Project EISPN. Your comments are addressed below:

1. In previous discussions between Schuler Homes, Inc. and the Department of Education, the DOE has indicated that elementary schools may be collocated with a public park. The draft Ewa Development Plan Report (City Planning Department, June 1995) advocates the collocation of elementary schools with neighborhood or community parks (p. 8-5). From the community planning perspective, the collocation of neighborhood-serving park and school facilities makes a lot of sense. It provides an important focus for neighborhood-based activities, and becomes an important organizing land use element for each of the major neighborhoods within the project. Stand-alone facilities will increase the overall land requirement (as you note), reduce residential densities (by directly displacing homes), and increase the relative distances between the facilities, reducing the pedestrian orientation of the project.

The applicant appreciates your concern about coordinating the development and operation of these facilities as the timely and coordinated delivery of these facilities is vital to overall project success. The applicant looks forward to working closely with the various government agencies to ensure the timely and coordinated delivery of these important community facilities.

2. The applicant will work with your Department to assure safe ingress/egress to the school sites.
3. The Draft Environmental Impact Statement will include various utility master plans with projected time schedules, in part to allow coordination with agencies such as the Department of Education (Planning Branch and Facilities Branch).

Helber Hastert & Fee  
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Helber Hastert  
*Planners*

Mr. Gordon Matsuoka  
January 8, 1996  
Page 2

4. Discussions between the developer and DOE will continue in order to address the concerns expressed in your letter.

We appreciate your interest in the project and comments. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

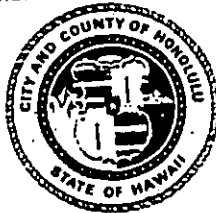


Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

DEPARTMENT OF TRANSPORTATION SERVICES  
**CITY AND COUNTY OF HONOLULU**

PACIFIC PARK PLAZA  
711 KAPIOLANI BOULEVARD, SUITE 1200  
HONOLULU, HAWAII 96813



CHARLES O. SWANSON  
DIRECTOR

JEREMY HARRIS  
MAYOR

11/95-05544R

December 22, 1995

Mr. Michael Angotti  
Director of Land Services  
Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813

JAN - 2 1996

Dear Mr. Angotti:

Subject: Environmental Impact Statement Preparation Notice  
for East Kapolei Project

Based on our review of the current project and prior reviews (January 12, 1995 and May 3, 1995) of the previous environmental documents, we have the following comments which should be addressed in the environmental impact statement or subsequent documents:

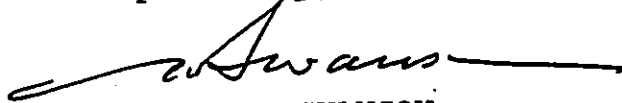
1. The proposed scheduling of improvements to Farrington Highway and the "North-South" Road, in relation to the development of this project, should be provided. Of particular concern is the vehicular carrying capacity of Farrington Highway for the two-lane segments which fall outside the limits of this project. The extent and subsequent phasing of this development may be limited if roadway improvements planned for these segments or the connection to the freeway is not completed in a timely manner.
2. A roadway master plan should be provided to our department during the early stages of the project. The plan should show the general alignment of the major roadways; the approximate number of dwelling units or square footage of commercial/office space for each increment, whichever is appropriate; the roadway cross-sections; and a phasing plan for the development. We are particularly concerned with the present roadway alignment and its relation to the community park. Additional concerns include the proposed loop road which may cause vehicular sight problems and mid-block pedestrian crossing at green ways.

Mr. Michael Angotti  
December 22, 1995  
Page 2

3. Schematic plans of major intersections indicating laneage and the anticipated level-of-service at each approach should be provided. The analysis should include a determination of the lengths of left turn lanes and the need for separate right turn lanes.
4. Subdivision maps for this development have been processed which differ from the roadway alignment shown on the project site plan. The site plan should be revised to reflect the current alignment of the proposed "North-South" Road and Kapolei Parkway.

Should you have any questions regarding these comments, please call Faith Miyamoto of the Transportation Systems Planning Division at 527-6976.

Respectfully,



CHARLES O. SWANSON  
Director

cc: Ms. Lin Wong, Planning Department  
✓ Ms. Leslie Kurisaki, Helber Hastert & Fee  
Office of Environmental Quality  
Control

Helber Hastert  
Planners

January 8, 1996

Mr. Charles O. Swanson, Director  
Department of Transportation Services  
City and County of Honolulu  
Pacific Park Plaza  
711 Kapiolani Boulevard, Suite 1200  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 22, 1995**

Dear Mr. Swanson:

Thank you for your letter dated December 22, 1995 in response to the East Kapolei Project EISPN. We have reviewed your comments and offer the following responses:

1. Your concern is noted and will be discussed in the DEIS.
2. A roadway master plan will be submitted to your department during the early stages of project development.
3. Schematic plans of major intersections indicating laneage and the anticipated level-of-service at each approach will be provided.
4. Based on a follow-up conversation with your staff, we understand the specific concern relates to the alignment of the proposed North-South Road 1 to 2 miles south of the project area. Your staff noted that a subdivision map on file indicates the North-South Road turns to the east as it passes through the Ewa Villages project, connecting with sections already built through the Ewa by Gentry project. Our "Preliminary Concept Plan" indicates a North-South Road intersection with the proposed Kapolei Parkway, east of the Ewa Villages project (as represented on the July 1993 Kapolei Area Long Range Master Plan prepared for the Estate of James Campbell). The area in question is well south of the project site on lands controlled by others. The applicant looks forward to working with the ongoing, DTS-led North-South Road planning effort in its deliberations to determine the actual alignments in this area, and makes no prior assumptions as to what the final alignment will ultimately be.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Helber Hastert  
Planners

Mr. Charles O. Swanson  
January 8, 1996  
Page 2

We appreciate your comments. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBERT HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.



**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714



December 12, 1995

JEREMY HARRIS, Mayor  
WALTER O. WATSON, JR., Chairman  
MAURICE H. YAMASATO, Vice Chairman  
KAZU HAYASHIDA  
MELISSA Y.J. LUM  
FORREST C. MURPHY  
KENNETH E. SPRAGUE  
BARBARA KIM STANTON  
  
RAYMOND H. SATO  
Manager and Chief Engineer

Ms. Leslie Kurisaki  
Helber Hastert & Fee Planners  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

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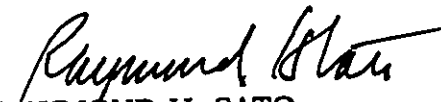
Dear Ms. Kurisaki:

Subject: Your letter of November 22, 1995 Regarding the Environmental Impact Statement Preparation Notice (EISPN) for the Proposed East Kapolei Project, TMK: 9-1-17: 4 and 9-1-18: 1, Ewa, Oahu, Hawaii

Thank you for the opportunity to review and comment on the EISPN for the proposed East Kapolei Project. Our previous comments of January 6, 1995 to Helber Hastert & Fee on the EISPN and of March 8, 1995 to the City Planning Department on the Draft Environmental Impact Statement are still applicable.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

  
RAYMOND H. SATO  
Manager and Chief Engineer

Helber Hastert  
Planners

January 5, 1996

Mr. Raymond H. Sato, Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 S. Beretania St.  
Honolulu, Hawaii 96843



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 12, 1995**

Dear Mr. Sato:

Thank you for your letter dated December 12, 1995 in response to the East Kapolei Project EISPN. We note your previous comments of January 6, 1995 and March 8, 1995 are still applicable.

Previously, a water master plan was prepared showing a water system covering all the agricultural lands bounded by the H-1 Freeway to the north, Ewa Villages to the south, the Villages of Kapolei to the west, and Fort Weaver Road to the east. An addendum to this original water master plan has been completed, specifically for the East Kapolei project. Both the original water master plan and addendum will be included in the Draft EIS. Your comments have been forwarded to the project engineers, and your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.  
Mr. Dave Bills, Gray Hong Bills & Associates

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

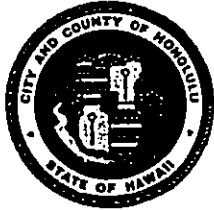
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

DEPARTMENT OF PARKS AND RECREATION  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

JEREMY HARRIS  
MAYOR



DONAL L. HANAIKE  
DIRECTOR  
ALVIN K.C. AU  
DEPUTY DIRECTOR

December 13, 1995

DEC 5

Ms. Leslie Kurisaki, Project Planner  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Leslie Kurisaki:

Subject: East Kapolei Development Project  
Environmental Impact Statement Preparation Notice

This is in response to your November 22, 1995 letter requesting our comments on the above-described project and to confirm our discussion with Mr. Tom Fee of your company.

As was discussed with Mr. Fee at the November 30, 1995 meeting in our office, the proposed project by Schuler Homes will have a serious impact on our existing park facilities in that area.

All projects of this size will need to comply with Park Dedication Ordinance No. 4621 and our department's park space standard of two (2) acres for every 1,000 residents that will be created by the project. Therefore, assuming 3.0 persons per household, the developer will need to provide 48 acres of "active" or community-based park space for the residents of the development project.

We recommend that you provide us with a revised plan and additional information on the proposed park sites for the East Kapolei development project.

*We Add Quality to Life*

Ms. Leslie Kurisaki  
Page 2  
December 13, 1995

If you have any questions, please contact Lester Lai of  
our Advance Planning Branch at 523-4696.

Sincerely,



For DONA L. HANAIKE  
Director

DLH:ei

cc: Planning Department (Lin Wong)  
Department of Land Utilization (Bob Moore)

Helber Hastert  
*Planners*

January 5, 1995

Ms. Dona L. Hanaike, Director  
Department of Parks and Recreation  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 13, 1995**

Dear Ms. Hanaike:

Thank you for your letter dated December 13, 1995 in response to the East Kapolei Project EISPN. We note that based on the City and County's Park Dedication Ordinance (PDO) formula, the project generates a requirement of 31 acres of park space, based on the proposed mix of single and multi-family units. The East Kapolei project provides 32 acres of neighborhood and community parks which will be dedicated to the City and County, exceeding the PDO requirement.

Based on the existing Development Plan standard (2 acres per 1,000 residents), the project's 22,400 residents would require 45 acres of open space and recreational area. In addition to the 32 acres of dedicated public park space, at least 13 acres of additional open space and park areas in the form of bikeway/greenbelts and passive open space will be provided and maintained by homeowners associations within the East Kapolei project, thus meeting the DP standard.

We also note that the Department of Parks and Recreation is actively involved in planning new parks for Ewa, and is considering possible future development of up to 1,100 acres of park space at the Barbers Point Naval Air Station. This would provide significant regional park resources available to project residents.

Helber Hastert & Fec  
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Facsimile 808 545-2050

**Helber Hastert**  
*Planners*

Ms. Dona L. Hanaike  
January 5, 1996  
Page 2

Thank you for your comments. Your letter will be reproduced in the Draft EIS.

Sincerely,

**HELBER HASTERT & FEE, Planners**

*Leslie Kurisaki*

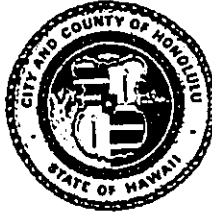
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

PLANNING DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

JEREMY HARRIS  
MAYOR



CHERYL D. SOON  
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI  
DEPUTY CHIEF PLANNING OFFICER

LW

December 29, 1995

JAN - 5

Helber Hastert & Fee  
Grosveror Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Attn: Ms Leslie Kurisaki

Gentlemen:

Comments to the Environmental Impact Statement  
Preparation Notice (EISPN), 96/E-1  
Ewa Development Plan Land Use Map Application and  
Environmental Assessment (EA), East Kapolei Project, Ewa, Oahu

We have reviewed the subject EISPN and offer the following comments.

The project is consistent with the existing City General Plan and Development Plan policies to direct growth to Ewa and to promote development of a secondary urban center in Kapolei. In addition, the preliminary concept plan appears to be consistent with guidelines proposed for residential communities in the Draft Revision of the Ewa Development Plan. We recommend that the following information be included in the Draft Environmental Impact Statement (DEIS).

Population

The EA shows a 2010 population forecast of 93,112 for Ewa or 9.3% of the islandwide population. For your information, population forecast data which was recently extended to the year 2020 shows an updated projections for 2010 of 100,800 or 10.1 percent of the islandwide population (Development Plan Annual Report, Fiscal Year 1995, September, 1, 1995, see page 7, Table-II: "Comparison of Development Plan Population Distribution with General Plan Guidelines"). This is still within the upper limits of the General Plan distribution guidelines of 132,900 for Ewa or 13.3% of the islandwide population.

The EA based its estimate of project-related population on 2.8 persons per household and assumes full build-out of 8,000 units by 2012. We recommend that the DEIS reflect the estimated absorption rate of the project for the years 2010 and 2015 in order to evaluate the project's impact on the population projections for Ewa and the General Plan policies.

### Housing

The summarized 1994 Market Assessment Report in the EA estimated "residential demand in the Ewa study area as ranging from 52,961 to 57,474 units, between 1994 and 2010." You had previously stated that the market study area included the Ewa DP area plus the Waikele and Royal Kunia communities. The residential demand cited referred to the total projected demand in the market study area between 1994 and 2010, including existing units. It is our understanding that the study is currently being updated. We will reserve further comments until we have had an opportunity to review the updated study. We request that in order to facilitate comparison with our department's housing forecast data for the Ewa DP area, the DEIS should break down its residential supply and demand projections to reflect projected demand and supply of additional units in the Ewa DP area.

The DEIS should provide additional information to describe the housing component, such as the number and types, target income groups, development timetable for build-out, and how the project will comply with State and City policies on affordable homeownership and rental opportunities.

The EA notes that the project "could reinforce the existing development trend, of housing development in advance of employment centers and community facilities." While provision of affordable homes is consistent with the General Plan housing policies, we find that this pattern of development is not necessarily desirable. The DEIS should include a discussion on the availability of employment opportunities in Ewa as it relates to the development schedule of the project.

### Public Costs and Revenues

The DEIS should include a comprehensive fiscal impact analysis of all projected costs and revenues associated with the full development of the proposed project to assess the overall impact on various governmental services and facilities. The EA states that "because the project is located in Ewa, it will contribute to the funding of already-planned capital improvements." The DEIS should clarify whether already-planned capital improvements included East Kapolei in its planning; if not, what additional services and facilities would be required; and how the applicant proposes to meet the additional demand, if any, to accommodate the additional project-related impacts.



Traffic/Transportation

The EA states that project access will be via Farrington Highway until completion of the North-South Road and freeway interchange; and that access from Farrington Highway will be constructed as part of the initial development phase, starting in 1998 in the southern project area and expanding northward. The DEIS should address the issue of timing and construction of improvements to Farrington Highway, the North-South Road and freeway interchange, and should also provide a development schedule of the project as it relates to the proposed scheduling of improvements to the above roadways.

The DEIS should also include a discussion on how the project will incorporate transit provisions within its proposed plans and coordinate with other transportation measures proposed for the region.

While we are encouraged by the conceptual circulation pattern which facilitates pedestrian and other non-vehicular travel to and from the community park and commercial area, the DEIS should include a discussion on potential traffic impacts related to the circulation pattern and proposed measures to mitigate these impacts.

A potential future roadway connection to Fort Weaver Road is also identified in the EA. The DEIS should define this connection and clarify its feasibility.

Drainage

The EA stated that the project is confined to the West Loch drainage basin. The DEIS should provide additional information on the on-site drainage system for the project and the impact of project-related runoffs on the West Loch drainage basin.

A description of potential impacts and mitigative measures related to flooding of adjacent communities including the West Loch and Ewa Villages should also be included in the DEIS.

We have concerns that this project is immediately adjacent to other lands potentially developable within Kaloi Gutch drainage basin. The apparent attempt to sever the two to avoid the regional Kaloi Gutch drainage issue must remain a major concern to Campbell Estate whenever they undertake development agreements. We are further concerned by recent announcements that these adjacent lands may be "traded" to the State again without any explanation of who is taking responsibility for drainage. This pattern cannot be allowed to continue.

Helber Hastert & Fee  
December 29, 1995  
Page 4

Parks

There is a discrepancy in the park acreage requirement between estimates stated in the EA and those provided by the Department of Parks and Recreation (DPR). The EA reflects 32 acres of park areas to meet the Park Dedication Ordinance requirements and estimates that a minimum of 45 acres of open space and recreation areas will ultimately be required to meet the 2 acres per thousand persons requirement stated in the Development Plan Common Provisions. The DPR stated that 48 acres of active or community-based park space is required for the project, based on 3.0 persons per household and a build-out of 8,000 units. The DEIS should include any discussions with the DPR to address the difference, specify proposals to meet the 2 acres of park area per thousand persons requirement, and incorporate an open space plan in the conceptual site plan.

The DPR has also expressed safety concerns for pedestrian crossing on the loop road around the park. The department also indicated a need for provision of park areas in the 82-acre mauka residential area which is currently lacking park space in the preliminary conceptual plan. Please address these issues in the DEIS.

Schools

The DEIS should include a description of the impact on the Department of Education (DOE) school system and any discussions with the DOE to meet enrollment growth related to the project.

In addition, the State has recently announced a new site for the University of Hawaii West Oahu Campus. It plans to sell 500 acres of the State landbank site adjacent to the subject site, and possibly exchange 183 acres of land with Campbell Estate. Please reflect this development in the DEIS and indicate any potential impact on the subject proposal.

Should you have any questions, please do not hesitate to contact Lin Wong of my staff at 523-4485.

Sincerely,



CHERYL D. SOON  
Chief Planning Officer

CDS:ft

cc: Managing Director's Office

Helber Hastert  
Planners

January 8, 1996

Ms. Cheryl D. Soon, Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project**  
**Environmental Impact Statement Preparation Notice (EISPN)**  
**Your Letter dated December 29, 1995**

Dear Ms. Soon:

Thank you for your letter dated December 29, 1995 in response to the East Kapolei Project EISPN. We have reviewed your comments and offer the following responses:

We are pleased to note your determination that the project is consistent with the existing City General Plan and Development Plan Policies to direct growth to Ewa and to promote development of a secondary urban center in Kapolei, and that the preliminary concept plan appears consistent with guidelines proposed for residential communities in your department's Draft Revision of the Ewa Development Plan. The applicant is committed to continue its working relationship with your department to ensure consistency with the City's policies and objectives for development of the East Kapolei area.

**Population**

The revised 2010 population projection for the Ewa DP area of 100,800 will be included in the DEIS. The mean annual absorption rate for the project is estimated at 500 units, based on the applicant's experience and an analysis of existing and projected market conditions. The hypothetical absorption schedule assumes a project start in 1998 and build out completion by 2013. According to the schedule, the 2010 unit count would be 6,650 units, with an associated population of 18,620 (assuming 2.8 persons per household). 2015 dwelling unit counts and residential population would of course coincide with the 2013 build-out projections (i.e., 8,000 units and 22,400 residents, respectively).

**Housing**

The DEIS will include a discussion of residential supply and demand projections for "additional" units in the market study area as well as the Ewa DP area alone. Numbers and types of units and timetable for build-out will be discussed in Chapter 2 of the DEIS. Chapter 3 of the DEIS will include a discussion of how the project will comply with government housing policies.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

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Helber Hastert  
Planners

Ms. Cheryl D. Soon  
January 8, 1996  
Page 2

The applicant acknowledges the need for additional employment in the Ewa region to realize the General Plan objectives of creating a true "second city." Some encouraging recent and anticipated activities include the opening of a major Bank of Hawaii office complex and City and State plans for offices and other public facilities in the City of Kapolei; continuing expansion of Campbell Industrial Park and the Kapolei Business Park; and potential for economic development related to the reuse of Barbers Point Naval Air Station.

#### Public Costs and Revenues

The DEIS will include a fiscal impact analysis of the project. Updated infrastructure studies (i.e., water, wastewater, drainage, power, roadways, etc.) as well as comments from various service providers (utility agencies, schools, police, fire, etc.) will be presented in the EIS. It is anticipated that through the EIS consultation process, project impacts and appropriate mitigation measures will continue to be identified. The applicant and its consultants will continue to work with the various agencies and service providers, to ensure that project demands are accommodated.

#### Traffic/Transportation

The DEIS will provide a discussion of the timing of improvements along Farrington Highway, the North South Road and associated H-1 Freeway interchange.

Access to adequate transit service will be an important amenity for future residents of East Kapolei. Relatively high residential densities and the pedestrian orientation of the project's core area will facilitate implementation of transit service in the mid- to long-term. Specific plans for the incorporation of transit-oriented facilities (beyond recognition of need) have not yet been formulated. The project recognizes and supports the City's planned transit corridor along Farrington Highway and down the proposed North-South Road, and has anticipated the development of higher density transit nodes to the north and west of the project area. In a related area, the project will also encourage pedestrian and bicycle travel modes through its introduction of "neo-traditional" land use concepts relating to land use mix, density, street patterns, and a comprehensive network of greenbelts for bicycle and pedestrian use. The ongoing environmental review, agency consultation, DP amendment process and master planning efforts will provide an opportunity to further refine the conceptual plan for transit services.

The DEIS will include a discussion of potential traffic impacts related to the proposed internal circulation pattern, and proposed measures to mitigate these impacts. The proposed future roadway connection to Fort Weaver Road is represented as a conceptual alignment at this time, based on the City's proposed Ewa Development Plan. More detailed studies of the adjacent "West Loch bluffs" area (i.e., between the project and Fort Weaver Road) need to be conducted to determine a precise alignment. As noted in the DEIS, a tie into Fort Weaver Road is considered a long-term possibility, not be feasible in the short-term due to capacity conditions being experienced

Helber Hastert  
Planners

Ms. Cheryl D. Soon  
January 8, 1996  
Page 3

along Fort Weaver Road, and the fact the area through which the proposed alignment passes is not slated for development until after 2005.

#### Drainage

The DEIS will describe the on-site drainage system and proposed off-site improvements. The East Kapolei project is confined to the West Loch drainage basin, and will therefore have no effect on the nearby Kaloi Gulch basin.

#### Parks

As noted in the DEIS, the project will provide 32 acres of community and neighborhood park, exceeding the 31 acre Park Dedication Ordinance requirements. Based on the existing Development Plan Common Provisions standard (2 acres per 1,000 residents), the project's 22,400 residents would require 45 acres of open space and recreational area. In addition to the 32 acres of dedicated public park space, at least 13 acres of additional open space and park areas in the form of bikeway/greenbelts and passive open space will be provided and maintained by homeowners associations within the East Kapolei project, thus meeting the DP standard.

The 82-acre *mauka* parcel (between H-1 Freeway and Farrington Highway) is too small to support a standard, dedicated neighborhood park. Accordingly, park needs will be accommodated via private open space and recreation areas within the context of the project's overall Park Dedication Ordinance requirements.

With regard to regional park planning, we note that the Department of Parks and Recreation is actively involved in planning new parks for Ewa, and is considering possible future development of up to 1,100 acres of park space at the Barbers Point Naval Air Station. This would provide significant new regional park resource available to project residents.

The applicant is continuing to work with the Department of Parks and Recreation, as well as the Department of Transportation Services, to address their concerns about the proposed loop road around the community park.

#### Schools

The DEIS will include a discussion of projected school enrollments at project build-out. The applicant will continue to work with the Department of Education to ensure that adequate school facilities are developed in a timely manner. We are concerned over recent correspondence from DAGS indicating its objections to collocating the proposed elementary schools with neighborhood parks (see DAGS letter dated December 19, 1995). This view appears contrary to previous practice, and recommended community design objectives articulated in the proposed Ewa

Helber Hastert

Planners

Ms. Cheryl D. Soon

January 8, 1996

Page 4

Development Plan. We will be working closely with DAGS and DOE to resolve their concerns, and will welcome your department's continuing input into this dialogue.

Although the State has recently announced plans for a new University of Hawaii West Oahu campus site mauka of the H-1 Freeway, we feel it would be speculative and premature to discuss these proposals in the DEIS, other than to note the general discussion, as no information on these proposals has been provided for public review other than several newspaper articles. At present, both the Legislature and University of Board of Regents have yet to endorse the new site, and until that time, the original site remains the "official" University site. Regardless of the outcome, the feasibility of the project is not affected.

Regarding the 183-acre parcel encompassing the southern end of the application area, the DEIS clearly states that (1) the parcel is now owned by the State of Hawaii, (2) the State has authorized the applicant to include the acreage in its DP amendment application, (3) should projected circumstances prevail, the applicant will ultimately assume control of the subject parcel, and (4) should the parcel ultimately not be available for development, the project will proceed without it.

Thank you for your comments. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

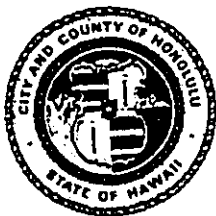
*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Mr. Mike Angotti, Schuler Homes, Inc.

DEPARTMENT OF PUBLIC WORKS  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

KENNETH E. SPRAGUE  
DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO  
DEPUTY DIRECTOR

ENV 95-324

December 1, 1995

DEC - 4 1995

Ms. Leslie Kurisaki, Project Planner  
Helber Hastert & Fee  
733 Bishop Street, Suite 2590  
Honolulu, HI 96813

Dear Ms. Kurisaki:

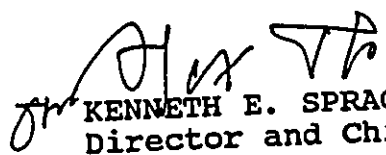
Subject: Environmental Impact Statement Preparation Notice  
(EISPN) - East Kapolei Project, TMK: Various

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

1. All new and existing roads that support the proposed project and are planned to be dedicated to the City should be constructed in accordance with the City standards.
2. The EISPN should address storm water quality along with implementation of best management practices (BMPs) to control and reduce pollutants.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

  
KENNETH E. SPRAGUE  
Director and Chief Engineer

Helber Hastert  
*Planners*

January 5, 1996

Mr. Kenneth E. Sprague  
Director and Chief Engineer  
Department of Public Works  
City and County of Honolulu  
650 S. King St.  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 1, 1995**

Dear Mr. Sprague:

Thank you for your letter dated December 1, 1995 in response to the East Kapolei Project EISPN. Your comments are noted and will be discussed in the Draft EIS. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

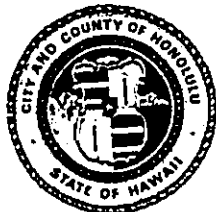
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
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DEPARTMENT OF WASTEWATER MANAGEMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

FELIX B. LIMTIACO, P.E.  
DIRECTOR  
CHERYL K. OKUMA-SEPE, ESQ.  
DEPUTY DIRECTOR

In reply refer to:  
WCC 95-48

December 12, 1995

Ms. Leslie Kurisaki, Project Planner  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

DEC 5 1995

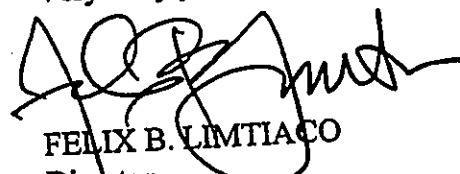
Dear Ms. Kurisaki:

Subject: EISPN for East Kapolei Project, dated November 1995

Please include our department on Table 2: Summary of Approval Needed. In addition to comments made in section 6.3 regarding the wastewater system, submittal of a wastewater master plan is required for our review and approval. The preparation of the master plan should be coordinated with this department. However, you may proceed with the environmental review process.

If you have any questions, please contact Ms. Tessa Yuen of the Service Control Branch at 523-4957.

Very truly yours,

  
FELIX B. LIMTIACO  
Director

Helber Hastert  
Planners

January 5, 1996

Mr. Felix Limtiaco, Director  
Department of Wastewater Management  
City and County of Honolulu  
650 S. King St.  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 12, 1995**

Dear Mr. Limtiaco:

Thank you for your letter dated December 12, 1995 in response to the East Kapolei Project EISPN. As requested, we have added the Department of Wastewater Management to the table "Summary of Approvals Needed." An updated wastewater master plan for the project area will be submitted to your department for review, and will be included in the Draft EIS. Previously, a wastewater master plan was prepared for the area bounded by the H-1 Freeway to the north, Ewa Villages to the south, the Villages of Kapolei to the west, and Fort Weaver Road to the east. This master plan was intended to facilitate overall, long-range coordination with your department. The updated master plan shows the ultimate size trunk sewers, as well as the requirements of the East Kapolei project.

Your comments have been forwarded to the project engineers, who will continue to work with your department. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

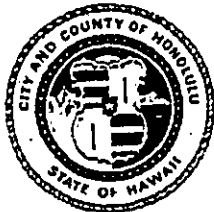
Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

DEPARTMENT OF HUMAN RESOURCES  
**CITY AND COUNTY OF HONOLULU**

STANDARD FINANCE PLAZA  
715 SOUTH KING STREET  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

SALVATORE S. LANZILOTTI, ED.D.  
DIRECTOR

MICHAEL T. AMI  
DEPUTY DIRECTOR

ADMINISTRATION  
2ND FLOOR: (808) 527-5311  
FAX: (808) 523-4074

ELDERLY AFFAIRS DIVISION  
HONOLULU COMMITTEE ON AGING  
5TH FLOOR: (808) 523-4761

WORKHAWAII DIVISION  
5TH FLOOR: (808) 523-4102

SPECIAL PROJECTS SECTION  
HONOLULU COUNTY COMMITTEE ON THE STATUS OF WOMEN  
MAYOR'S COMMITTEE FOR PERSONS WITH DISABILITIES  
MAYOR'S CHILD CARE ADVISORY BOARD  
5TH FLOOR: (808) 527-6264

December 22, 1995

Mr. Leslie Kurisaki  
Project Planner  
Helber Hastert & Fee  
Grosvenor Center  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Subject: **EAST KAPOLEI PROJECT - ENVIRONMENTAL  
IMPACT STATEMENT PREPARATION NOTICE (EISP)**

Dear Mr. Kurisaki:

The Department of Human Resources has reviewed the subject matter cited above and offers the following comments:

We note that the applicant is proposing to construct approximately eight thousand (8,000) residential units in addition to providing sixteen (16) acres for commercial use.

While the applicant is looking toward providing land for recreational and educational purposes, there are other social needs that will undoubtedly be generated by the project given its size. For example, given the fact that the project will include a significant number of affordable housing units targeting young families, we foresee the need for quality child care services. Additionally, we hope that the jobs to be generated by the planned commercial component will be proportionately filled by residents of the East Kapolei community thereby reducing the potential traffic impact on the already overburdened Leeward Oahu commuters. A significant factor that prevents parents from working is the lack of affordable quality child care services. Consequently, an on-site child care facility would be especially attractive for the planned project.

**East Kapolei Project - EISPN**

December 22, 1995

Page Two

Therefore, as the primary City agency responsible for addressing the social and human service needs of our communities on Oahu, we propose the following:

- (1) That an area be dedicated within the proposed development and funds be provided to the City for the construction of a facility to house programs and services which address the community's social needs such as child care and/or programs/services for the disabled, at-risk youth, elderly, unemployed, etc.; or,
- (2) Cash payment in lieu of land be dedicated to the City and County of Honolulu for construction of a facility to house social programs and services for the community at an alternative site within the project's immediate vicinity.

Additionally, we ask that the applicant consider the inclusion of an elderly housing component for the proposed project which is in critical demand by our growing population of seniors. Our seniors are an integral part of the communities in which they reside and we believe that an elderly housing component for the proposed project would be consistent with the applicant's planned community concept.

Please be informed that these comments are consistent with our memorandums dated February 24, 1995 (Draft Environmental Impact Statement [DEIS] East Kapolei Project, Ewa, Oahu, TMK: 9-1-17:04 [por]) and April 13, 1996 (Agency and Public Review Package for the 1995 Development Plans Annual Amendment Review) with respect to the East Kapolei Project.

Consequently, we ask that our department be included in the forthcoming EIS process and look forward to reviewing your response to our comments.

Thank you for the opportunity to comment on this matter.

Sincerely,



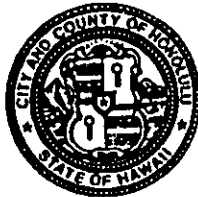
*Michael J. Lanzilotti*  
SALVATORE S. LANZILOTTI, Ed.D.  
Director

*Attachments*

a:\enstkap.dsp

DEPARTMENT OF HUMAN RESOURCES  
**CITY AND COUNTY OF HONOLULU**

STANDARD FINANCE PLAZA  
715 SOUTH KING STREET  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

SALVATORE S. LANZILOTTI, ED.D.  
DIRECTOR

ROBERT AGRES, JR.  
DEPUTY DIRECTOR

ADMINISTRATION  
2ND FLOOR: (808) 527-6311  
FAX: (808) 523-4074

ELDERLY AFFAIRS DIVISION  
HONOLULU COMMITTEE ON AGING  
5TH FLOOR: (808) 523-4761

WORKHAWAII DIVISION  
5TH FLOOR: (808) 523-4102


SPECIAL PROJECTS SECTION  
HONOLULU COUNTY COMMITTEE ON THE STATUS OF WOMEN  
MAYOR'S COMMITTEE FOR PERSONS WITH DISABILITIES  
MAYOR'S CHILD CARE ADVISORY BOARD  
5TH FLOOR: (808) 527-6284

February 24, 1995

**MEMORANDUM**

TO: CHERYL D. SOON, DIRECTOR  
PLANNING DEPARTMENT

ATTN: BRIAN SUZUKI

FROM: SALVATORE S. LANZILOTTI, Ed.D., DIRECTOR  
DEPARTMENT OF HUMAN RESOURCES 

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)  
EAST KAPOLEI PROJECT, EWA, OAHU, TMK: 9-1-17: 04 (por)

The Department of Human Resources (DHR) has reviewed the subject matter cited above and offers the following comments:

*We understand that the proposed project, when completed, will be comprised of 10,000 dwelling units and approximately 28,000 residents. We anticipate that a fair percentage of these dwelling units will be targeting young families, particularly those units that will be designated as affordable. Although the applicant has made allowances for the increased demand in educational services, there will also be a need for quality affordable child care services as well. Also, once the proposed University of Hawaii - West Oahu campus project is completed, there will be a much stronger demand for child care services as generated by its faculty, employees and students in Kapolei, Oahu.*

**EAST KAPOLEI PROJECT - DEIS**  
February 24, 1995  
Page Two

*Therefore, we ask that the applicant provide the City and County of Honolulu with a minimum of 2 acres in each phase of the project or a cash equivalent for the construction of a facility that will be able to provide quality child care services for the East Kapolei residents within the project's immediate vicinity. For example, there is a possibility that a child care facility may be placed on a City park site. Therefore, the applicant in its provision of land to the City for park purposes may provide the necessary capital for the construction of a child care facility on this parcel in lieu of additional land. Of course this option is only available if the child care facility does not interfere with activities projected for the parcel by the City's Department of Parks & Recreation.*

*Irrespective of the option chosen by the applicant, the land and/or funds would enable the City & County of Honolulu to service a cross-section of the community as it is our intention to design a facility that is multi-generational in usage (i.e. youth/senior/child care center). This concept allows the center to evolve into other social service functions as the population ages and different human service needs arise.*

*Finally, we ask that the applicant consider designating a fair percentage of dwelling units as affordable rentals as well as the inclusion of an elderly housing component. These types of housing units are at a critical shortage and will continue to be in high demand in the immediate future. If we are to continue to look to the Kapolei region as the "Second City," then, future residential projects must be sensitive to the needs of the whole community and the inclusion of the aforementioned housing components is a positive step in that direction.*

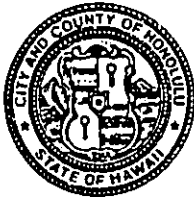
If you have any questions or require further clarifications regarding our comments, please direct your inquiries to Mr. Ernie Martin of our department's *Special Projects Section* at X-6264.

Thank you for the opportunity to comment on this matter.

cc: Brian J.J. Choy, Director  
Office of Environmental Quality Control  
Mike Angotti, Director of Land Services  
Schuler Homes, Inc.  
Leslie Kurisaki, Project Planner  
Helber Hastert & Fee, Planners

DEPARTMENT OF HUMAN RESOURCES  
**CITY AND COUNTY OF HONOLULU**

STANDARD FINANCE PLAZA  
715 SOUTH KING STREET  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

SALVATORE S. LANZILOTTI, ED.D.  
DIRECTOR

ROBERT AGRES, JR.  
DEPUTY DIRECTOR

ADMINISTRATION  
2ND FLOOR: (808) 527-5311  
FAX: (808) 523-4074

ELDERLY AFFAIRS DIVISION  
HONOLULU COMMITTEE ON AGING  
5TH FLOOR: (808) 523-4761

WORKHAWAII DIVISION  
5TH FLOOR: (808) 523-4102

SPECIAL PROJECTS SECTION  
HONOLULU COUNTY COMMITTEE ON THE STATUS OF WOMEN  
MAYOR'S COMMITTEE FOR PERSONS WITH DISABILITIES  
MAYOR'S CHILD CARE ADVISORY BOARD  
5TH FLOOR: (808) 527-6264

April 13, 1995

**MEMORANDUM**

TO: CHERYL D. SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: SALVATORE S. LANZILOTTI, Ed.D., DIRECTOR  
DEPARTMENT OF HUMAN RESOURCES

SUBJECT: AGENCY AND PUBLIC REVIEW PACKAGE FOR  
THE 1995 DEVELOPMENT PLANS ANNUAL AMENDMENT REVIEW

The Department of Human Resources has reviewed the above-cited request and offers the following comments:

We propose that developers of large recreational and residential projects through Unilateral Agreement(s) with the City and County of Honolulu either:

- I. Dedicate an area within the proposed development and provide funds to the City for the construction of a facility to house programs and services which address the community's social needs such as child care, homeless shelters, and/or programs/services for the disabled, at-risk youth, elderly, unemployed, etc.; or,
- II. Make cash payment in lieu of land to the City and County of Honolulu for the construction of a facility to house social programs and services for the community at an alternative site within the project's immediate vicinity.

We request that these provisions be required, during the time in which the developer(s) apply for re-zoning, for the following projects:

PROJECT  
East Kapolei  
Waiawa by Gentry

PD REF. NO.:  
95/E-1  
95/CO-2

**1995 DEVELOPMENT PLANS ANNUAL AMENDMENT REVIEW**

April 13, 1995

Page Two

With respect to the East Kapolei project (PD Ref. No. 95/E-1) it was stated in the applicant's response of March 27, 1995 to our February 24th comments on the Draft Environmental Impact Statement (DEIS) that the provision of child care services for families of the proposed project could be met through various options to include off-site facilities. It was also noted that some families may be inclined to place their children in a facility in close proximity to their place of work.

While we do not differ with these assumptions and in fact would not recommend an on-site child care facility if the need was adequately addressed by other centers, we would like to point out some of the advantages of an on-site facility.

First of all, one of the reasons that government has supported the development of a Second City in the Ewa Plains is the diversion of traffic from the downtown urban core. If a City-sponsored on-site facility was developed for the proposed project, it may be linked to a park-and-ride project whereby parents can drop off their children at the center, park their vehicle at an adjacent lot and ride a bus rather than drive their car to work.

Secondly, as noted in our comments of February 24th, we would develop a multi-generational facility that would enable the City to serve a cross-section of the community. This concept allows the facility to evolve into other social service functions as the population ages and different human service needs arise. Additionally, the inclusion of such a facility would ensure that the social service needs of the community would be addressed within the project which we believe would enhance its marketability.

Finally, the advantage of government-private provider partnership with respect to a child care facility is that the construction costs for the provider may be leveraged with city, state or federal funds thereby enabling tuition rates to be set at a lower level than what a private provider would be able to provide on a standalone project.

If you have any questions or require further clarifications concerning our comments, please direct your inquiries to Mr. Ernie Martin of our department's *Special Projects Division* at X-6264.

Thank you for the opportunity to comment on this matter.

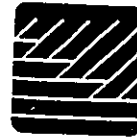
SSL:spd



Helber Hastert  
Planners

January 8, 1996

Dr. Salvatore S. Lanzilotti, Ed.D., Director  
Department of Human Resources  
City and County of Honolulu  
Standard Finance Plaza  
715 S. King St.  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 22, 1995**

Dear Dr. Lanzilotti:

Thank you for your letter dated December 22, 1995 in response to the East Kapolei Project EISPN, as well as your previous comments (memoranda dated February 24, 1995 and April 13, 1995).

Area/Funds for Community Social Needs

As stated in our March 27, 1995 letter to your department, the developer concurs that facilities and programs to meet the social needs (i.e., child care, disabled, youth, elderly, unemployed, etc.) are important in a functioning community. However, we would also like to reiterate that the provision of these social and human service needs should be shared by all sectors of the community. Churches are anticipated to take a lead role in providing child care within the East Kapolei community. The proposed University of Hawaii West Oahu campus is likely to include a child care center, and may be a more appropriate location for other social service facilities as well. Area parks are likely to include programs targeted at senior citizens and youth; school facilities can be used during non-school hours for adult education. The developer can include covenants and restrictions for the project to allow registered family day care homes (for children, elderly, disabled, etc.) to be operated in the project.

Overall, we agree that the availability of comprehensive social services will greatly enhance the quality of life within a multi-generational community. However, because the East Kapolei project is primarily a residential development, we do not feel it is an appropriate location for regional social service facilities. Also, we believe that the provision of land and/or funding for these services and facilities are a regional responsibility, which should be shared by the Ewa community at large, and by the public as well as private sectors.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Helber Hastert  
Planners

Dr. Salvatore S. Lanzilotti  
January 2, 1996  
Page 2

Elderly Housing Component

As stated previously, the developer is willing to discuss the potential for elderly housing as part of the project's affordable housing component.

Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners



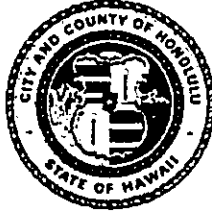
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET, 5TH FLOOR • HONOLULU, HAWAII 96813  
PHONE: (808) 523-4427 • FAX: (808) 527-5498

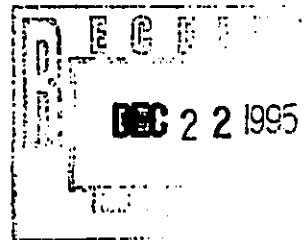
JEREMY HARRIS  
MAYOR



ROLAND D. LIBBY, JR.  
DIRECTOR  
ROBERT AGRES, JR.  
DEPUTY DIRECTOR

December 20, 1995

Ms. Leslie Kurisaki  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813



Dear Ms. Kurisaki:

Subject: East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Tax Map Key: Project Area: 9-1-17:04 (por); 9-1-18:01 (por);  
9-2-2:1 (por); 9-2-4:5 (por); and 9-1-10:2 (por) DP Application Area:  
9-1-17:4 (por); and 9-1-18:1 (por)

This is in response to your letter dated November 22, 1995, requesting our comments on the East Kapolei Project EISPN.

The DHCD understands that the developer will make 30 percent of the units affordable to families below 120 percent of the City and County median income. The DHCD requests that the units be apportioned so that 10 percent of the housing units to be developed be made affordable to households with incomes below 80 percent of Oahu's median income and that 20 percent of the total be made affordable to families with incomes between 81 and 120 percent of Oahu's median income, or that the developer provide an in-kind substitute acceptable to DHCD. Please have the developer contact our Housing Development Division at 523-4264 to discuss a program acceptable to DHCD.

The DHCD also understands that the project will drain into the West Loch Drainage Basin and that both the drainage and traffic studies are being updated. The DHCD would like to request copies of these studies as soon as they become available so that any possible impacts on the City projects in the area can be determined. The DHCD is also interested in the developer's participation in the construction of the North South Road.

The Department would also like to be consulted for the Draft Environmental Impact Statement (DEIS).

Thank you for the opportunity to comment.

Sincerely,

A handwritten signature in cursive script that reads "Gail Kaito".

GAIL M. KAITO  
Acting Chief Planner

Helber Hastert  
Planners

January 8, 1996

Ms. Gail M. Kaito, Acting Chief Planner  
Department of Housing and Community Development  
City and County of Honolulu  
650 S. King St., 5th Floor  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 20, 1995**

Dear Ms. Kaito:

Thank you for your letter dated December 20, 1995 in response to the East Kapolei Project EISPN. The applicant will make 30 percent of the units affordable to families below 120 percent of City and County median income, and will work with your department to develop a program acceptable to DHCD.

The Draft EIS will include copies of the drainage and traffic studies for your review. The developer will participate in the preparation and implementation of the Ewa regional transportation master plan, and is coordinating its involvement through the Estate of James Campbell, which is spearheading the master plan effort.

Your Department will continue to be consulted through the EIS process. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.  
Mr. Dave Bills, Gray Hong Bills & Associates

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

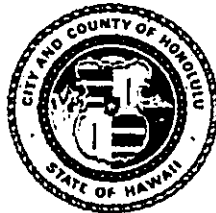
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

POLICE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

801 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

JEREMY HARRIS  
MAYOR



MICHAEL S. NAKAMURA  
CHIEF

HAROLD M. KAWASAKI  
LEE DONOHUE  
DEPUTY CHIEFS

OUR REFERENCE BS-DL

December 18, 1995

DEC 20 1995

Ms. Leslie Kurisaki  
Project Planner  
East Kapolei Project  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

Thank you for the opportunity to review the Environmental Impact Statement Preparation Notice for the East Kapolei Project.

Section 6.6 states that "The Police Department currently has plans to add an additional substation in the Kapolei area to serve the region's growing population, which is expected to meet any increased demand for police services in the project area." This is only partially correct. The Kapolei regional station will meet our facility needs, assuming that it is actually constructed on time and according to plan. Building the station, though, does not, in and of itself, ensure that adequate staffing will be provided for the area.

Police protection for the area is already barely adequate. In spite of repeated budget requests, HPD has not received any new positions for officers for this area (or anywhere else) for the last four fiscal years. HPD has already "stolen" officers from other areas of the department to reinforce this rapidly growing area, but there are limits to this sort of manipulation.

Timing is also important. It takes a long time to budget for, hire, and train new officers; two years might be a reasonable estimate if all goes well. There is also a limit on how many new officers HPD can take in at one time. Slow, steady growth is far preferable to large growth spurts. This means that the staffing problems cannot be solved overnight.

New developments cannot go forward without water, roads, wastewater treatment or fire protection. We are simply saying that development should not proceed without adequate police protection.

Sincerely,

MICHAEL S. NAKAMURA  
Chief of Police

By *Eugene Uemura*  
EUGENE UEMURA, Assistant Chief  
Administrative Bureau

Helber Hastert  
Planners

January 5, 1996

Mr. Eugene Uemura, Assistant Chief  
Administrative Bureau  
Police Department  
City and County of Honolulu  
801 S. Beretania St.  
Honolulu, Hawaii 96813



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 18, 1995**

Dear Mr. Uemura:

Thank you for your letter dated December 18, 1995 in response to the East Kapolei Project EISPN.

We note that the Kapolei regional station will meet *facility* needs, but that *staffing* requirements continue to be an ongoing concern of your department. Your comments have been incorporated in the Draft EIS. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

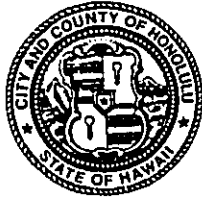
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

FIRE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

3375 KOAPAKA STREET, SUITE H425  
HONOLULU, HAWAII 96819-1869

JEREMY HARRIS  
MAYOR



ANTHONY J. LOPEZ, JR.  
FIRE CHIEF

ATTILIO K. LEONARDI  
FIRE DEPUTY CHIEF

November 29, 1995

Ms. Leslie Kurisaki, Project Planner  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

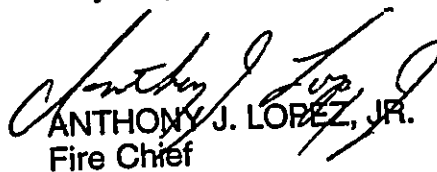
**SUBJECT: East Kapolei Project  
Environmental Impact Statement Preparation Notice**

We have reviewed the application for the above subject. Fire protection services provided from Kapolei and Waipahu engine companies with ladder service from Waipahu are adequate. We have no objections to the proposed project.

Access for fire apparatus, water supply and building construction shall be in conformance to existing codes and standards.

Should you have any questions, please call Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

Very truly yours,

  
ANTHONY J. LOPEZ, JR.  
Fire Chief

AJL:TKP:ny

Helber Hastert  
Planners

January 5, 1996

Chief Anthony J. Lopez, Jr., Fire Chief  
Fire Department  
City and County of Honolulu  
3375 Koapaka St., Suite H425  
Honolulu, Hawaii 96819-1869



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated November 29, 1995**

Dear Chief Lopez:

Thank you for your letter dated November 29, 1995 in response to the East Kapolei Project EISPN. We note that fire protection services provided from Kapolei and Waipahu engine companies with ladder service from Waipahu are adequate to serve the project. Access for fire apparatus, water supply and building construction shall be conformance to existing codes and standards. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050



THE GENTRY COMPANIES

December 19, 1995



RECEIVED

DEC 20 1995

Ms. Leslie Kurasaki  
Project Planner  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, HI 96813

*Re: East Kapolei Project  
Environmental Impact Statement Preparation Notice*

Dear Ms. Kurasaki:

We've reviewed the abovementioned EIS Preparation Notice. The only comment, which is relatively insignificant, is with respect to paragraph 6.5 (Schools and Parks): (1) we understand Kapolei Elementary School is already completed, and (2) the new elementary school within our Ewa By Gentry project -- which has been named Holomua Elementary School -- is scheduled to open in August 1996 (it is a multitrack, year-round school).

We're requesting you confer consulted party status on us in the forthcoming EIS process, and look forward to hearing from you. Correspondence may be directed to Barry Edwards, Ewa By Gentry Project Director, Gentry Homes, Ltd., P.O. Box 295, Honolulu, HI 96809. If you have any questions, please feel free to call Mr. Edwards at 599-8372.

Sincerely,

Nona Forrest  
Planning & Project Development  
Gentry Homes, Ltd.

Helber Hastert  
Planners

January 5, 1996

Ms. Nona Forrest  
Planning and Project Development  
Gentry Homes, Ltd.  
P.O. Box 295  
Honolulu, Hawaii 96809



**East Kapolei Project  
Environmental Impact Statement Preparation Notice (EISPN)  
Your Letter dated December 19, 1995**

Dear Ms. Forrest:

Thank you for your letter dated December 19, 1995 in response to the East Kapolei Project EISPN. We have incorporated your comments regarding the Kapolei Elementary School and the new Holomua Elementary School in the Draft EIS. Gentry Homes, Ltd. will continue to be consulted during the environmental review process. Your letter will be reproduced in the Draft EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

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CONSULTED PARTIES AND PARTICIPANTS IN THE FEIS PREPARATION PROCESS

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**CHAPTER 13**  
**CONSULTED PARTIES AND PARTICIPANTS IN THE FINAL EIS**  
**PREPARATION PROCESS**

Notice of the Draft EIS was published in the January 23, 1996 edition of *The Environmental Notice*. Copies of the DEIS were distributed to 76 agencies, organizations, individuals and libraries. The deadline for comments was March 8, 1996. A total of 31 written comments were received by the publication date of the Final EIS (April 1996). The agencies, organizations and individuals who responded are identified below with an asterisk (\*). Comments and applicant responses are reprinted on the following pages.

Federal Agencies

- \* Army Engineer District
- \* Department of the Interior, U.S. Fish & Wildlife Service
- Department of the Interior, U.S. Geological Survey
- Department of Commerce, National Marine Fisheries Service
- Department of Transportation, U.S. Coast Guard
- Environmental Protection Agency
- \* Department of Agriculture, Natural Resource Conservation Service
- Commander, Naval Base Pearl Harbor
- \* Pacific Division, Naval Facilities Engineering Command

State Agencies

- Department of Accounting and General Services
- ✓ \* State Public Works Engineer
- Department of Agriculture
- Department of Business, Economic Development and Tourism:
- Director
- ✓ \* Land Use Commission
- ✓ \* Energy Division
- Library
- Department of Defense
- \* Department of Education
- ✓ \* Housing Finance and Development Corporation
- ✓ \* Department of Health:
- Director
- Environmental Management Division
- \* Office of Environmental Quality Control
- Department of Hawaiian Home Lands

- \* Department of Human Services
- ✓\* Department of Labor and Industrial Relations
- Department of Land and Natural Resources:
  - Chairman's Office
  - State Historic Preservation Division
  - Commission on Water Resource Management
- \* Office of State Planning
- Department of Transportation
- \* Office of Hawaiian Affairs
- Oahu Metropolitan Planning Organization
- Legislative Reference Bureau

University of Hawaii

- Senior Vice President For Administration
- Water Resources Research Center
- ✓\* Environmental Center
- Hamilton Library

City and County of Honolulu

- \* Building Department
- ✓\* Board of Water Supply
- Department of Finance
- ✓\* Fire Department
- \* Department of Housing and Community Development
- ✓\* Department of Human Resources
- \* Department of Land Utilization
- \* Department of Parks and Recreation
- \* Planning Department
- ✓\* Department of Public Works
- ✓\* Police Department
- \* Oahu Civil Defense Agency
- ✓\* Department of Transportation Services
- \* Department of Wastewater Management

Public Utilities

- \* Hawaiian Electric Company, Inc.
- GTE Hawaiian Telephone Company, Inc.
- Oceanic Cable
- The Gas Company

Libraries

State Archivist  
Municipal Reference and Records Center  
Legislative Reference Bureau  
Hawaii State Library  
Kaimuki Public Library  
Kaneohe Public Library  
Pearl City Public Library  
Hilo Public Library  
Wailuku Public Library  
Kauai Library District  
Ewa Beach Public and School Library

Media

Honolulu Star Bulletin  
Honolulu Advertiser  
Sun Press

Other Agencies, Organizations and Individuals

Estate of James Campbell  
State Senator Brian Kanno  
State Senator David Ige  
State Representative Annelie Amaral  
City Council Chair John DeSoto  
Ewa Neighborhood Board  
Ewa Village Community Association  
American Lung Association  
Haseko (Ewa), Inc.  
\* Gentry Homes, Ltd.  
Makakilo/Kapolei Neighborhood Board



DEPARTMENT OF THE ARMY  
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS  
FT SHAFTER, HAWAII 96858-5440

RECEIVED

REPLY TO  
ATTENTION 01

February 8, 1996

'96 : 9 PM 3:07

Planning and Operations Division

C&C HONOLULU

Ms. Lin Wong  
City and County of Honolulu  
Planning Department  
650 South King Street  
Honolulu, Hawaii 96813

Dear Ms. Wong:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the East Kapolei Project, Ewa, Oahu (TMKs 9-1-9: por. 4; 9-1-18: por. 1; 9-2-2: por. 1; 9-2-4: por. 5; and, 9-1-10: por. 2). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. Based on the information provided, a DA permit may be required for the proposed drainage improvements. Please contact our Regulatory Section at 438-9258 for further information and refer to file number 950010045.

b. The flood hazard information provided on page 4-5 of the DEIS is correct.

Sincerely,

Paul Mizue, P.E.  
Acting Chief, Planning  
and Operations Division

Helber Hastert  
Planners

April 8, 1996

Mr. Paul Mizue, P.E.  
Acting Chief  
Planning and Operations Division  
Department of the Army  
Pacific Ocean Division, Corps of Engineers  
Ft. Shafter, Hawaii 96858-5440



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 8, 1996**

Dear Mr. Mizue:

Thank you for your letter to Ms. Lin Wong, Planning Department, dated February 8, 1996 in response to the East Kapolei Project Draft EIS. A DA permit is not required for the project, as indicated in a April 4, 1996 letter from Linda Hihara-Endo, Acting Chief, Operations Branch to Gray, Hong, Bills & Associates.

We appreciate your review of the project and your input. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.





United States Department of the Interior

FISH AND WILDLIFE SERVICE  
PACIFIC ISLANDS SCORION  
300 ALA MOANA BOULEVARD, ROOM 3108  
BOX 50088  
HONOLULU, HAWAII 96850  
PHONE: (808) 541-3441 FAX: (808) 541-3470

In Reply Refer To: AAP

Ms. Cheryl D. Soon  
Planning Department  
650 South King Street  
Honolulu, Hawaii 96813

MAR 29 1996

Re: January 1996 Draft Environmental Impact Statement, East Kapolei Project, Ewa, Oahu, Hawaii. TMK: 9-1-19: por. 04; 9-1-18: por. 01; 9-2-02: por. 01; 9-2-04: por. 05; and 9-1-10: por. 02

Dear Ms. Soon:

The U.S. Fish and Wildlife Service (Service) has reviewed the January 1996 Draft Environmental Impact Statement (EIS) for the East Kapolei Project, Ewa, Oahu, Hawaii. The project sponsor, Schuler Homes, Inc., proposes to develop 321 hectares [ha] (794 acres [ac]) of land for the construction of 8,000 residential units over a 16-year period. The development is known as the East Kapolei project. The Service offers the following comments for your consideration.

The Service's main concern regarding the above-referenced project pertains to the drainage system that the East Kapolei project will connect to for storm runoff diversion into the West Loch of Pearl Harbor. The document specified that the project will provide an on-site drainage system and a channel from the project boundary that will connect to an existing detention basin and the new Ewa by Gentry-East facilities south of the West Loch Fairways. The off-site channel from the East Kapolei project to the existing detention basin will eventually be dedicated to the City and County of Honolulu.

Currently, the drainage system sponsored by the Ewa by Gentry - East development remains in the design and permitting phases and has not been constructed. The proposed drainage capacity was designed to accommodate surrounding projects, land owners, and their projected drainage contributions, as reported in the May 1995 Drainage Report for Ewa by Gentry - East, Phase I Offsite Drainage Plan. This report documented the carrying capacity of the proposed drainage system to accommodate a total drainage area of approximately 2.51 square miles or the equivalent

January 1996 DEIS  
East Kapolei Project  
Ewa, Oahu, Hawaii

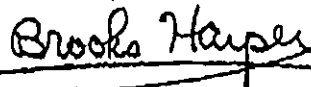
of 650 ha (1,607 ac). Identified users of the drainage system included the Campbell Estate - 277 ha (685 - ac); City and County of Honolulu - 71 ha (176 ac); Gentry Development Company - 99 ha (245 ac); State of Hawaii - 72 ha (178 ac); and the U.S. Navy 130 ha (323 ac). Because contributing drainage from the East Kapolei Development was not initially included in the study, the overall holding capacity of the proposed Ewa by Gentry drainage system may not be sufficient to accommodate the additional runoff from the East Kapolei project.

Specifically, the holding capacity of the detention basin and berm was designed to accommodate a 2- year 24 hour detention period with top elevation of the berm at 20 foot mean sea level. The berm will also be extended through a 12.5 ha (31-ac) parcel to provide at least 1 foot freeboard above the hydraulic grade line (hgl). We are concerned that additional runoff from the East Kapolei project into the proposed Gentry drainage system may reduce the existing 1 foot freeboard above the hgl and allow potential flood spillover into the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge (Refuge).

The Refuge provides important year-round nesting and foraging habitat for four endangered Hawaiian waterbirds: the Hawaiian moorhen (*Gallinula chloropus sandvicensis*), the Hawaiian coot (*Fulica alai*), the Hawaiian stilt (*Himantopus mexicanus knudseni*), and the Hawaiian duck (*Anas wyvilliana*). The Refuge also provides foraging and loafing habitat for numerous species of migratory shorebirds and waterfowl including golden plovers (*Pluvialis dominica*), wandering tattlers (*Heteroscelus incanus*), ruddy turnstones (*Arenaria interpres*), sanderlings (*Calidris alba*), northern pintails (*Anas acuta*), and northern shovelers (*Anas chryseata*). Unexpected flooding may alter habitat conditions and adversely affect the reproductive success of the above-mentioned species. Therefore, the Service recommends that our concerns for adequate drainage disposal from the project site and potential flooding of the Refuge be resolved prior to issuance of the Final EIS.

We appreciate the opportunity to comment. If you have questions regarding these comments, please contact Fish and Wildlife Biologist Arlene Pangelinan at 808/541-3441.

Sincerely,



Brooks Harper  
Field Supervisor  
Ecological Services

Helber Hastert  
Planners

April 24, 1996



Mr. Brooks Harper, Field Supervisor  
Ecological Services  
U.S. Department of the Interior  
Fish and Wildlife Service  
Pacific Islands Ecoregion  
300 Ala Moana Blvd., Rm. 3108  
Box 50088  
Honolulu, Hawaii 96850

**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 29, 1996**

Dear Mr. Harper:

Thank you for your letter to Ms. Cheryl Soon, Chief Planning Officer, City and County of Honolulu, dated January 30, 1996 in response to the East Kapolei Project Draft EIS. We have reviewed your comments and offer the following responses:

Your concern about potential flooding of the Refuge is important and has now been more fully addressed in the FEIS. We would like to take this opportunity to respond to points made in your letter.

1. As stated in the attached Gentry letter dated April 16, 1996, the East Kapolei Project was always included in the Ewa by Gentry-East drainage facility design. The *Final EIS for the Ewa by Gentry-East Offsite Drainage Plan* (Environmental Communications, September 1995) indicates that the project would include a "master-planned drainage system that would accommodate all lands within the natural drainage basin and mitigate the impacts to the wildlife refuge and West Loch, Pearl Harbor coastal zone..." The *Drainage Report for Ewa by Gentry-East Phase 1, Offsite Drainage Plan* (Park Engineering, May 1995), Figure 4-1 "Drainage Map (Ultimate Conditions)," clearly indicates that the East Kapolei project has been included in the sizing of the Gentry improvements. The drainage report discusses improvements under both "interim" and "ultimate" conditions. Under interim conditions, improvements will accommodate runoff from Ewa by Gentry-East, U.S. Navy lands, and the City and County. Improvements for the ultimate conditions would provide capacity for the entire watershed which include the East Kapolei project area.

A discussion of the drainage basin area is included in Section 3.2, Hydrology, of the *Preliminary Drainage Study, West Loch Drainage Basin, East Kapolei Project*, prepared

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733 Bishop Street, Suite 2590  
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Helber Hastert  
Planners

Mr. Brooks Harper  
April 24, 1996  
Page 2

by Gray Hong Bills & Associates, December 1, 1995. In summary, the Park Engineering drainage report states that the detention basin was sized for a drainage basin area of 1,607 acres. Based on Gray Hong Bills & Associates analysis of aerial photo contour maps, the drainage basin should be 1,684 acres, roughly 5 percent larger. Table 3 of the GHB drainage report provides a summary of the land owners within the drainage basin. Land previously allocated to the State of Hawaii is included in the "East Kapolei/Campbell Estate" category.

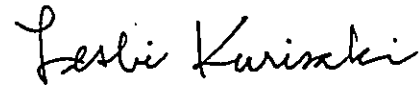
Schuler Homes, Inc. and Gentry are currently working together to confirm the watershed area and hydraulic grade line (HGL), and are negotiating terms for the construction of a joint detention basin. The 31-acre parcel will be incorporated into the design for additional storage.

2. **The freeboard height will be maintained at one foot above the hydraulic grade line to protect the Refuge and adjacent properties from inundation during the 100-year storm event.** As noted above, the watershed area and HGL are being confirmed jointly by Schuler Homes, Inc. and Gentry. The berm will have a 1-foot minimum freeboard above the HGL.
3. **Schuler Homes and Gentry Homes are currently negotiating cost sharing-terms for the construction of the improvements to accommodate the ultimate condition.** The intent is to create a regional drainage facility that will handle the needs of the entire watershed. Ongoing discussion between the interested parties, including your agency, will be needed to ensure this outcome.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBERT HASTERT & FEE, Planners



Leslie Kurisaki  
Project Planner

attachment

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

THE GENTRY COMPANIES



April 16, 1996

Mr. Harvey Goth  
Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813


Dear Mr. Goth:

Re: *East Kapolei Development*  
*West Loch Drainage Basin*

This letter is to confirm that the Ewa by Gentry - East Offsite Drainage project is being designed to handle the tributary area for the East Kapolei Development currently being processed for approval as outlined in Gray, Hong, Bills. & Associates, Inc.'s report dated December 1, 1995.

Very truly yours,

GENTRY HOMES, LTD.



Randolph K. Ouye,  
Senior Vice President/  
Chief Operating Officer

RKO:sacm

/kapolei-wewa



United States  
Department of  
Agriculture

Natural  
Resources  
Conservation  
Service

P. O. Box 50004  
Honolulu, HI  
96850-0001

February 28, 1996

Ms. Lin Wong  
Planning Department  
City and County of Honolulu  
650 S. King Street, 3rd Floor  
Honolulu, Hawaii 96813

MAR - 1 1996

Dear Ms. Wong:

Subject: DEIS - East Kapolei Project, Kapolei, Oahu, Hawaii

We have reviewed the above-mentioned document and offer the following comments:

The project area is located on prime agricultural lands. These land should be kept in agriculture and the less productive lands be used for urban development.

We thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO  
State Conservationist

cc:

Mr. Mike Angotti, Schuler Homes, Inc., 828 Fort Street Mall, 4th Floor,  
Honolulu, HI 96813

Ms. Leslie Kurisaki, Helber Hastert & Fee, Planners, 733 Bishop Street, Suite 2590,  
Honolulu, HI 96813

The Natural Resources Conservation Service  
formerly the Soil Conservation Service, works  
hand-in-hand with the American people to  
conserve natural resources on private lands.

AN EQUAL OPPORTUNITY EMPLOYER

Helber Hastert  
Planners

April 8, 1996

Mr. Kenneth M. Kaneshiro  
State Conservationist  
United States Department of Agriculture  
Natural Resources Conservation Service  
P.O. Box 50004  
Honolulu, Hawaii 96850-0001



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 28, 1996**

Dear Mr. Kaneshiro:

Thank you for your letter to Ms. Lin Wong, Planning Department, dated February 28, 1996 in response to the East Kapolei Project Draft EIS. You note that the project area is located on prime agricultural land, and state that these lands should be kept in agriculture and less productive lands used for urban development.

The project area was formerly under sugar cultivation by Oahu Sugar Company, which ceased operations in 1995. Since that time, the lands have been fallow. OSCo's termination of agriculture operations occurred independent of the proposed project. As a result, the project does not remove land from agricultural use, nor have an impact on agricultural operations.

We appreciate your comments. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050



DEPARTMENT OF THE NAVY  
PACIFIC DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
(MAKALAPA, HI)  
PEARL HARBOR, HAWAII 96860-7300

5090R--  
Ser 231/1004

7 MAR 1996

MAR 11 1996

Ms. Lynn Wong  
Planning Department  
City & County of Honolulu  
650 South King Street  
Honolulu, HI 96813

Dear Ms. Wong:

Subj: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS), EAST KAPOLEI PROJECT

Thank you for the opportunity to review and comment on the draft EIS for the East Kapolei Project, Oahu. With respect to the storm water drainage we offer the following comments:

a. The flood elevation in the proposed Gentry detention basin for the 100-year storm is increased from 18.4 feet (as provided in the "Drainage Report for Ewa by Gentry-East Phase I" May 1995, prepared by Park Engineering) to 19.4 feet MSL. This increase of flood elevation reduces the freeboard along the adjacent Honouliuli Unit of the Pearl Harbor National Wildlife Refuge from 1.6 feet to .6 feet. This may result in an unacceptable level of protection for the National Wildlife Refuge and the endangered species which are known to exist within.

b. The new grass-lined channel which will serve to convey runoff from the existing detention basin to the proposed Gentry detention basin will be sized for the 2-year 24-hour detention requirements. It is recommended that the EIS assess the impact of the 100-year peak flow on the proposed grass-lined channel, detention basin and surrounding areas and provide mitigating measures, as applicable.

c. The Navy has not yet approved the proposed Gentry detention basin which will provide storm water runoff drainage for a substantial portion of the proposed East Kapolei Project. Negotiations for approval of the proposed detention basin are currently ongoing and include evaluation of required environmental impact and mitigation measures and acceptance of operation and maintenance responsibility by the City.

Should you have any questions, please contact Mr. Gerald G: Gibbons at 471-9338 or by facsimile transmission at 474-4890.

Sincerely,

RALPH T. KANESHIRO  
Director  
Environmental Planning Division  
Acting

Copy to: (see next page)



50902.  
Ser 231/1004

7 MAR 1966

Copy to:  
Mr. Mike Angotti  
Schuler Homes, Inc.  
828 Fort Street Mall, Fourth Floor  
Honolulu, HI 96813

Ms. Leslie Kurisaki  
Helber Hastert & Fee, Planners  
733 Bishop Street, Suite 2590  
Honolulu, HI 96813



U.S. Fish and Wildlife Service  
P.O. Box 50167  
Honolulu, HI 96850-4984

Helber Hastert  
Planners

April 24, 1996



Mr. Ralph T. Kaneshiro, Acting Director  
Environmental Planning Division  
Department of the Navy  
Pacific Division Naval Facilities Engineering Command  
Pearl Harbor, Hawaii 96860-7300

**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 7, 1996**

Dear Mr. Kaneshiro:

Thank you for your letter to Ms. Lin Wong, City and County of Honolulu Planning Department, dated March 7, 1996 in response to the East Kapolei Project Draft EIS. We have reviewed your comments and offer the following responses:

- a. As discussed in the *Addendum to the Preliminary Drainage Study, West Loch Drainage Basin* (Gray Hong Bills & Associates, April 18, 1996), Schuler Homes, Inc. and Gentry are currently negotiating terms for a joint detention basin, constructed to accommodate the runoff from the total West Loch watershed. Additional storage will be provided within the 31-acre site, which when combined with the proposed Gentry detention basin will accommodate the total runoff. Schuler Homes, Inc. is working with Gentry to confirm the limits of the watershed and the HGL. The berm proposed by Gentry for protection of the Wildlife Refuge and the berm proposed in the 31-acre parcel will have 1-foot minimum freeboard above the HGL. The portion of the 31-acre site used for the drainage improvements will be dedicated to the City and County of Honolulu.
- b. As noted in the *Addendum to the Preliminary Drainage Study*, both Gentry and Schuler Homes are now jointly designing the detention facilities within the 31-acre site. The improvements cited in your letter will be reevaluated. The impact of the 100-year peak flow on the facilities will be assessed in the design process.
- c. We acknowledge that the Navy has not yet approved the proposed Gentry detention basin and that negotiations for its approval are currently ongoing. The Final EIS will include this as an unresolved issue.

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Grosvenor Center, Makai Tower

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Helber Hastert  
Planners

Mr. Ralph Kaneshiro  
April 24, 1996  
Page 2

We appreciate your review of the DEIS and your input. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mike Angotti, Schuler Homes, Inc.

(P) 1165.6

MAR 8 1996

MAR 11 1996

Planning Department  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813

Attention: Ms. Lin Wong

Gentlemen:

Subject: East Kapolei Project  
Draft EIS

We have reviewed the draft EIS for the subject project and have no additional comments to offer beyond those provided in our previous letter dated December 19, 1995.

Thank you for the opportunity to comment on the subject project. If there are any questions, please have your staff call Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,



GORDON MATSUOKA  
State Public Works Engineer

RY:jy

cc: Schuler Homes, Inc.  
Helber Hastert & Fee, Planners  
Mr. Lester Chuck  
OEQC

Helber Hastert  
Planners

April 8, 1996

Mr. Gordon Matsuoka, State Public Works Engineer  
State of Hawaii  
Department of Accounting and General Services  
Public Works Division  
P.O. Box 119  
Honolulu, Hawaii 96810



Dear Mr. Matsuoka:

**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 8, 1996**

Thank you for your letter to Ms. Lin Wong, City and County of Honolulu Planning Department, in response to the East Kapolei Project Draft EIS. We note that you have no additional comments to offer beyond those provided in your previous letter dated December 19, 1995.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 515-2055  
Facsimile 808 515 2050

BENJAMIN J. CAYETANO  
GOVERNOR



ESTHER UEDA  
EXECUTIVE OFFICER

STATE OF HAWAII  
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM  
LAND USE COMMISSION  
Room 104, Old Federal Building  
335 Merchant Street  
Honolulu, Hawaii 96813  
Telephone: 587-3822

FEB 15 1996

February 14, 1996

Ms. Lin Wong  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Ms. Wong:

Subject: Draft Environmental Impact Statement (DEIS) for  
the East Kapolei Project, Ewa, Oahu, Hawaii

We have reviewed the DEIS for the subject project and have  
the following comments to offer:

- 1) Upon review of the studies in the DEIS, we note that  
reference is made to the proposed location of the 500-  
acre University of Hawaii-West Oahu campus west of the  
project area. It also appears that various studies in  
the DEIS utilized this location of the campus as a  
basis for certain findings with respect to potential  
impacts.

In light of the Governor's proposed land exchange with  
Campbell Estate for a new location of the campus mauka  
of the H-1 Freeway, we suggest that this new campus  
location and the impacts to and from the subject  
project also be reviewed and addressed accordingly in  
the FEIS.

- 2) In the applicant's response to our letter dated  
December 8, 1995, on the Environmental Impact Statement  
Preparation Notice, it was stated that "Schuler Homes  
will request Urban District redesignation for the  
remainder of the application area," excluding an  
adjacent 183-acre portion that is the subject of LUC  
Docket No. A94-708/Office of State Planning.

Clarification should be provided as to what portions of  
the project area are proposed to be included in the  
boundary amendment petition to the Land Use Commission.

Ms. Lin Wong  
February 14, 1996  
Page 2

Information on the approximate acreage should also be provided.

- 3) In Volume I, section 3.2.3., page 3-8, reference is made to the State Land Use Commission Rules, adopted October 1986. Please be advised that the Commission has recently amended its rules under Chapter 15-15, HAR. A copy of the rules will be provided to you as soon as they become available.

Also, in Volume I, section 3.2.3., we suggest that the relationship of the subject project to the City and County of Honolulu Planning Department's document, "Alternative Growth Patterns for Ewa and Central Oahu's Future," as well as the Office of State Planning's Draft Boundary Review Update document, "2020 Growth Scenarios for Oahu," be included.

- 4) In accordance with §11-200-17(i), HAR, the DEIS should include a discussion of the interrelationships and cumulative impacts of the subject project and other related projects upon the environment and the provision of public facilities and services. A discussion on the secondary impacts of the subject project should also be included.
- 5) The costs of the proposed project, including projected on-site and off-site development costs, should be provided. We suggest that such costs be broken down by categories (e.g., roadways, wastewater, drainage, construction of the residential units, etc.).
- 6) The number and size of the residential lots, as well as updated information on the selling prices of the market single- and multi-family residential units, should be provided.
- 7) An assessment of the impact of the proposed project upon the cultural resources of the area, specifically addressing Hawaiian customary and traditional rights under Article XII, section 7, of the Hawaii State Constitution, should be provided.
- 8) The discussion on page 3-8, regarding the extent to which the proposed project conforms to the Urban District standards, should be expanded to include all of the criteria under §15-15-18, HAR.

Ms. Lin Wong  
February 14, 1996  
Page 3

- 9) The discussion on page 3-10, regarding the conformity of the project to the Coastal Zone Management Program should be expanded to include all of the objectives and policies under Chapter 205A, HRS.
- 10) An assessment of the conformity of the project to the zoning designation and polices of the City and County of Honolulu, and any amendments required, should be provided.
- 11) Based on the project phasing, it appears that the project will be implemented over a 16-year period. In light of this timetable, a schedule for development of the total project in seven-year increments together with a map identifying the location of each increment should be provided.

We have no further comments to offer at this time. We appreciate the opportunity to comment on this DEIS.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,



ESTHER UEDA  
Executive Officer

EU:th

cc: Mike Angotti  
✓Leslie Kurisaki  
OEQC  
OSP



Helber Hastert  
Planners

April 11, 1996



Ms. Esther Ueda  
Executive Officer  
Land Use Commission  
Department of Business, Economic Development & Tourism  
State of Hawaii  
State Office Tower, 4th Floor  
Honolulu, Hawaii 96813

**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 14, 1996**

Dear Ms. Ueda:

Thank you for your letter to Ms. Lin Wong, Planning Department, dated February 14, 1996 in response to the East Kapolei Project Draft EIS. We have reviewed your comments and offer the following responses:

1. You suggest that in light of the Governor's proposed land exchange with Campbell Estate for a new University of Hawaii-West Oahu campus site, the new proposed campus location (mauka of the H-1 Freeway) should be evaluated in the FEIS. Although the FEIS recognizes the land exchange process, there are still too many uncertainties and unresolved issues to discuss this proposal with any detail. The mauka site was recently approved by the University Board of Regents, but it has yet to receive final Legislative approval. The type of university facilities, and what if any ancillary facilities may be developed is still not clear at this time, nor is the timing of any of the improvements. Because of these uncertainties, the FEIS discusses both the original and mauka sites, but continues to evaluate the original site as the "official" University site. The final location of the university, its timing, or even if it is built at all, does not affect the feasibility of the East Kapolei project.
2. The applicant intends to submit its petition to redesignate the entire project area from the State Agricultural District to the State Urban District, including the 183-acre area you refer to. The applicant has received permission to include this State-owned parcel from the Chairman of the State Board of Land and Natural Resources (letter dated November 21, 1995).
3. We look forward to receiving a copy of the revised Land Use Commission Rules. The relationship of the project to the City and County Planning Department's *Alternative Growth Patterns for Ewa and Central Oahu's Future* and the Office of State Planning's *2020 Growth Scenarios for Oahu* ✓ has been included in the FEIS.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2500  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Helber Hastert  
Planner

Ms. Esther Ueda  
April 11, 1996  
Page 2

4. The FEIS includes a separate discussion of the interrelationships and cumulative impacts of the project on the physical environment and the provision of public facilities and services. Discussion of secondary impacts is also included. ✓
5. Project cost information has been included in the FEIS. ✓
6. Single-family residential lots are anticipated to average about 4,000 square feet in size. The numbers of and estimated selling prices for the residential units is provided in Chapter 2 of the FEIS. ✓
7. An assessment of impact of the project upon the cultural resources of the area, specifically addressing Hawaiian customary and traditional rights under Article XII, section 7 of the Hawaii State Constitution, is provided in the FEIS.
8. An expanded discussion of the project's conformance to the Urban District Standards, including all criteria under Section 15-15-18, HAR, has been provided in the FEIS.
9. An expanded discussion of the project's conformity to Coastal Zone Management Program has been provided in the FEIS.
10. An assessment of the project's conformity to zoning designation and policies and amendments required has been provided in the FEIS.
11. The developer anticipates developing the 8,000 units over a 14 to 16-year construction period, with between 500 to 550 units constructed per year. Development of the project will require massive, up-front investment in major infrastructure systems (water, wastewater, drainage and roadways). Rapid changes in housing affordability (e.g., fluctuations in mortgage interest rates) are now common, forcing developers to respond rapidly in adapting housing product. The ability to develop multiple sites within the project area simultaneously, rather than constrained by incremental phasing, will be important for the developer to respond to ever changing market conditions. In light of the foregoing discussion, the applicant will request that the Land Use Commission redistrict the entire site to the Urban District rather than require incremental districting.

We appreciate your review of the DEIS and your input. Your letter will be reproduced in the Final EIS.

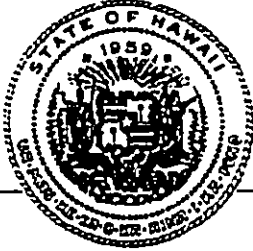
Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mike Angotti, Schuler Homes, Inc.



DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT, AND TOURISM

BENJAMIN J. CAYETANO  
Governor  
SEIJI F. NAYA  
Director  
RICK EGGED  
Deputy Director

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813

FAX: (808) 587-3820

February 12, 1996

FEB 15 1996

Ms. Lin Wong  
Planning Department  
City & County of Honolulu  
650 South King St.  
Honolulu, Hawaii 96813

Dear Ms. Wong:

Subject: East Kapolei Project Draft Environmental Impact Statement (DEIS)  
Project Area: 9-1-19 por 04; 9-1-18 por 01; 9-2-02 por 01; 9-2-04 por 05; and  
9-1-10 por 02. DP Application Area: 9-1-17 por 04; and 9-1-18 por 01.

Thank you for the opportunity to comment on the proposed East Kapolei residential development of multi-family apartments, townhomes and single family homes.

As you are aware, Draft Environmental Impact Statements should comply with the requirements found in State laws for evaluating any energy impacts that the project will have. The mandate for such an evaluation is found in Chapter 344, HRS ("State Environmental Policy") and Chapter 226, HRS ("Hawaii State Planning Act). Act 96 which amended HRS 226, in particular 18(c)(4) includes a State policy objective of promoting all cost-effective conservation through adoption of energy-efficient practices and technologies.

We would like to call the developer's attention to the desirability of roof insulation in east Kapolei. The solar heat transmitted through roofs may be minimized by painting the roof with a reflective coating and insulating the ceiling with radiant barriers, or installing blow-in insulation. Utilizing a light-colored roof plus insulation would heighten the effectiveness of reducing solar gain. Furthermore, studies indicate that insulating the ceilings of residences reduces perceived indoor temperatures by about nine percent.

Insulation and roof treatments are cost effective. For example, the installed cost of foam board insulation (R-10) (with a light-colored roof to bring the total R-value to R-19) is about \$1.00 to \$2.00 per square foot. The cost to install this on an air-conditioned two-story home with an 800 square foot roof is \$1,360. Annual savings are \$400 and the payback is 3.4 years. The cost of blown in cellulose or fiberglass ceiling insulation (R-19, 5 to 6 inches thick) is about \$.80 to \$1.00 per square foot. The cost for the 800 square foot roof is \$720, with annual savings of \$450 per year and payback of 1.6 years.

Ms. Lin Wong  
Page 2  
February 12, 1996

We have recently completed a comparative life-cycle cost study of alternate types of water heating installed in Housing Finance Development Corporation's housing on Oahu and Maui from 1993 to 1995. The results show that on Oahu, solar systems will save homeowners \$1,448 per family compared to electric water heaters. They will save homeowners \$2,008 per family compared to gas water heaters. We feel that this savings is significant enough, especially for the affordable homes, to strongly consider offering solar water heating in this development.

Sincerely,



Maurice H. Kaya  
Energy, Resources, and Technology  
Program Administrator

c: OEQC  
Schuler Homes  
Helber Hastert & Fee

Helber Hastert  
Planners

March 8, 1996

Mr. Maurice H. Kaya  
Energy Program Administrator  
State of Hawaii  
Department of Business, Economic Development and Tourism  
Energy Division  
335 Merchant Street, Rm. 110  
Honolulu, Hawaii 96813



Dear Mr. Kaya:

East Kapolei Project, Ewa, Oahu, Hawaii  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 12, 1996

Thank you for your letter to Ms. Lin Wong, Planning Department dated February 12, 1996 responding to our request for comments on the above-referenced DEIS. The Environmental Impact Statement will comply with the requirements found in State laws for evaluating energy impacts the project will have.

We appreciate the information you provided regarding the use of roof and ceiling insulation to reduce energy requirements. This information has been transmitted to the applicant/developer. The developer will consider the installation of roof insulation and solar water heaters as an option for East Kapolei home buyers.

In addition to building-related energy efficiency, we would like to emphasize that as a part of the second city in Kapolei, the project will have a positive long-term effect on Oahu's transportation-related energy consumption. The transportation sector has been identified as the single largest consumer of energy in the State (State Functional Plan, Energy, 1991). The development of the "second city" is largely intended to reduce the need for automobile commuting between downtown Honolulu and suburban Oahu. As part of the second city, the East Kapolei project will promote a new community where residents can live and work close by, contributing to a reduction in automobile-related fossil fuel consumption.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBERT HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2500  
Honolulu, Hawaii 96813

Telephone 808 515 2055  
Facsimile 808 515 2050

Benjamin J. Cayetano  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF EDUCATION  
P. O. BOX 2360  
HONOLULU, HAWAII 96804

HERMAN M. AIZAWA, PH.D.  
SUPERINTENDENT

OFFICE OF THE SUPERINTENDENT

March 12, 1996

Ms. Lin Wong  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Ms. Wong:

SUBJECT: Draft Environmental Impact Statement  
East Kapolei Project

We have reviewed the subject draft environmental impact statement and have determined that our previous comments dated January 8, 1996, are still relevant on the proposed development. We have no other comments to make at this time.

Should there be any questions, please call the Facilities Branch at 733-4862.

Sincerely,

Herman M. Aizawa, Ph.D.  
Superintendent

HMA:hy

cc: A. Suga, OBS  
A. Maeda, LDO  
L. Kurisaki, Helber Hastert & Fee  
M. Angotti, Schuler Homes, Inc.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

Helber Hastert

Planners

April 15, 1996

Dr. Herman M. Aizawa, Ph.D.  
Superintendent  
State of Hawaii  
Department of Education  
P.O. Box 2360  
Honolulu, Hawaii 96804



East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 12, 1996

Dear Dr. Aizawa:

Thank you for your letter to Ms. Lin Wong, City and County of Honolulu Planning Department, dated March 12, 1996 in response to the East Kapolei Project Draft EIS. We note that your previous comments dated January 8, 1996 are still relevant and that you have no other comments to make at this time. We provided a full response to your letter dated January 17, 1996. Both letters were appended to the DEIS.

The project still proposes to provide two 8-acre elementary school sites (collocated with City neighborhood parks) and half of an 18-acre intermediate school site (the other half being provided by the adjacent land owner as part of its fair share contribution to a region-serving facility).

As noted in the January 17, 1996 response, the applicant recognizes the significant contribution good school facilities will make towards building a desirable community. The applicant is therefore committed to working with your department to ensure that school facility needs are met in a timely, orderly and on a fair basis.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2500  
Honolulu, Hawaii 96813

Telephone: 808 545-2055  
Facsimile: 808 545-2050

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF BUDGET AND FINANCE  
HOUSING FINANCE AND DEVELOPMENT CORPORATION  
877 QUEEN STREET, SUITE 300  
HONOLULU, HAWAII 96813  
FAX (808) 587-0800

ROY S. OSHIRO  
EXECUTIVE DIRECTOR

IN REPLY REFER TO:

96:PPE/822

February 29, 1996

MAR - 5 1996

The Honorable Cheryl D. Soon  
Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Attn: Ms. Lin Wong

Dear Ms. Soon:

SUBJECT: Draft Environmental Impact Statement (DEIS) for the  
East Kapolei Project, Ewa, Oahu

We have reviewed the subject DEIS and have the following  
comments to offer:

1. In section 2.3.1, reference is made to the Villages of Kapolei. Please note that the total land area for the project is approximately 890 acres. ✓
2. In section 2.6, the project is described to include parks, neighborhood commercial areas, and sites for elementary and intermediate schools. Consideration should be given to include at least one recreational facility and several church sites within the project.
3. What types of pedestrian and bikeway linkages will be provided from the project to the major regional arterial roadways (i.e., North-South Road and Farrington Highway)?
4. Will the developer be seeking exemptions for the project under the provisions of chapter 201E through the City and County of Honolulu's Department of Housing and Community Development? It is our understanding that ten percent of the units should be made available to families earning eighty percent and below the area median income. This does not appear to be addressed.





The Honorable Cheryl D. Soon  
Page 2  
February 29, 1996

5. In section 2.6.4, a statement is made that the developer is assuming that the adjacent land owner will provide "an additional nine acres" toward the development of an intermediate school. What efforts have occurred to coordinate and seek the concurrence of the land owner?
6. In section 2.7, the purpose for the project is stated as meeting "the need for affordable and moderately priced housing..." What are the anticipated prices for the approximately seventy percent "market" units? How many of these will target the 121% to 140% of area median income? How many of these units will be affordable rentals and what are the target groups?
7. In section 5.2, reference is made to the Villages of Kapolei project being developed by HFDC. However, the project is not being completed "in conjunction with the Department of Housing and Community Development."
8. What efforts has the developer undertaken to minimize the impact of the project on the traffic situation? Since the North-South Road, extension of the Kapolei Parkway, improvements to Farrington Highway, and freeway interchange are assumed to be part of the roadway network, a major impact will be felt if these roadway improvements are not provided pursuant to the Ewa Region Highway Master Plan time line.
9. We recommend that consideration and effort be given toward consolidating the water system improvements for the remaining lands in the Ewa region.
10. We recommend that reconsideration be given to the proposed wastewater collection system and the impact on adjacent lands.

Thank you for the opportunity to comment on the DEIS.

Sincerely,



ROY S. OSHIRO  
Executive Director

c: Mr. Mike Angotti, Schuler Homes, Inc.  
Ms. Leslie Kurisaki, Helber Haster & Fee, Planners  
OEQC

Helber Hastert  
Planners

April 15, 1996

Mr. Roy S. Oshiro, Executive Director  
State of Hawaii  
Department of Budget and Finance  
Housing Finance and Development Corporation  
677 Queen Street, Suite 300  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 29, 1996**

Dear Mr. Oshiro:

Thank you for your letter to Ms. Cheryl Soon, Chief Planning Officer, dated February 29, 1996 in response to the East Kapolei Project Draft EIS. We have reviewed your comments and offer the following responses:

1. Your comment regarding the total land area for the Villages of Kapolei will be incorporated in the Final EIS.
2. The applicant has closely considered the recreational and cultural aspects of the plan. Recreational needs will be accommodated by a large 20-acre park, two 6-acre neighborhood parks and a 2-3 acre public mini park. In addition, bikeways and private mini-parks will complement the dedicated park facilities. Church sites are being considered.
3. As noted above, the project will provide bikeways linking the residential areas, the central district park, commercial areas and the schools/neighborhood parks. Where possible, provisions will also be made to connect to regional bikeway facilities along the North-South Road and Farrington Highway
4. At the present time, the developer does not intend to seek exemptions for the project under the provisions of Chapter 201E. The applicant/developer intends to comply with the affordable housing guidelines set forth by the city Department of Housing and Community Development.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Heiter Hastert  
Planners

Mr. Roy S. Oshiro  
April 15, 1996  
Page 2

5. The adjacent land is owned by the State of Hawaii. The applicant believes that a requirement to provide a full 18-acre intermediate school site exceeds its fair share requirement, and that the adjacent property, assumed to be developed for residential uses, would benefit from shared use of the intermediate school facilities. The applicant is willing to coordinate efforts with the appropriate State entity in providing the intermediate school and will continue to work with the Department of Education to ensure that the intermediate school needs of the East Kapolei project are accommodated.
6. An estimated breakdown of number of units by target market and price is now included in Chapter 2 of the FEIS. Anticipated prices for the multi-family and single family market units range from \$185,000 to \$285,000. The buying power of people in 121% to 140% of median income group will depend on prevailing mortgage interest rates, down payment requirements and other developer incentives at the time of purchase.

Current plans for East Kapolei do not include any rental units.

7. Comment noted and the change has been made.
8. In order to minimize project impacts and provide for smoother operating conditions, several roadway improvements are recommended by the year 2010. They include two left-turn lanes westbound at the intersection of Farrington Highway and the proposed North-South Road; the addition of an extra through lane from the project's Farrington Highway access road intersection west to the western edge of the project; and two left-turn lanes entering and exiting two of the project access roads along the planned North-South Road. Sufficient right-of-way will be reserved along the entire Farrington Highway frontage to allow for future widening as proposed in the Ewa Region Highway Master Plan.

In addition to the above recommendations, the project concept plan itself mitigates potential traffic impacts. The incorporation of convenience retail, schools and parks within the project area will eliminate the need to travel on external roads for those activities. The project's bikeway network will encourage pedestrian and bicycle activity within the project area.

9. The applicant is master planning infrastructure for the project and adjacent areas to ensure consistency. It is willing to work with the adjacent land owners to consolidate the water and wastewater system improvements for the region.

Helber Hastert

Planner

Mr. Roy S. Oshiro  
April 15, 1996  
Page 3

We appreciate your input. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

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BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



LAWRENCE MIKE  
DIRECTOR OF HEALTH

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

In reply, please refer to:

April 9, 1996

94-270A/epo

Ms. Lin Wong  
Planning Department  
City & County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

APR 22

Dear Ms. Wong:

Subject: Draft Environmental Impact Statement (DEIS)  
East Kapolei Project  
Ewa, Oahu  
TMK: 9-1-17: por. 4, various others

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer:

Polluted Runoff Control

The East Kapolei Project is located in the Pearl Harbor Hydrologic Unit Area. The Pearl Harbor Estuary is one of the State's designated Water Quality Limited Segments, meaning its water quality is impaired from polluted runoff. The construction of the East Kapolei Project will greatly increase the acreage of impervious areas, thereby increasing storm water runoff volumes. The State has developed the "Hawaii Coastal Nonpoint Pollution Control Program Draft Management Plan." This draft management plan addresses proper planning, design, and use of Best Management Practices to substantially reduce polluted runoff (nonpoint source pollution). Please refer to the Draft Management Plan (Pages III-95 to III-148) for urban management measures. The Draft Management Plan can be obtained from the Department of Health, Polluted Runoff Control Program or from the Office of State Planning, Coastal Zone Management Program. The following are suggested management measures to consider:

1. For New Development

Please refer to the "Hawaii Coastal Nonpoint Pollution Control Program Draft Management Plan" (Page III-98). The management measure goal of reducing total suspended solid loadings are suggested once the site is stabilized.

Ms. Lin Wong  
April 9, 1996  
Page 2

2. For Site Development
  - a. Include within the conceptual landscape plan open "green areas" that will slow down and retain stormwater runoff. For instance, the lands set aside for parks could be constructed as sediment basins which would retain polluted runoff.
  - b. Limit disturbance of natural drainage features and vegetation.
3. For Construction Site Erosion and Sediment Control
  - a. Conduct grubbing and grading activities during the low rainfall months (April-October).
  - b. Grub area sequentially so that only a small portion of the site is bare at any time.
  - c. Use vegetation, mulch, gravel, and porous pavement wherever feasible to maximize the acreage of pervious areas.
  - d. We encourage the developer to grass and irrigate immediately after grading is completed and certified.
4. Pollution Prevention Measures
  - a. We encourage the implementation of pollution prevention and education programs to reduce polluted runoff. The developer could assist the city and state in their efforts of environmental education by providing new homeowners educational packets that contain information on reducing polluted runoff, such as the proper storage, use, and disposal of household chemicals and the proper disposal of pet excrement.
  - b. We encourage large developments to imprint the message "Dump No Waste, Goes to Ocean," over storm drains to remind homeowners not to illegally dump materials in the storm drain system.

If you have questions on this matter, please call Mr. Randy Rush of the Environmental Planning Office at 586-7550.

#### Noise Concerns

1. Although not necessarily incompatible, commercial land uses next to residential areas may result in negative noise

Ms. Lin Wong  
April 9, 1996  
Page 3

impacts. Activities such as deliveries and refuse collection may result in noise impacts to the surrounding residences. Mitigative measures toward minimizing these impacts, such as buffering distances, landscaping or design should be implemented within any planned mixed use community.

2. Through facility design, sound levels emanating from stationary equipment such as air conditioning systems, exhaust fans, refrigeration compressors or generators must be attenuated to comply with the provisions of Chapter 11-43, Hawaii Administrative Rules, "Community Noise Control for Oahu."

Should there be any questions on this matter, please call Jerry Haruno, Environmental Health Program Manager of the Noise, Radiation & Indoor Air Quality Branch at 586-4701.

#### Wastewater

It has been determined that the subject project is located within the County sewer service system. As the area is sewerred, we have no objections to the proposed 794 acre development collectively referred to as the "East Kapolei Project" provided that the project is connected to the public sewers.

The developer should work closely with the County to assure the availability of additional treatment capacity and adequacy for the project. Non availability of treatment capacity will not be an acceptable justification for use of any private treatment works.

Should you have any questions on this matter, please contact Ms. Lori Kajiwara of the Wastewater Branch at 586-4294.

Sincerely,



BRUCE S. ANDERSON, Ph.D.  
Deputy Director for Environmental Health

c: EPO  
NR&IAP  
OEQC  
WWB  
Helber Hastert & Fee  
Schuler Homes, Inc.

Helber Hastert  
Planners

April 25, 1996

Dr. Bruce S. Anderson,  
Deputy Director for Environmental Health  
State of Hawaii  
Department of Health  
P.O. Box 3378  
Honolulu, Hawaii 96801



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated April 9, 1996**

Dear Dr. Anderson:

Thank you for your letter to Ms. Lin Wong, City and County of Honolulu Planning Department, dated April 9, 1996 in response to the East Kapolei Project Draft EIS. We have reviewed your comments and offer the following responses:

**Polluted Runoff Control**

We acknowledge your comment that the Pearl Harbor Estuary is one of the State's designated Water Quality Limited Segments, meaning its water quality is impaired from polluted runoff. The Hawaii Coastal Nonpoint Pollution Control Program Draft Management Plan will be consulted and your suggested management measures will be followed when possible during construction.

The National Pollutant Discharge Elimination System (NPDES) permit for the project will include an Erosion Control Plan (ECP) and procedures and a Best Management Practices Plan to minimize the impacts of sedimentation caused by grading during construction.

The applicant is willing assist your Department and other State and City agencies in your efforts on environmental education, including providing new homeowners with educational materials, as noted.

**Noise Concerns**

As you have suggested, mitigation measures to reduce noise impacts on residential areas will be incorporated, including adequate setbacks from roadways, appropriate landscaping and residential unit design.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050



Helber Hastert  
Planners

Dr. Bruce S. Anderson  
April 25, 1996  
Page 2

**Wastewater**

The developer will work closely with the County to assure the availability of treatment capacity for the project. A wastewater master plan for the project is currently being reviewed by the City Department of Wastewater Management.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners



Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

**BENJAMIN J. CAYETANO**  
GOVERNOR



**GARY GILL**  
DIRECTOR

**STATE OF HAWAII**  
**OFFICE OF ENVIRONMENTAL QUALITY CONTROL**

220 SOUTH KING STREET  
FOURTH FLOOR  
HONOLULU, HAWAII 96813  
TELEPHONE (808) 586-4185  
FACSIMILE (808) 586-4188

March 6, 1996

MAR - 8 1996

Cheryl Soon  
Planning Department, City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Attention: Lin Wong

Dear Ms. Soon:

Subject: Draft Environmental Impact Statement (EIS) for East Kapolei Project, Ewa

The proposed drainage facilities for East Kapolei will connect to the planned Ewa Gentry-East offsite drainage. The May 1995 Ewa Gentry-East EIS did not include any drainage facility considerations for East Kapolei.

How does the East Kapolei project affect Gentry's drainage facilities? Can the Gentry drainage system handle the extra volume of water? How does this change affect the West Loch Wildlife Refuge?

If you have any questions please call Nancy Heinrich or Jeyan Thirugnanam at 586-4185.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary Gill".

Gary Gill  
Director

c: Leslie Kurisaki, Helbert, Hastert & Fee

Helber Hastert  
Planners

April 24, 1996

Mr. Gary Gill, Director  
State of Hawaii  
Office of Environmental Quality Control  
220 S. King Street, 4th Floor  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 6, 1996**

Dear Mr. Gill:

Thank you for your letter to Ms. Lin Wong, City and County of Honolulu Planning Department, dated March 6, 1996 in response to the East Kapolei Project Draft EIS.

Please note, the drainage section in the FEIS has been revised to provide an expanded and more comprehensive discussion of drainage issues raised in the DEIS consultation process.

As stated in the attached Gentry letter dated April 16, 1996, the East Kapolei Project was always included in the Ewa by Gentry-East drainage facility design. The *Final EIS for the Ewa by Gentry-East Offsite Drainage Plan* (Environmental Communications, September 1995) indicates that the project would include a "master-planned drainage system that would accommodate all lands within the natural drainage basin and mitigate the impacts to the wildlife refuge and West Loch, Pearl Harbor coastal zone..." The *Drainage Report for Ewa by Gentry-East Phase 1, Offsite Drainage Plan* (Park Engineering, May 1995), Figure 4-1 "Drainage Map (Ultimate Conditions)," clearly indicates that the East Kapolei project has been included in the sizing of the Gentry improvements. The drainage report discusses improvements under both "interim" and "ultimate" conditions. Under interim conditions, improvements will accommodate runoff from Ewa by Gentry-East, U.S. Navy lands, and the City and County. Improvements for the ultimate conditions would provide capacity for the entire watershed which includes the East Kapolei project area.

A discussion of the drainage basin area is included in the *Preliminary Drainage Study, West Loch Drainage Basin, East Kapolei Project* (Gray Hong Bills & Associates, December 1, 1995) included in the DEIS as Appendix M. In summary, the Park Engineering drainage report states that the detention basin was sized for a drainage basin area of 1,607 acres. Based on Gray Hong Bills & Associates analysis of aerial photo contour maps, the drainage basin should be 1,684 acres, roughly 5 percent larger.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
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Facsimile 808 545-2050

Helber Hastert  
Planners

Mr. Gary Gill  
April 24, 1996  
Page 2

Schuler Homes, Inc. and Gentry are currently working together to confirm the watershed area and hydraulic grade line (HGL) and are negotiating terms for the construction of a joint detention basin. The 31-acre Schuler Homes parcel will be incorporated into the design to provide additional storage. The berm height will be set to provide a one-foot minimum freeboard above HGL to protect the adjacent Wildlife Refuge from inundation during the 100-year flood event.

Upon reaching an agreement, the Gentry-East and Schuler Homes improvements will be further coordinated to ensure that the final detention basin design will protect adjacent areas, including the Wildlife Refuge, from floodwater inundation.

We appreciate your input. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*  
Leslie Kurisaki  
Project Planner

attachment

cc: Ms. Cheryl Soon, Planning Department  
Mike Angotti, Schuler Homes, Inc.

THE GENTRY COMPANIES



April 16, 1996

Mr. Harvey Goth  
Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813

Dear Mr. Goth:

Re: *East Kapolei Development*  
*West Loch Drainage Basin*

This letter is to confirm that the Ewa by Gentry - East Offsite Drainage project is being designed to handle the tributary area for the East Kapolei Development currently being processed for approval as outlined in Gray, Hong, Bills & Associates, Inc.'s report dated December 1, 1995.

Very truly yours,

GENTRY HOMES, LTD.

Randolph K. Ouye,  
Senior Vice President/  
Chief Operating Officer

RKO:sacm

/kapolei-wewa

BENJAMIN J. CAYETANO  
GOVERNOR



SUSAN M. CHANDLER, M.S.W., Ph.D.  
DIRECTOR

KATHLEEN G. STANLEY  
DEPUTY DIRECTOR

STATE OF HAWAII  
DEPARTMENT OF HUMAN SERVICES  
1390 Miller Street  
Honolulu, Hawaii 96813

February 21, 1996

FEB 27 1996

Ms. Cheryl Soon  
Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement  
East Kapolei Project, Ewa, Oahu, Hawaii  
Project area: 0 9-1-19: por. 04; 9-1-18: por. 01; 9-2-02: por.  
01; 9-2-04: por 05; and 9-1-10: por 02

We have reviewed the following draft environmental impact statement and have no comments to offer at this time. Thank you for the opportunity to review this document.

Sincerely,

For Susan M. Chandler, M.S.W., Ph.D.  
Director

c: Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, HI 96813

✓ Helber Haster & Fee, Planners  
733 Bishop St., Suite 2590  
Honolulu, HI 96813

Helber Hastert  
Planners

April 8, 1996

Ms. Susan M. Chandler, M.S.W., Ph.D.  
Director  
State of Hawaii  
Department of Human Services  
1390 Miller Street  
Honolulu, Hawaii 96813



East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 21, 1996

Dear Ms. Chandler:

Thank you for your letter to Cheryl Soon, Chief Planning Officer, dated February 21, 1996 in response to the East Kapolei Project Draft EIS. We note that you have no comments to offer at this time. We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone: 808 545-2055  
Facsimile: 808 545 2050

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS  
OFFICE OF THE DIRECTOR  
830 PUNCHBOWL STREET, ROOM 321  
HONOLULU, HAWAII 96813

LORRAINE H. AKIBA  
DIRECTOR

DAYTON M. NAKANELUA  
DEPUTY DIRECTOR

February 28, 1996

MAR - 1 1996

Ms. Lin Wong  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Ms. Wong:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the proposed East Kapolei Project. The Department of Labor and Industrial Relations (DLIR) has no additional comments to offer at this time.

Our previous comments of February 23, 1995 to the City and County's Planning Department still apply. DLIR continues to offer its assistance in recruiting job applicants to fill the demand for construction workers through its various employment and training agencies.

If you have any questions, please call Naomi Harada, Chief of our Research and Statistics Office, at (808) 586-8999.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Lorraine H. Akiba".

Lorraine H. Akiba  
Director

c: Schuler Homes, Inc.  
✓ Helber Hastert & Fee  
Office of Environmental Quality Control



Helber Hastert  
Planners

April 8, 1996

Ms. Lorraine H. Akiba, Director  
Department of Labor and Industrial Relations  
State of Hawaii  
830 Punchbowl St., Rm. 321  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 28, 1996**

Dear Ms. Akiba:

Thank you for your letter to Ms. Lin Wong, Planning Department, dated February 28, 1996 in response to the East Kapolei Project DEIS. We note that your department's previous comments to the Planning Department dated February 23, 1995 still apply. The developer acknowledges your offer of assistance in recruiting job applicants for construction jobs through your various employment and training agencies.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBERT HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone: 808 515-2055  
Facsimile: 808 515 2050

STATE OF HAWAII  
OFFICE OF STATE PLANNING  
P.O. Box 3540  
Honolulu, Hawaii 96811-3540

Ref. No. Z-0056

March 7, 1996

MAR 12

The Honorable Cheryl D. Soon  
Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813-3017

Attn: Ms. Lin Wong

Dear Ms. Soon:

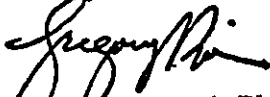
We have the following comments on the East Kapolei Project Draft Environmental Impact Statement (DEIS) at Ewa, Oahu.

We note the discrepancy between the applicant's plan on page 2-15 allocating nine acres for an intermediate school site and the Department of Education's letter in section 10 requesting an 18-acre site within the project area. The probable impacts of the larger site should be discussed in the document.

Also, the impacts and mitigation measures of the drainage flowing to West Loch should be summarized in the document as opposed to referencing a study on page 6-13.

If there are any questions, please call Charles Carole at 587-2804.

Sincerely,



Gregory G.Y. Pai, Ph.D.  
Director

cc: Mr. Mike Angotti, Schuler Homes, Inc.  
✓ Ms. Leslie Kurisaki, Helber Hastert & Fee, Planners  
Abe Mitsuda  
James T. Yamamoto

Helber Hastert  
Planners

April 15, 1996

Dr. Gregory G.Y. Pai, Director  
State of Hawaii  
Office of State Planning  
P.O. Box 3540  
Honolulu, Hawaii 96811-3540



Dear Dr. Pai:

East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 7, 1996

Thank you for your letter to Ms. Cheryl Soon, Chief Planning Officer, in response to the East Kapolei Project Draft EIS.

As you note in your letter, the East Kapolei Project includes nine acres of an 18-acre intermediate school. The East Kapolei Project is expected to generate between 400 and 600 intermediate school students (grades 7-8) at build-out, about half the enrollment of a typical intermediate school. The remaining intermediate school enrollment is expected to come from surrounding residential areas. As such, the applicant believes that the nine acres provides its fair share of an intermediate school contribution. It is anticipated that the owner of adjacent lands, presumably planned for residential development, would generate its own requirement for intermediate school facilities, and would therefore be requested to contribute its fair share towards completion of the school. In any event, intermediate school facilities will be needed and the applicant is committed to working with DOE to ensure that adequate facilities are available at the appropriate time.

The impacts and mitigation of the drainage flow to West Loch have been summarized in the Final EIS, based on the findings and conclusions of the *Ewa by Gentry-East Drainage Plan Final EIS* (Environmental Communications, October 1995) and the *Ewa by Gentry-East Drainage Plan Environmental Assessment* (Environmental Communications, December 1994).

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*  
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
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733 Bishop Street, Suite 2500  
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STATE OF HAWAII  
OFFICE OF HAWAIIAN AFFAIRS  
711 KAPI'OLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813

March 14 1996

MAR 22

Ms. Leslie Kurisaki  
Helber Hastert & Fee, Planners  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement, East Kapolei Project,  
Ewa, O'ahu, Hawaii.

Dear Ms. Kurisaki:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for the proposed East Kapolei Project at Ewa, O'ahu, Hawaii. We have the following concerns with about potable water availability and wastewater accommodation.

The developer is proposing a large residential development, yet the DEIS fails to identify whether potable water is available for the project. The issue of water availability is skirted by stating that potential water resources will not be detailed in the document and that the Board of Water Supply will designate the sources of water after allocations of water are set by the Commission on Water Management.

This lack of specific information on water sources appears to reflect risky planning especially considering the scale of development on the Leeward coast and the critical nature of current water supplies. The interests of the community would be better served if the developers immediately ascertain whether the Commission on Water Resource Management will in fact allocate any water for this project.

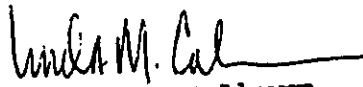
In addition, OHA has some concern with the need for additional information on wastewater disposal. The DEIS states that the proposed project will ultimately generate an average daily flow of

Ms. Leslie Kurisaki  
March 14, 1996  
Page two

1.98 mgd of wastewater flow over a 13-year period. There is some uncertainty, however, as indicated on pages 6-6 and 6-8 of the DEIS and again in appendix L as to whether current City and County wastewater systems in the area will be able to accommodate the added wastewater.

We believe that these questions concerning water resources and wastewater management must be answered in the final document. If you have any question or need any additional information, please contact Linda Delaney, Land and Natural Resources Officer or Lynn Lee, EIS Planner at 594-1888.

Sincerely,



Linda M. Colburn  
Administrator

cc: Clayton H.W. Hee, Chairperson  
Board of Trustees

Kina'u Boyd Kamali'i, Chairperson  
Land and Sovereignty Committee

Helber Hastert  
Planners

April 15, 1996

Ms. Linda M. Colburn, Administrator  
State of Hawaii  
Office of Hawaiian Affairs  
711 Kapiolani Blvd., Suite 500  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 14, 1996**

Dear Ms. Colburn:

Thank you for your letter dated March 14, 1996 in response to the East Kapolei Project Draft EIS. We have reviewed your comments and offer the following responses:

**Water Source**

At the present time, firm commitments for water source have not been obtained. In response to your comment about "risky planning," we note that existing procedures for granting water allocations for new development projects vary among the public water agencies in terms of when approvals are given. For example, the Board of Water Supply does not commit water to a specific project until that project has reached the construction plan or building permit stage. The Commission on Water Resource Management, on the other hand, will not process or approve a Water Use Permit until the necessary city zoning permits have been obtained. At this time, the East Kapolei project is not at the stage in the entitlement process where the water agencies will grant an allocation.

The applicant is diligently working to secure sufficient water source for the project. The issue is perceived as a matter of *where* the water will come from and not *whether* the water is available. The developer is confident that it can work together with the Commission on Water Resource Management and City Board of Water Supply to develop an integrated water resource plan to accommodate not only the needs of the East Kapolei project, but also for other developments that are proposed for Ewa. Water source will be clearly identified as an unresolved issue in the final EIS. The FEIS will also include a discussion of potential sources of potable water, current City policies regarding use of non-potable water and potential sources of non-potable water.

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Grosvenor Center, Makai Tower

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Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Helber Hastert  
Planners

Ms. Linda Colburn  
April 15, 1996  
Page 2

**Wastewater**

A Wastewater Master Plan has been prepared for the project (Appendix L in the DEIS) and is presently being reviewed by the City Department of Wastewater Management. The City and County will accept all wastewater generated from the project. The only significant issue is timing.

We appreciate your review of the DEIS and your input. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.



## University of Hawai'i at Mānoa

Environmental Center  
A Unit of Water Resources Research Center  
Crawford 317 · 2550 Campus Road · Honolulu, Hawai'i 96822  
Telephone: (808) 956-7361 · Facsimile: (808) 956-3980

March 8, 1995  
RE:0671

Ms. Lynn Wong  
City and County of Honolulu  
Planning Department  
650 South King Street  
Honolulu, Hawai'i 96813

Dear Ms. Wong:

Draft Environmental Impact Statement (EIS)  
East Kapolei Project  
Ewa, Oahu

The applicant, Schuler Homes, Inc., is seeking an amendment to the City and County of Honolulu's Ewa Development Plan Land Use Map for the proposed East Kapolei project. The amendment request proposes the redesignation of approximately 742 acres from Agriculture to Low Density Apartment, Parks and Recreation, Public and Quasi-Public and Commercial. In addition, proposed text changes to the Ewa Development Plan Special Provisions are being requested. The proposed project will provide approximately 8,000 residential units to be developed over a 16 year period. Approximately 30 percent of the new homes will be affordable to families earning below 120 percent of the median income. In addition to residential uses, the preliminary concept also includes two elementary school sites, a portion of an intermediate school site; two neighborhood parks, a community park, a greenbelt network and neighborhood-serving commercial shopping areas. This document supersedes a January, 1995 draft EIS and incorporates changes to the project boundaries, the location of schools and various transportation issues.

This review was completed with the assistance of Paul Ekern, Emeritus; Peter Flachsbart, Urban and Regional Planning; Jon Matsuoka, Social Work; Dave Penn, Geography; and Malia Akutagawa and Thomas Hawley, Environmental Center.

### General Comments

This document replaces the January, 1995 draft EIS but virtually none of our comments from the earlier document resulted in changes to the new draft EIS. Our comments were substantive and serious at that time and remain so today. We have therefore repeated them here with the hope that they will be taken seriously as planning for the project continues.



Ms. Lynn Wong  
March 8, 1996  
Page 2

### Conflicts Over Water Appropriation

We are concerned about the possible conflicts over water appropriation. Attached to the Potable Water Master Plan, Appendix J, is a letter by D.B. Goth of the Estate of James Campbell (dated October 6, 1994) referring to the Ewa Shaft, (EP 15 & 16), suggested as the primary water source for the East Kapolei project. It states that:

... the Estate intends to reserve all water rights with respect to the lands that Schuler intends to acquire from the Estate for this project. These rights include the ownership and operation of the Ewa Shaft which will be a water source for the Estate's activities ... loss of the Ewa Shaft through eminent domain or regulation, both, would entitle the Estate to substantial compensation, not only for such loss, also for loss of value to the Estate's surrounding lands ... we would prefer that you delete any references to the Ewa Shaft as a potential water source.

Since there is an ensuing conflict between the Board of Water Supply and Campbell Estate over the Ewa Shaft and since other water sources located off-site are currently unavailable (as stated on p. 1 of Appendix J), it seems presumptive for Schuler Homes to have proceeded this far with its development. None of the developer's elaborate plans may be implemented without water. It is difficult to rely on a water plan based on uncertain water sources.

As to the question of eminent domain (that the state may take private property provided it justly compensates the landowner), how does the Board of Water Supply propose to obtain the water rights to the Ewa Shaft? Will the State itself or the developer incur the cost of compensating Campbell Estate for the loss of its water source and diminution in value of its lands?

### Climate

Section 4.1 on Climate is inadequate. There is no assessment of evaporation rates and water demands. The document should include estimated changes in air temperature when sugar irrigation operations cease.

### Water Needs

Section 4.5 on Groundwater Resources lacks an assessment of the caprock water balance as it relates to changing land uses from a predominantly agricultural area to a residential and commercial one. There has been a series of changes in the caprock water due to sugar cultivation. Furrow irrigation, which was first implemented, operated at 30% efficiency for deep percolation, drip irrigation operated at 80% efficiency, and now with the closing of the sugar industry, recharge will be reduced. Residential and commercial landscaping will contribute very little water to the caprock aquifer.

Ms. Lynn Wong  
March 8, 1996  
Page 3

Appendix G on Impact on Agriculture pays little attention to irrigation needs. The Draft EIS does not mention the implementation of xeriscapes which was suggested by R.H. Sato of the Board of Water Supply in a letter dated January 6, 1995. Recommendation 6 reads, "Water efficient landscaping should be utilized to reduce the irrigation demand." This is important since the Ewa region is relatively dry.

The document completely dismisses the caprock aquifer as a non-potable source for irrigation. Tables 1 and 2 of Appendix J provide balances for potable water only, and these balances are incomplete. If the document refers to the use of 400-500 GPD for irrigating lawns and pools, this value is too small. How realistic are the data presented in these tables? A separate irrigation system is mentioned, but from where will the water be imported? Does water importation from the Waiahole Ditch make an important contribution as a potable and non-potable water resource?

#### Drainage

More attention needs to be given to drainage and storm water recharge issues in Chapter 6. Recommendations for using and retaining storm water for irrigation should be included. Mention was made of detention basins for retaining water for silt deposition, but will this water also be used for recharge? Natural ravines or grassways should be used instead of concrete channels. In doing so, natural processes will be utilized to facilitate draining with a greater likelihood of increasing ground water recharge in the area and mitigating impacts on ocean and shoreline resources at points of discharge.

#### Air Quality and Traffic

More recent data than September 1988 should be used in deriving automotive emission factors for CO for the years 2005 and 2011 (Appendix I, p. 13). We concur with the developer that traffic problems will be alleviated so long as it complies with the recommendations set forth in the Traffic Impact Assessment Report (Appendix K, p. 37-8).

It is unclear in the Draft EIS what type of street pattern will be used for this project. We assume that an arterial street will be constructed to keep traffic out of residential streets, thereby insuring a more quiet, peaceful neighborhood atmosphere, and keeping developer costs down. The downside of this arterial design is that it encourages traffic overload on arterial streets and discourages bus service, bicycling, and pedestrian activity in the area. Thus, the recommendation set forth in the draft EIS may be defeated by such a design.

We suggest that the developer would be more successful in mitigating traffic impacts by engaging in neo-traditional town planning principles through the development of a grid type street network. Other states have favored this model. (For more information, see Toward the Architecture of Community: New Urbanism by Peter Katz). We realize that development costs would increase with the utilization of this model but it is more cost effective in the long run, will provide an incentive for home buyers to settle in Kapolei, and will encourage alternate methods of transportation, namely carpooling and bus services, bicycling and pedestrian activity.

Ms. Lynn Wong  
March 8, 1996  
Page 4

Bike paths placed on main connector streets is a good idea. More connections between the project site and the proposed university campus will also aid in alleviating traffic problems.

#### Socio-Economic Environment

Overall, Chapter 5 on the Socio-Economic Environment was adequate. However, quality of life issues were not addressed. How will the housing divisions be designed to enhance community cohesion?

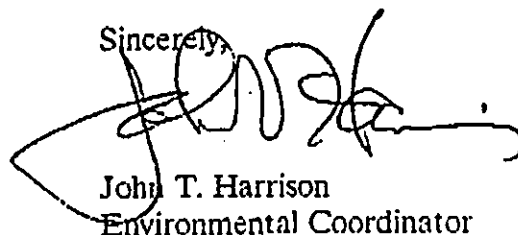
This section also mentioned the State's plan to build the University of Hawai'i, West Oahu campus adjacent to the Kapolei project site. Now that it is unlikely that the university project will be approved, what are the implications in regards to the East Kapolei development? Will it alter traffic estimates? How will potential businesses and the community-at-large be affected?

#### Conclusion

Given that this is a new draft EIS which supersedes a January, 1995 document, we are concerned that so few of our earlier comments were incorporated into the new version. The public review process is designed to allow for project modifications based on public input. To prepare an entirely new draft EIS without accommodating such input violates both the spirit and the intent of the environmental impact review process. We are dismayed that the developer neglected the opportunity to update the project at this relatively early stage. We sincerely hope that all received suggestions will be taken seriously in the final EIS.

Thank you for the opportunity to comment on this draft EIS.

Sincerely,



John T. Harrison  
Environmental Coordinator

cc: OEQC  
Schuler Homes, Inc.  
Helber Hastert & Fee, Planners  
Roger Fujioka  
Paul Ekern  
Peter Flachsbart  
Jon Matsuoka  
David Penn  
Malia Akutagawa  
Thomas Hawley

Helber Hastert  
Planners

April 11, 1996



Mr. John T. Harrison  
Environmental Coordinator  
University of Hawaii at Manoa  
Environmental Center  
Crawford 317, 2550 Campus Road  
Honolulu, Hawaii 96822

Dear Mr. Harrison:

**East Kapolei Project, Ewa, Oahu, Hawaii  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 8, 1996**

Thank you for your letter to Ms. Lin Wong, City and County of Honolulu Planning Department, dated March 8, 1996 responding to our request for comments on the above-referenced DEIS. We have reviewed your comments and offer the following responses:

**General Comments**

You note that this document replaces the January 1995 Draft EIS and that your comments to that earlier document were not addressed.

Please be advised that this document supersedes the April 1995 Final EIS for East Kapolei accepted by the Planning Department on May 11, 1995, not the January 1995 Draft EIS. The issues raised in your March 9, 1995 letter *were* addressed in our response letter to you dated April 7, 1995 and included in the April 1995 Final EIS. We apologize that the information was not incorporated into the text of the DEIS.

We have updated our responses to your concerns:

**Conflicts Over Water Appropriation**

As noted in the DEIS, the applicant continues to work to secure sufficient water source for the project. At the present time, firm commitments for water source have not been obtained, and water source remains an unresolved issue. As you note, none of the developer's plans can be implemented until a source is identified, and water commitments can and will be obtained.

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Heller Hestert  
Planners

Mr. John T. Harrison  
April 11, 1996  
Page 2

The developer's options for water source are discussed in the FEIS, including allocation from within the Pearl Harbor Water Management Area and development of other groundwater sources (i.e., north sector, windward sector).

### **Climate**

Evaporation on the Ewa plains has heretofore only been significant for the purposes of monitoring and estimating water needs for sugarcane crops. We do know that evaporation levels on the Ewa plain are high and primarily driven by wind energy. Due to the fact that the tradewinds will continue to be the primary influence on the climate in the area, it is not anticipated that development of the site will significantly impact regional climatic conditions.

The change in land use from a predominantly agricultural use to a residential use in part results from the closure of Oahu Sugar Company, which has already occurred without the influence of the proposed project. The urbanization of the area will significantly alter the microclimate of the project area from one associated with agriculture to one associated with a fully-developed residential area. Changes in air temperature and/or groundwater recharge which occur when sugar operations cease are not attributable to the East Kapolei development.

### **Water Needs**

The East Kapolei project is will not have a significant negative impact on the caprock water balance. This statement is primarily based on the fact that during the peak sugar production periods on the Ewa plains, the water requirement from the caprock aquifer needed for sugarcane irrigation was between 14 and 16 mgd. Currently, this demand has reduced to 0 mgd with the cessation of sugarcane cultivation. It has been estimated that if all the non-potable land uses on the Ewa plains were developed and served with caprock aquifer water, the total demand could be 8 mgd (Tom Nance, Water Resource Engineering). Presently, only a small portion of this non-potable requirement is in place.

The methods by which the caprock aquifer is recharged are rainfall, irrigation and basalt leakage. Researchers such as T. Giambellucca, UH Water Resources Research Center, have studied Central Oahu and the Ewa Plains and have suggested that recharge through residential irrigation and commercial irrigation can be significant in dry areas. In particular, recharge potential was measurable as compared to areas where no irrigation was occurring (i.e., fallow sugarcane fields).

The residential areas of the East Kapolei project do not require the use of non-potable water. However, current City policies require non-potable (dual) systems for irrigation be provided for the project's schools, parks, commercial areas and along major roadways. Several options

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Mr. John T. Harrison  
April 11, 1996  
Page 3

for non-potable water are being considered, including reuse of effluent from Honouliuli Wastewater Treatment Plant, the Ewa caprock aquifer and the brackish basal aquifer. These options are discussed in the FEIS.

The proposed use of reclaimed wastewater for irrigation provides significant potential for recharge of the caprock aquifer, which could restore it as a future source of non-potable water. The City is currently planning a pilot project to study the potential for aquifer recharge with treated reclaimed water, as well as to evaluate the water quality impacts of effluent use within the lower Ewa plain region. Pending the results of this pilot project, the caprock could receive recharge of up to 13 mgd, restoring it as a source of non-potable water for East Kapolei.

#### **Drainage**

Natural ravines and grassways rather than concrete channels have been incorporated where practical, i.e., in the lower sections of the drainage channel connecting to the Ewa by Gentry-East detention basin. In the upper (mauka) sections of the project area, the overall grades involved and the relatively large volume of upland stormwater, would require the grass swales to be extremely wide to avoid exceeding the maximum velocity of 5 feet per second, in accordance with City Department of Public Works standards. This would encompass a tremendous land area, reducing the area available for residential units, and is not a feasible alternative.

#### **Air Quality**

The age distribution of registered vehicles in Honolulu has not exhibited great variation over the years, and therefore does not have a significant impact on computed emission factors. In response to your comment, our air quality consultant (Jim Morrow) obtained March 1992 data and reran the emissions model. The results indicated less than a 0.5 percent difference, leading to the conclusion that there would be no significant change in the study's findings or conclusions by using more recent data.

#### **Traffic**

Major circulation elements within the project area include four arterials providing access to regional roadway network and the outer ring road which provides access to neighborhoods within the project. The roadway network serving the area within the outer ring road has been intentionally designed to favor local access, provide a more pedestrian/bicycle-friendly environment, and to prevent vehicular short-cutting, speeding and commuter-oriented peak hour trips through the central area. Over 50 percent of the project's 22,400 residents will live within the outer ring road, within a five minute walk of the central district park and adjacent

Hellen Hastett  
Planner

Mr. John T. Harrison  
April 11, 1996  
Page 4

neighborhood-serving retail uses. Bikeways are planned to facilitate non-vehicular (bike and pedestrian) circulation. Bus service can also be included to serve the major use areas of the project such as the multi-family and commercial areas.

The proposed plan implements neo-traditional town planning concepts articulated in the City's draft revisions to the Ewa Development Plan (City Planning Department, June 1995). The plan promotes a strong pedestrian orientation by clustering neighborhood serving facilities (elementary schools, neighborhood parks, commercial uses) within relatively short walking distances of the respective service areas, through the introduction of traffic calming design features (e.g., the proposed loop road around the central district park). Unlike traditional planned communities, the roadway network is designed to provide the motorist with multiple roadway choices, distributing rather than concentrating vehicular movements.

While the retail, office and government (employment) center in the City of Kapolei is beyond walking distance from East Kapolei, the project will serve to focus commuter trips there, away from the Primary Urban Center.

#### **Socio-Economic Environment**

Quality of life issues are thoroughly addressed in the Socio-Economic Impact Assessment by Community Resources, Inc. (CRI) (Appendix E of the EIS) and summarized in Chapter 5 of the EIS. Chapter 5 of the CRI report addresses the questions of area resident's sense of compatibility of the project with surrounding land uses, and quality of life impacts are systematically addressed in Chapter 6.

Although the Governor has identified an alternative site for the University of Hawaii-West Oahu campus mauka of the H-1 Freeway, at the time of the study, that proposal was yet to be approved by the Legislature. The site to the west of East Kapolei has been regarded as the "official" site, and was therefore retained in the EIS analysis. Development of the University at either site will not impact the feasibility of the East Kapolei project.

If the University moves to the mauka site, the differences in traffic flow from the East Kapolei project onto North-South Road will be right turns instead of straight through movements in the morning (am) and left turns instead of straight throughs in the afternoon (pm). We do not know at this preliminary stage of planning what, if any, changes would be needed for intersection layouts. As you know, the anticipated schedule for completion of the university has also been the subject of recent discussion. Given that the timing and scope of university improvements is still unknown, as well as what land uses will be developed at the "old" university site, an assessment of impacts on potential business and the community at large are

Helber Hastert

Planners

Mr. John T. Harrison

April 11, 1996

Page 5

problematic at best, and in any event, unrelated to and beyond the scope of the East Kapolei project.

**Conclusion**

As stated earlier, all of your previous comments (March 9, 1995) were addressed in our response dated April 7, 1995 and included in the April 1995 FEIS. Please be assured that your comments were taken seriously, and it was not our intent to ignore your input.

Your recent March 8, 1996 letter will be reproduced in the Final EIS. We will also ensure that your comments are incorporated into the text of the forthcoming FEIS.

Thank you for your review of the DEIS and for your input.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.



MAR-13-96 WED 9:01 PLANNING DEPT C&C

P. 01/01

1/46 0265

BUILDING DEPARTMENT  
CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING  
650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

JEREMY HARRIS  
MAYOR



RANDALL K. FUJIKI  
DIRECTOR AND BUILDING SUPERINTENDENT  
MIDDOM BAQUILAN  
DIRECTOR AND BUILDING SUPERINTENDENT

PB 96-62

To: Leslie Kuwinski  
Melba Hastert  
\* Fee  
Fax: 545-2050  
From: Lin Wong  
Tel: 522-4485

January 30, 1996

MEMO TO: CHERYL SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: RANDALL K. FUJIKI  
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: EAST KAPOLEI PROJECT - DRAFT ENVIRONMENTAL ASSESSMENT

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

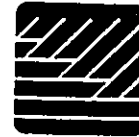
For RANDALL K. FUJIKI  
Director and Building Superintendent

cc: G. Tamashiro

Helber Hastert  
Planners

April 8, 1996

Mr. Randall K. Fujiki  
Director and Building Superintendent  
Building Department  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Memo dated January 30, 1996**

Dear Mr. Fujiki:

Thank you for your memorandum to Ms. Cheryl Soon, Chief Planning Officer, dated January 30, 1996 in response to the East Kapolei Project Draft EIS. We note that you have no comments to offer.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

March 8, 1996

MAR 12

TO: CHERYL D. SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT.

ATTN: LIN WONG *Raymond H. Sato*

FROM: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE EAST KAPOLEI  
PROJECT, EWA, TMK: 9-1-19: PORTION 04; 9-1-18: PORTION 01;  
9-2-02: PORTION 01; 9-2-04: PORTION 05; 9-1-10: PORTION 02;  
(DP AREA: 9-1-17: PORTION 04; 9-1-18: PORTION 01

Thank you for the opportunity to review and comment on the DEIS for the subject project. We have the following comments to offer:

1. The developer will be required to install the necessary source, storage and transmission facilities to serve the development. The revised East Kapolei Water Master Plan should be submitted for our review and approval. All required water infrastructure should be addressed by the master plan including hydraulic calculations for peak pressures and fire flows.

The projected water demands should account for the Board of Water Supply (BWS) requirement for nonpotable water sources to serve large landscaped areas such as schools, parks and roadways. The final EIS should be revised to include the approved water master plan or the most current version.

2. The BWS Rules and Regulations require nonpotable water as the first option for an irrigation source for large landscaped areas. Therefore, a dual water system should be thoroughly investigated to provide nonpotable water for irrigation of large landscaped areas, such as schools, parks and roadways. A nonpotable water master plan should be submitted to BWS if the nonpotable water system will be dedicated to BWS. Provisions in the final EIS should indicate the possibility of a dual water system due to the caprock resource in the project area.
3. The proposed project is subject to our cross-connection control requirements prior to the issuance of the building permit. BWS approved reduced pressure principle backflow prevention assemblies will be required after all domestic water meters serving lots with dual water systems.

If you have any questions, please contact Barry Usagawa at 527-5235.

cc: Office of Environmental Quality Control  
Schuler Homes, Inc.  
Helber Hastert and Fee, Planners

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714



Date Received **APR 19 1996**  
File 2419-1  
Action: 14-1996  
cc. Scheller  
FD: Helber + Haskett  
JEREMY HARRIS, Mayor  
WALTER O. WATSON, JR., Chairman  
MAURICE H. YAMASATO, Vice Chairman  
KAZU HAYASHIDA  
MELISSA Y.J. LUM  
FORREST C. MURPHY  
KENNETH E. SPRAGUE  
BARBARA KIM STANTON  
RAYMOND H. SATO  
Manager and Chief Engineer

April 17, 1996

Mr. Daniel S. C. Hong  
Gray, Hong, Bills & Associates, Inc.  
119 Merchant Street, Suite 607  
Honolulu, Hawaii 96813-4499

Dear Mr. Hong:

Subject: Your Letter of February 23, 1996 Regarding the Addendum Report for the East Kapolei Project Water Master Plan

Thank you for your letter regarding the Addendum Report for the East Kapolei Potable Water Master Plan.

We approve the Addendum Report with the following conditions:

1. A potable water source is a requirement of the development. The Board of Water Supply will assist the developer in designating and locating a potable water source.
2. A transmission main from the potable water source to the development is required.
3. The applicant should investigate the availability and use of nonpotable water for irrigation. If nonpotable water is not available or its use is not feasible, a report of the investigation should be submitted to us before we will consider the use of potable water for irrigation.

If you have any questions, please contact Joseph Kaakua at 527-6123.

Very truly yours,

  
RAYMOND H. SATO  
Manager and Chief Engineer

Helber Hastert  
Planners

April 25, 1996

Mr. Raymond H. Sato, Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii 96843



**East Kapolei Project**  
**Draft Environmental Impact Statement (DEIS) Comments**  
**Your Memo dated March 8, 1996**

Dear Mr. Sato:

Thank you for your memorandum to Ms. Cheryl Soon, Chief Planning Officer, dated March 8, 1996 in response to the East Kapolei Project Draft EIS, and for your letter dated April 17, 1996 to Gray Hong Bills & Associates conditionally approving the Potable Water Master Plan. We have the following responses to your DEIS comments:

1. The applicant intends to construct the necessary source, storage and transmission facilities to serve the project. Copies of the revised *East Kapolei Water Master Plan* have been submitted to your office for review. We note that per your April 17, 1996 letter to Gray Hong Bills & Associates, the BWS has approved the Addendum Report, subject to the conditions listed.
2. The project's school and park sites, the primary potential users of non-potable water, will be dedicated to the Department of Education (DOE) and Department of Parks and Recreation (DPR), respectively, and the applicant has no direct control over the scheduled development of these sites.

The FEIS includes a review of current City and State policies requiring the establishment of dual water systems for irrigation and other appropriate uses. It summarizes the applicant's investigation into the possibility of a dual water system for irrigation of large landscaped areas such as the schools, parks, commercial areas and along roadways. The FEIS includes a discussion of this, and potential sources of non-potable water for the project, including use of 1) treated wastewater effluent from Honouliuli WWTP; 2) Ewa caprock aquifer; and 3) brackish basal aquifer.

The technical and financial feasibility of each of the options, as well as timing of the development of the parks and schools, will have a major influence on the option selected. The applicant will coordinate with the DOE and DPR in development of the non-potable

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Helber Hastert  
Planners

Mr. Raymond H. Sato  
April 25, 1996  
Page 2

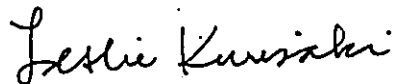
water system, and will work with adjacent landowners to explore the possibility of a regional non-potable system

3. We understand the project is subject to your cross-connection control requirements prior to the issuance of the building permit.

We appreciate your input. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

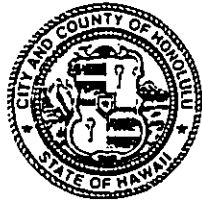


Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department

FIRE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

3375 KOAPAKA STREET, SUITE H425  
HONOLULU, HAWAII 96819-1969

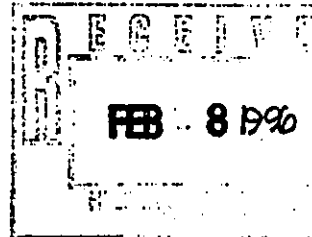


JEREMY HARRIS  
MAYOR

ANTHONY J. LOPEZ, JR.  
FIRE CHIEF

ATTILIO K. LEONARDI  
FIRE DEPUTY CHIEF

February 6, 1996




TO: CHERYL D. SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: ANTHONY J. LOPEZ, JR., FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT  
EAST KAPOLEI PROJECT - EWA, OAHU  
TMK: 9-1-19: POR. 04; 9-1-18: POR 01; 9-2-02: POR 01;  
9-2-04: POR 05; AND 9-1-10: POR 02

We have reviewed the subject material provided and have no additional comments.

Should you have any questions, please call Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

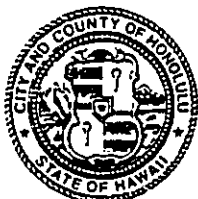
  
ANTHONY J. LOPEZ, JR.  
Fire Chief

AJL/PHG

cc: Schuler Homes, Inc. (Mike Angotti)  
Helber Hastert & Fee, Planners (Ms. Leslie Kurisaki)  
Office of Environmental Quality Control w/report

FIRE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

3375 KOAPAKA STREET, SUITE H425  
HONOLULU, HAWAII 96819-1869

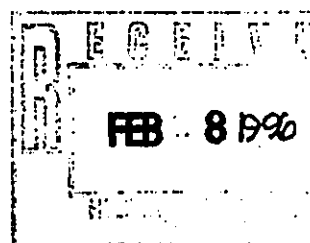


JEREMY HARRIS  
MAYOR

ANTHONY J. LOPEZ, JR.  
FIRE CHIEF

ATTILIO K. LEONARDI  
FIRE DEPUTY CHIEF

February 6, 1996




TO: CHERYL D. SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: ANTHONY J. LOPEZ, JR., FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT  
EAST KAPOLEI PROJECT - EWA, OAHU  
TMK: 9-1-19: POR. 04; 9-1-18: POR 01; 9-2-02: POR 01;  
9-2-04: POR 05; AND 9-1-10: POR 02

We have reviewed the subject material provided and have no additional comments.

Should you have any questions, please call Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

  
ANTHONY J. LOPEZ, JR.  
Fire Chief

AJL/PHG

cc: Schuler Homes, Inc. (Mike Angotti)  
Helber Hastert & Fee, Planners (Ms. Leslie Kurisaki)  
Office of Environmental Quality Control w/report



Helber Hastert  
Planners

April 8, 1996

Chief Anthony J. Lopez, Jr., Fire Chief  
Fire Department  
City and County of Honolulu  
3375 Koapaka St., Suite H425  
Honolulu, Hawaii 96819-1869



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 6, 1996**

Dear Chief Lopez:

Thank you for your memorandum to Ms. Cheryl Soon, Chief Planning Officer, dated February 6, 1996 in response to the East Kapolei Project Draft EIS. We note that you have no additional comments. We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

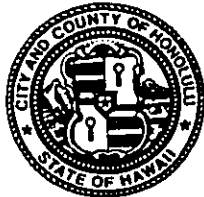
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET, 5TH FLOOR  
HONOLULU, HAWAII 96813  
PHONE: (808) 523-4427 • FAX: (808) 527-5498

JEREMY HARRIS  
MAYOR



RONALD S. LIM  
DIRECTOR

ROLAND D. LIBBY, JR.  
DEPUTY DIRECTOR

March 7, 1996

MAR 11 1996

MEMORANDUM

TO: CHERYL D. SOON, DIRECTOR  
PLANNING DEPARTMENT

FROM: ROLAND D. LIBBY, DIRECTOR

SUBJECT: EAST KAPOLEI PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)  
TAX MAP KEY: 9-1-17: 04 (POR.); 9-1-18: 01 (POR.); 9-2-02: 01  
(POR.); 9-2-04: 05 (POR.); and 9-1-10: 02 (POR.)  
EWA, OAHU

This is in response to the Office of Environmental Quality Control's request to review and comment on the East Kapolei Project DEIS.

The Department of Housing and Community Development (DHCD) has no objections to the use of the former Cane Haul Road (Balfour Boulevard) as the route connecting to DHCD's existing 4-acre detention basin and the proposed Ewa by Gentry-East open drainage channel, located east of the West Loch Fairways subdivision. If possible, the Department would prefer the drainage channel to be constructed of "rip-rap" instead of the proposed reinforced concrete rectangular channel. We would also like to request that the plans for the drainage channel and the unused portion of the road be circulated to the DHCD, Department of Parks and Recreation (DPR) and Department of Public Works for review and approval before any construction begins.

The Department also agrees with the construction of the pedestrian overpass connecting West Loch Fairways with Asing Park. The DHCD would like to request that the Developer contact the DPR who will maintain Asing Park, the abutting owners and those who will benefit from the pedestrian link to receive their comments and approval before constructing the overpass.

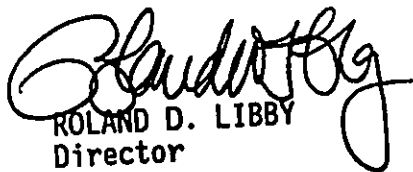
The Department understands that 30% of the units will be affordable to families earning between 80 and 120 percent of the median income. The DHCD would like to request that 10 percent of the housing units to be developed be made affordable to households with incomes below 80 percent of Oahu's median income and that an additional 20 percent of the total be made affordable to families with incomes

Memorandum to Cheryl D. Soon  
March 7, 1996  
Page 2

between 81 and 120 percent of Oahu's median income. Please have the developer contact our Housing Development Division at 523-4264 to discuss a program acceptable to DHCD.

Please feel free to contact Jason Ching of the Planning and Analysis Division at 523-4368 if you have any further questions.

Thank you for the opportunity to comment.

  
ROLAND D. LIBBY  
Director

cc: Mike Angotti, Schuler Homes, Inc.  
✓ Leslie Kurisaki, Helber Hastert & Fee, Planners  
Department of Parks and Recreation  
Department of Public Works

Helber Hastert  
Planners

March 28, 1996

Mr. Roland D. Libby, Director  
Department of Housing and Community Development  
City and County of Honolulu  
650 S. King Street, 5th Floor  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Memo dated March 7, 1996**

Dear Mr. Libby:

Thank you for your memorandum to Ms. Cheryl Soon, Chief Planning Officer, dated March 7, 1996 in response to the East Kapolei Project Draft EIS. We have reviewed your comments and offer the following responses:

**Drainage Issues**

1. We acknowledge that the DHCD has no objection to the use of the former cane haul road (Balfour Boulevard) as the route connecting to the existing detention basin and proposed Ewa by Gentry-East drainage channel.
2. A trapezoidal rip-rap channel was considered as an alternative to the concrete rectangular channel but was eliminated due to both cost constraints and to minimize land use (and maximize land available for park use).
3. Plans for the channel and related improvements will be submitted to DHCD, the Department of Public Works and the Department of Parks and Recreation for review and comment prior to start of construction.
4. The developer has submitted copies of the drainage plan, including plans for the pedestrian overpass, to the Department of Parks and Recreation for review and comment. The applicant will consult with the Department of Parks and Recreation and abutting land owners on the construction of the overpass as more definitive plans are developed.

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Helber Hastert  
Planners

Mr. Roland D. Libby  
March 28, 1996  
Page 2

**Affordable Housing Issues**

The applicant intends to comply with the City's affordable housing requirements and looks forward to working with your department in developing an acceptable program.

We appreciate your review of the DEIS and your input. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

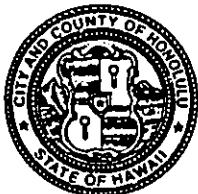
*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department

DEPARTMENT OF HUMAN RESOURCES  
**CITY AND COUNTY OF HONOLULU**

STANDARD FINANCE PLAZA  
715 SOUTH KING STREET  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

SALVATORE S. LANZILOTTI, ED.D.  
DIRECTOR

Michael Amii  
DEPUTY DIRECTOR

ADMINISTRATION  
2ND FLOOR (808) 527-5311  
FAX: (808) 523-4074

ELDERLY AFFAIRS DIVISION  
HONOLULU COMMITTEE ON AGING  
5TH FLOOR: (808) 523-4761

WORKHAWAII DIVISION  
5TH FLOOR: (808) 523-4102

SPECIAL PROJECTS SECTION  
HONOLULU COUNTY COMMITTEE ON THE STATUS OF WOMEN  
MAYOR'S COMMITTEE FOR PERSONS WITH DISABILITIES  
MAYOR'S CHILD CARE ADVISORY BOARD  
5TH FLOOR: (808) 527-6264  
EM

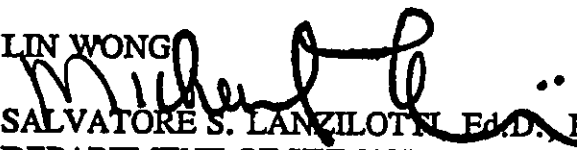
March 8, 1996

**MEMORANDUM**

MAR 14

TO: CHERYL SOON, DIRECTOR AND CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

ATTN: LIN WONG

FROM:  SALVATORE S. LANZILOTTI, ED.D., DIRECTOR  
DEPARTMENT OF HUMAN RESOURCES

SUBJECT: EAST KAPOLEI PROJECT  
**DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)**

The Department of Human Resources has reviewed the subject matter cited above and offers the following comments:

In our previous comments on this project (*memorandums of February 24, 1995, April 13, 1995 & December 22, 1995*), we requested that the applicant dedicate land and/or funds to the City for the construction of a facility to house social programs and services for residents of its projected 8,000 dwelling units.

While the applicant in its letter of January 8, 1996 agreed that the availability of social services would greatly enhance the quality of life within a multi-generational community, being that the East Kapolei project would be a primarily residential development, they felt that it would not be an appropriate location for regional social service facilities. The applicant further stated that the proposed University of Hawaii West Oahu campus is likely to include a child care center and may be a more appropriate location for other social service facilities as well.

Ms. Cheryl Soon  
March 8, 1996  
Page Two

Should the University of Hawaii West Oahu include a child care center on its campus, this facility will primarily service children of the University's faculty and student populations. Secondly, universities are traditionally academic and research-oriented as opposed to social service delivery institutions. In so far as the residents of the community would be benefitted by the type of services that social &/or human service programs provide, we do not feel that it would be inappropriate for programs of this nature to be located in residential developments.

We however do concur with the applicant's summation that the provision of land and/or funding for social services and facilities are a regional responsibility that should be shared by the Ewa community at large as well as by the public and private sectors. Please be informed that our comments concerning the East Kapolei project are consistent with our review of other major residential projects throughout the City & County of Honolulu. Consequently, we have held discussions with and secured commitments from other private developers and community-based organizations with respect to providing social and/or human service programs for other communities on Oahu to include the Ewa region. We therefore would welcome the opportunity to discuss this matter with the applicant in order to seek their assistance in addressing the social and human service needs of the Ewa community.

If you have any questions or require further information concerning our comments, please direct your inquiries to Mr. Ernie Martin of our department's *Special Projects Division* at X-6264.

Thank you for the opportunity to comment on this matter.

c: Brian J.J. Choy, Director  
Office of Environmental Quality Control  
Mike Angotti  
Schuler Homes, Inc.  
Leslie Kurisaki  
Helber Hastert & Fee, Planners

a:\ekapolei.cis

Helber Hastert  
Planners

April 8, 1996

Dr. Salvatore S. Lanzilotti, Director  
Department of Human Resources  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Memo dated March 8, 1996**

Dear Dr. Lanzilotti:

Thank you for your memorandum to Ms. Cheryl Soon, Chief Planning Officer, dated March 8, 1996 in response to the East Kapolei Project Draft EIS. We acknowledge your comment that social programs and services, including child care, could be appropriately located in residential developments. The developer looks forward to discussing these matters with your department, and will assist other private developers and community organizations in addressing the social and human service needs of the Ewa community.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*

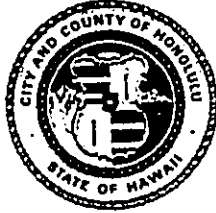
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department



DEPARTMENT OF LAND UTILIZATION  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813 • (808) 523-4432



JEREMY HARRIS  
MAYOR

PATRICK T. ONISHI  
DIRECTOR

LORETTA K.C. CHEE  
DEPUTY DIRECTOR

96-00517 (DT)

March 20, 1996

MAR 22

Ms. Leslie Kurisaki  
Helber Hastert & Fee  
Grosvenor Center, Makai Tower  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

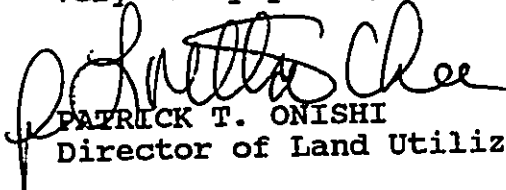
Dear Ms. Kurisaki:

Draft Environmental Impact Statement (DEIS)  
East Kapolei Project, Ewa, Oahu  
Tax Map Key: 9-1-17: por. 04

Thank you for the opportunity to review the above-described DEIS.  
We have no additional comments to offer.

Should you have any further questions, please contact Dana Teramoto  
of our staff at 523-4648.

Very truly yours,

  
PATRICK T. ONISHI  
Director of Land Utilization

PTO:am

cc: Planning Department

kapolei.djt

Helber Hastert  
Planners

April 8, 1996

Mr. Patrick Onishi  
Director of Land Utilization  
Department of Land Utilization  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 20, 1996**

Dear Mr. Onishi:

Thank you for your letter dated March 20, 1996 in response to the East Kapolei Project Draft EIS. We note that you have no comments to offer.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBERT HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department

MAR- 6-96 WED 10:57 PLANNING DEPT C&C

P. 01/83

2/96-0435

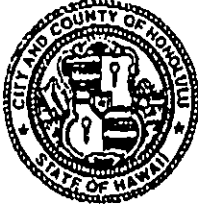
1/2/CFPO

DEPARTMENT OF PARKS AND RECREATION

**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

JEREMY HARRIS  
XXXXXXXXXX  
MAYOR



DONA L. HANAIKE  
XXXXXXXXXX  
DIRECTOR

ALVIN K. C. AU  
DEPUTY DIRECTOR

February 12, 1996

TO: CHERYL D. SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

ATTENTION: LIN WONG

FROM: DONA L. HANAIKE, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE  
EAST KAPOLEI DEVELOPMENT PROJECT, EWA, OAHU, HAWAII  
TAX MAP KEYS 9-1-019:004 (POR.)  
9-1-018:001 (POR.)  
9-2-002:001 (POR.)  
9-2-004:005 (POR.)  
9-1-010:002 (POR.)

We have reviewed the DEIS for the above-described project and make the following comments.

The project does not meet our department's requirements. The development's estimated population of 24,000 residents will have a severe impact on existing park facilities and services in the Kapolei area.

Our concerns were discussed with Mr. Mike Angotti of Schuler Homes, Inc. and Mr. Tom Fee of Helber Hastert & Fee during two separate meetings at our office on November 30, 1995 and again on December 13, 1995.

Our concerns are as follows:

1. The project does not meet our park space standard of two (2) acres of "active" recreational park space for every 1,000 residents. Active recreational facilities would include tennis courts, volleyball courts, basketball courts, softball fields, baseball fields, and football fields.

Cheryl D. Soon  
Page 2  
February 12, 1996

We estimate that Schuler Homes, Inc. would need to provide a total of 48 acres of "active" recreational space. While the report notes that additional open space and park areas will be provided in the form of greenbelts and private recreational areas, we do not consider greenbelts or open space to be "active" recreation space. The public is demanding more active recreation facilities such as playfields and playcourts and not more open space.

2. The project of this size will also require a district park for the 24,000 residents. The community park, which Schuler proposes, is intended to serve approximately 10,000 residents and will not have the type of facilities that would normally be provided in a district park. District park facilities would generally include a gymnasium, recreation complex, swimming pool, playfields, and courts.

As we explained to Mr. Angotti, a district park would require at least 20 acres and should be able to serve the 24,000 residents.

3. There is no "active" recreational facilities to serve the 82-acre mauka residential area which lies between Farrington Highway and the H-1 Freeway. The three proposed public parks are all located in the makai portion of the project and would not be readily accessible from the mauka residential portion.
4. We are concerned that the major one-way loop road combined with the diagonal vehicular parking system would create a potentially dangerous situation for park users trying to access the community park. Traffic congestion will also be aggravated by the commercial areas surrounding the park. A traffic study would need to be done to ensure pedestrian safety, especially for the younger park users.

The statement on page 3-10, Section 3.2.5, Recreational Resources, notes, "The project will not have an impact on the ocean recreational resources." This is incorrect. The 24,000 population will have a significant impact on the ocean recreational resources.

The final EIS should state that the East Kapolei Development project, as proposed, does not provide adequate park space to meet our minimum park requirements.

Thank you for the opportunity to review this project.

MAR- 6-96 WED 10:58 PLANNING DEPT C&C

P. 03/03

Cheryl D. Soon  
Page 3  
February 12, 1996

Should you have any questions, please contact Lester Lai of our  
Advance Planning Branch at 523-4696.



For DONA L. HANAIKE  
Director

DLH:ei

cc: Office of Environmental Quality Control  
Schuler Homes, Inc. (Mike Angotti)  
Helber Hastert & Fee (Leslie Kurisaki)

Helber Hastert  
Planners

April 25, 1996

Ms. Dona L. Hanaike, Director  
Department of Parks and Recreation  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Memo dated February 12, 1996**

Dear Ms. Hanaike:

Thank you for your memorandum to Ms. Lin Wong, Planning Department, dated February 12, 1996 in response to the East Kapolei Project Draft EIS

Concerns identified in your letter (items 1 through 4) include: the park space standard of two acres of active park for every 1,000 residents; need for a district park; the lack of active recreational facilities to serve the "mauka" residential area; and pedestrian safety around the park. All of these issues were subsequently discussed in a meeting between the project developer and members of your staff on February 29, 1996.

The following items were discussed and mutually agreed upon at that meeting:

**Dedicated County Parks**

- The project's proposed "central park" will be increased in size from 16 to 20 acres to meet your department's district park standard. This larger size will provide sufficient acreage for a gymnasium and recreation center. The Department supports the central park concept, and initial concerns over the proposed loop road around the park are being resolved by keeping posted traffic speeds low (e.g., 15 mile per hour speed limit around the park), internalizing the park parking instead of using on-street diagonal parking, and an overall roadway circulation plan which will minimize through traffic from transiting the area.
- The two neighborhood parks (each adjacent to an elementary school) will be reduced from eight acres to six acres each to compensate for the increased size of the "central" park. Six acres meets DPR size requirement for a neighborhood park.
- A new two- to three-acre park area (of sufficient size to meet Park Dedication Ordinance requirements associated with the *mauka* parcel) will be set aside to serve the *mauka* residential area. Conceptually, the park will be sited along the parcel's western boundary, to allow for future expansion by the adjacent landowner.

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Helber Hastert  
Planners

Ms. Dona Hanaike  
April 25, 1996  
Page 2

- Park Dedication Ordinance (PDO) requirements, currently estimated at about 31 acres based on 8,000 homes in a 1/4 single family, 3/4 multi family mix, will be met by the provision of sites for the 20 ac. central park, two 6-acre neighborhood parks, and a 2- to 3-acre park within the *mauka* parcel.

#### Development Plan Common Provisions/Parks Department Standards

The project will meet the DP Common Provisions/DPR park standard of two acres per thousand population. The bulk of this acreage will be provided in the form of dedicable County parks as discussed above. The balance will be provided in the form of private mini-parks located throughout the project.

#### Other Issues

Concerns over pedestrian safety in the vicinity of the central park were also expressed in your letter. The loop road surrounding the park has been designed for local access only, in order to reduce vehicle speeds. Park parking areas will be separated from the loop road right-of-way, and pedestrian barriers along the park perimeter and raised pedestrian crosswalks are being recommended to increase pedestrian safety.

Finally, your letter notes that the 24,000 population "will have a significant impact on ocean recreational resources." The East Kapolei project will increase the population in the Ewa region, and as such, is likely to increase the use of public beaches in that region. The project will not bring *additional* people into the City and County of Honolulu, but rather "redistribute" the existing population. Therefore, while the new East Kapolei residents may increase the overall use of Ewa area beaches, there should be a corresponding drop in the use of beaches they currently utilize.

We appreciate your review and comments on the DEIS, and the input and advise we have received from your staff over the past several months. Your letter will be reproduced in the Final EIS.

Sincerely,

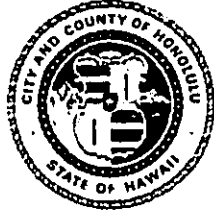
HELBER HASTERT & FEE, Planners

  
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

PLANNING DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

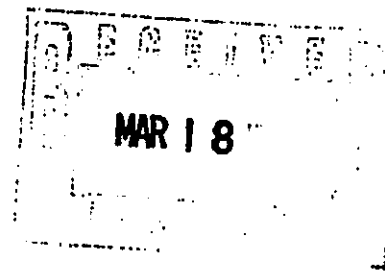


JEREMY HARRIS  
MAYOR

CHERYL D. SOON  
CHIEF PLANNING OFFICER  
CAROLL TAKAHASHI  
DEPUTY CHIEF PLANNING OFFICER

LW

March 14, 1996



Helber Hastert & Fee, Planners  
733 Bishop Street, Suite 2590  
Honolulu Hawaii 96813

Attention: Ms. Leslie Kurisaki  
Senior Associate

Gentlemen:

Comments to the Draft Environmental Impact Statement  
East Kapolei Project, PD No. 96/E-1  
TMKs: 9-1-17: Por. 4 & 9-1-18: Por. 1, Ewa, Oahu

We have reviewed the subject Draft Environmental Impact Statement (DEIS) and offer the following comments.

Transportation and Traffic Impacts

The Final Environmental Impact Statement (FEIS) should address the issue of timing and construction of proposed improvements to Farrington Highway and the North-South Road as they relate to the development of this project. The DEIS states that initial phases of the project are not dependent on the North-South Road and that the actual development timing of the road is beyond the developer's control. We note that the issue of timing may be critical due to currently limited capacity of Farrington Highway and other regional roadways to accommodate potential traffic generated by the East Kapolei project. The FEIS should include a schedule of anticipated vehicular demand due to the project and indicate how it compares with the proposed implementation timetable and resultant traffic capacities of these regional transportation facility improvements (1995-2000 for Farrington Highway improvements and 2001-2005 for the North-South Road as stated in the Oahu Regional Transportation Plan).



It is our understanding that discussions are on-going with the Department of Transportation Services (DTS) to address their concerns and comments to the DEA, some of which are reiterated in their comments to the DEIS. The FEIS should address these issues and provide updated information on mitigative measures and/or revised roadway plans, if any, to minimize safety concerns.

#### Water Supply

Water supply for the proposed project remains unresolved at this time. The water report in the DEIS continues to identify the Ewa Shaft (EP 15 and 16) as a possible water source for the proposed project, although that is uncertain due to conflicts between BWS and Campbell Estate regarding the use of the Ewa Shaft. Furthermore, the Addendum Report for the East Kapolei Potable Water Master Plan does not identify possible sources of water supply for the proposed project. The FEIS should discuss whether or not a viable water source for the project can be secured by the developer within the projected timeframe.

The Board of Water Supply (BWS) has asked that a revised East Kapolei water masterplan be submitted for their review and comment. We recommend that discussions be held with BWS regarding the revised masterplan.

The DEIS states that, as a residential project, the East Kapolei development is not required to use non-potable water. We note that the BWS Rules and Regulations require nonpotable water as the first option for an irrigation source for large landscaped areas, including schools, parks, and roadways. Developers of masterplanned projects are required to thoroughly investigate this option and provide for the installation of dual water systems for distribution of nonpotable water to these sites, if such an option is available and selected.

The DEIS states that the school and park sites will be dedicated to the Department of Education (DOE) and Department of Parks and Recreation (DPR), respectively, which will be responsible for use of nonpotable water in their development. However, as DOE and DPR will only accept land with site improvements, including water supply, it is the developer's responsibility to examine the possibility of a dual water system and explore nonpotable water resources. The FEIS should indicate the possibility of a dual water system for the project due to the caprock resource in the project area.

### Drainage

Based on concerns and comments expressed by a number of agencies, we recommend that the FEIS provide additional information on drainage, including potential project impacts on the proposed Ewa by Gentry-East drainage facilities and West Loch drainage basin.

The proposed off-site drainage channel is linked to the proposed Ewa by Gentry-East detention basin and outlet. The DEIS states that the impact of the runoff from the Ewa by Gentry-East detention basin to the West Loch has been addressed in the Ewa by Gentry-East Offsite Drainage Plan, Final FEIS. To address concerns about the project impact on the proposed Ewa by Gentry-East drainage facilities and West Loch wildlife refuge, the project FEIS should include summary information on potential impact and mitigative measures instead of referencing the Ewa by Gentry Offsite Drainage Plan, Final EIS. In addition, the Navy has indicated that the proposed Gentry detention basin which will serve a substantial portion of the East Kapolei project has not yet been approved. This should be addressed in the FEIS.

The DEIS states that a drainage study is currently being reviewed by the Department of Public Works (DPW), Department of Housing and Community Development (DHCD), and the Department of Parks and Recreation (DPR). The FEIS should indicate if issues and concerns previously raised by DPW in their June 5, 1995 comments have been resolved and if these agencies concur with the proposed improvements in the current proposal.

The DEIS indicates that the off-site drainage improvements proposed for the East Kapolei project will be dedicated to City and County of Honolulu for maintenance and park use. The DPW will only accept drainage easements limited to the width of the improved channel and the DPR will only consider land usable for park development. The FEIS should include information on discussions with these agencies and clarify if the proposed improvements are acceptable to these agencies, and the form of agreement involved.

### Wastewater

The Department of Wastewater Management (DWM) indicated that they received an updated wastewater collection system master plan in February 1996 and are currently reviewing it. The FEIS should include the updated version of the wastewater masterplan and, if possible, comments or concurrence from DWM for the masterplan.

#### School Facilities

There is a discrepancy between DOE's estimates and those stated in the DEIS for projected student enrollment and acreage required for school development due to the East Kapolei project. The adequacy of school facilities to meet enrollment demand remains an unresolved issue. The FEIS should address this discrepancy or provide additional information on the likelihood of the project meeting school needs generated by the project. The FEIS should also indicate the likelihood of the proposed intermediate school being operational within the project's timeframe, since this is based on the assumption that the State will provide the other nine acres.

#### Park Facilities

It is our understanding that the developer has had discussions with DPR to address their concerns about park and recreational facilities proposed for the project, and these proposals have since been revised. Please include in the FEIS the latest park proposals for the proposed project and include comments or concurrence from DPR regarding the latest park proposals.

#### Population

The FEIS should update population projections for the Ewa DP area cited for the year 2010 as presented in Table 2 in Section 3.3 relating to population. For your information, preliminary population forecast data which was extended to the year 2020 shows the following projections for the Ewa DP area: 100,800 or 10.1 percent of the islandwide population for the year 2010 and 125,000 or 11.6 percent of the islandwide population for the year 2020.

#### Housing

The DEIS states that the purpose of the East Kapolei project is to meet the needs for affordable and moderately priced housing. The DEIS states that 30 percent of the total units will be affordable to families between 80 and 120 percent of the City and County of Honolulu median income. The FEIS should include additional information on the remaining target market and/or estimated price ranges for the remaining moderately priced "market" units.

Helber Haster & Fee, Planners  
March 14, 1996  
Page 5

The Department of Housing and Community Development (DHCH) requests that 10 percent of the units be made affordable to households with incomes up to and below 80 percent of Oahu's medium income and that an additional 20 percent of the total be made affordable to those families between 81 and 120 percent of the medium income. This request should be addressed in the FEIS.

To be consistent with the DP designations sought in the application, the table on Page 2-14 of the DEIS relating to proposed types and numbers of residential units should reflect Low Density units instead of Medium Density units. (Existing Ewa Special Provisions allow up to 30 units per net acre.)

Other Proposed Facilities

The FEIS should note the latest State proposal to relocate the University of Hawaii West Oahu Campus site to mauka of H-1 and that the Legislature and the University Board of Regents are currently reviewing this proposal. The FEIS should indicate how the outcome would or would not affect the feasibility of the project.

We would also like to bring your attention to letters from the University of Hawaii Environmental Center and Oahu Civil Defense Agency dated March 8, 1996 and February 12, 1996, respectively, stating that their previous concerns and comments were not addressed in the DEIS. This is a serious concern. Their issues and comments should be addressed in the FEIS.

Thank you for the opportunity to comment on the subject document. Should you have any further questions on the matter, you may contact Lin Wong of our staff at 523-4485.

Sincerely,



CHERYL D. SOON  
Chief Planning Officer

CDS:ft

cc: Managing Director's Office  
Mr. Angotti, Schuler Homes, Inc.

Helber Hastert  
Planners

April 15, 1996

Ms. Cheryl D. Soon  
Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 14, 1996**

Dear Ms. Soon:

Thank you for your letter dated March 14, 1996 in response to the East Kapolei Project Draft EIS and for the feedback received at our meeting with you and your staff on April 2, 1996. We have reviewed your comments and offer the following responses:

**Transportation and Traffic Impacts**

The Oahu Regional Transportation Plan (ORTP) identifies various highway improvements for Oahu for different time periods. The major arterials (and scheduled improvement timeframes) that would be impacted by the East Kapolei Project are North-South Road (Year 2001-2005), Farrington Highway (Year 1995-2000) and Kapolei Parkway (Year 1995-2000). These are all County facilities, under the jurisdiction of DTS.

Farrington Highway widening is occurring in several phases. The State Housing Finance and Development Corporation (HFDC) is taking a lead role in widening the segment between the Makakilo Interchange and the proposed North-South Road; the Makakilo Interchange to Kapolei Villages Golf Course Access Road segment is in final design with construction expected to begin around the end of this year. A Legislative funding request for the Golf Course Road to North-South Road intersection segment has been made with construction expected by 2000. The North-South Road to Fort Weaver Road segment of Farrington Highway (a segment of which fronts the project site) is identified in the ORTP as being widened in the 1995-2000 timeframe. The applicant will be required to accommodate the ROW widening, construct certain intersection improvements related to the project, and participate on a pro-rata share basis towards regional transportation improvements.

To compare anticipated project-generated vehicular demand levels with ORTP highway capacities, selected highway segments were considered. The critical capacity impact on

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Heller-Hastert  
Planners

Ms. Cheryl D. Soon  
April 15, 1996  
Page 2

the ORTP improvements would occur at the intersection of the North-South Road with Farrington Highway. An estimate of the ratio of project-generated trips to North-South Road Intersection capacity is provided below, based on the following assumptions:

- Project-generated vehicular demand is based on a best-guess project absorption schedule (see Exhibit 7, *Limited Scope Update of the East Kapolei Market Assessment*, Atwater, December 1995).
- Capacity of the North-South Road/Farrington Highway intersection is based on build-out laneage as determined in the traffic impact report, and expressed in vehicles per hour. (Intersection capacity is a function of roadway and operational variables, and thus, the estimate is approximate).
- Project trip estimates are based on typical weekday afternoon peak hour since this period would generate the largest number of trips.

**Ratio of East Kapolei Trips to Intersection Capacity  
(Assuming Intersection Exists Today)**

<u>Year</u>	<u>% of Intersection Capacity</u>
1998	1%
1999	3%
2000	6%
2001 (Farr. Hwy & Kap. Pkwy completed*)	9%
2002	12%
2003	15%
2004	18%
2005 (N-S Rd. completed*)	22%
2006	25%
2007	29%
2008	33%
2009	37%
2010	41%
2011	45%
2012	46%
2013 (project buildout)	52%

\*ORTP Estimate

Helber Hastert  
Planner

Ms. Cheryl D. Soon  
April 15, 1996  
Page 3

Currently, the City and State are undertaking an EIS for the North-South Road. Subject to funding, the road would likely be completed before the year 2005. Assuming the North-South Road construction starts in 1998 and takes four years, the project's absorption schedule indicates that the project traffic would consist of about 12% of the intersection's capacity during the afternoon peak hour when the North-South Road is completed.

#### **Water Supply**

The FEIS includes expanded discussion of potential potable water sources and non-potable water requirements and systems, areas which were lacking in the DEIS. In preparing the additional information, we coordinated closely with BWS and DWM staff to ensure the information was as current as possible.

#### **Drainage**

The FEIS drainage discussion has been expanded to address issues and concerns raised during the DEIS review, including those raised in your comments.

We acknowledge that the Navy has not yet approved the proposed Ewa by Gentry-East detention basin facility. The FEIS recognizes this as an unresolved issue.

The FEIS addresses the issues raised in the Department of Public Works' June 5, 1995 comments.

The applicant will continue to coordinate with DHCD, DPW and DPR regarding the drainage channel design in the vicinity of the proposed Asing Park.

#### **Wastewater**

The FEIS includes the updated version of the wastewater master plan now being reviewed by DWM.

#### **School Facilities**

You point out the discrepancy between the DOE's estimates and those stated in the DEIS for projected student enrollment and acreage required. The discrepancy is between two different sets of "students per housing unit" ratios provided by the DOE (in its November 1994 and January 1996 EIS correspondence). The EIS calculates student enrollment at

Heber Hastert  
Planner

Ms. Cheryl D. Soon  
April 15, 1996  
Page 4

buildout using *both* sets of ratios, which resulted in total enrollment of 2,386 and 2,950, respectively. The EIS further states that the actual enrollments will probably be somewhere within this range.

The two planned elementary schools will accommodate the elementary school demands of the proposed project. The DEIS indicates the project will generate a need for between 400 and 600 intermediate school "seats," about one-third to half the size of a "desirable" enrollment per school of 1,200 students (Draft Ewa DP Report, Planning Department, June 1995, p. 8-3). Based on this demand, the plan shows half of an intermediate school site or 9 acres of an 18-acre site (upper range of school size per Ewa DP Report, p. 8-2), with the other half of the school site extending into the adjacent land area owned by the State and also planned for residential uses. This "sharing" of responsibility for providing the intermediate school assumes the adjacent property will be developed for residential uses, and thereby generate additional needs for intermediate school facilities. The applicant has committed to working with DOE to ensure that adequate intermediate school facilities are developed to serve the needs of future East Kapolei residents, in a timely and efficient manner. It is recognized however, that the actual provision of the school facilities is DOE's ultimate responsibility, and is subject to a number of factors outside the applicant's control including, the number of students generated by other residential developments in the area and the allocation of DOE planning and construction funds.

#### **Park Facilities**

The FEIS includes the latest park proposals as agreed with the Department of Parks and Recreation. Dedicated park space now includes a 20-acre central park, two 6-acre neighborhood parks and a 2-3 acre mini-park to serve the mauka residential area. Additional private parks will be provided by the project's community associations.

#### **Population**

Table 2 has been updated with the population figures you provided.

#### **Housing**

The applicant will comply with the City's affordable housing policies. Thirty percent of total units will be affordable to families earning up to 120 percent of City and County median income. Information on the remaining target market and/or estimated price ranges for the remaining units is included in Chapter 2 of the FEIS.



Helber Hastert  
Planners

Ms. Cheryl D. Soon  
April 15, 1996  
Page 5

As requested, Table 2 on page 2-14 of the DEIS has been revised to reflect "low density" units rather than "medium density" units for housing product at 20 dwelling units/acre.

#### Other Proposed Facilities

The FEIS notes the latest State proposal to relocate the University of Hawaii-West Oahu mauka of the H-1 Freeway, although this site has not yet been approved by the Legislature. The EIS will note that the location of the university will not impact the feasibility of the project.

We appreciate your review of the DEIS and the input and advise we've received from you and your staff over the past months. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

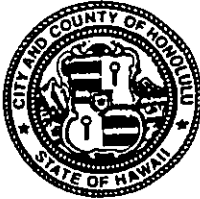


Leslie Kurisaki  
Project Planner

cc: Mr. Mike Angotti, Schuler Homes, Inc.

DEPARTMENT OF PUBLIC WORKS  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

KENNETH E. SPRAGUE  
DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO  
DEPUTY DIRECTOR

ENV 96-047

February 22, 1996

FEB 23

MEMORANDUM:

TO: CHERYL SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: *for* KENNETH E. SPRAGUE  
DIRECTOR AND CHIEF ENGINEER *KES*

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)  
EAST KAPOLEI PROJECT  
TMK: VARIOUS

We have reviewed the subject DEIS and have no additional comments to offer at this time.

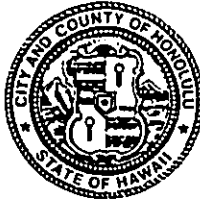
Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at Local 4150.

cc: OEQC  
Schuler Homes, Inc.  
Helber Hastert & Fee, Planners

DEPARTMENT OF PUBLIC WORKS  
**CITY AND COUNTY OF HONOLULU**

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JEREMY HARRIS  
MAYOR



KENNETH E. SPRAGUE  
DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO  
DEPUTY DIRECTOR

ENV 96-064

March 7, 1996

MAR 11

MEMORANDUM:

TO: CHERYL SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: *for* KENNETH E. SPRAGUE  
DIRECTOR AND CHIEF ENGINEER *KES*

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)  
EAST KAPOLEI PROJECT  
TMK: VARIOUS

With reference to our memo of February 22, 1996 (ENV 96-047), we wish to add the following comments:

1. We recommend that the existing roadway easement "2680" be terminated since Oahu Sugar Company is being dissolved.
2. All proposed drainage easements which are to be dedicated to the City and County of Honolulu (under the jurisdiction of the Department of Public Works) shall be limited to the width of the improved channel, i.e., from outside wall to outside wall of the channel.
3. A maintenance ramp for the channel should be provided.
4. For other comments and concerns, please see attached letter dated June 5, 1995 (Ref. No.: 95-12-0234).

cc: OEQC  
Schuler Homes, Inc.  
Helber Hastert & Fee, Planners  
DHCD (Ray Sakai)

bcc: Chief  
Assistant Chief  
Storm Water Quality Section  
(Attention: Mr. Gerald Takayesu)  
Drainage Section  
(Attention: Mr. Mel Takakura)

RETURN TO  
DIVISION OF ENGINEERING

95-12-0234

June 5, 1995

Mr. Harvey Goth  
Vice President  
Schuler Homes, Inc.  
828 Fort Street, 4th Floor  
Honolulu, Hawaii 96813

Dear Mr. Goth:

Subject: West Loch Drainage Basin, East Kapolei Project, TMK: 9-1-17: 04

Pursuant to a recent meeting with you, we met with the staff from the Department of Housing and Community Development (DHCD) and the Department of Parks and Recreation (DPR) to discuss the proposed drainage pathway and drainage requirements for the Schuler Homes, Inc.'s East Kapolei Project. Herewith are some of our concerns which were discussed in our meeting:

1. The City (DHCD) owns the area identified as the Cane Haul Road which has been proposed as a possible drainage pathway for the East Kapolei Project. Although Oahu Sugar Company has an easement for the Cane Haul Road, the easement will probably be terminated since the Oahu Sugar Company is being dissolved.
2. The preferred route for the East Kapolei Project apparently is along the Cane Haul Road if Items 3, 4, 5 and 6 listed below are met. DHCD has concerns with the proposed drainage pathway running through the City's elderly housing project, and noted that changes would be required to the existing pipe culverts through Fort Weaver Road because of its apparent insufficient capacity.
3. Schuler would need to obtain an easement from the City for the drainage path along the Cane Haul Road. Equitable compensation must be negotiated.
4. Schuler would need to discuss and obtain concurrence for the planned Cane Haul Road drainage pathway with the City Department of Transportation Services (DTS) and the State Department of Transportation.
5. Schuler would need to improve the land adjacent to the drainage pathway to enable DPR to properly maintain this area. Acceptable improvements should be discussed with DPR.


Mr. Harvey Goth  
Page 2  
June 5, 1995

6. Schuler would need to provide a pedestrian crossing for the West Loch Developments to the new Asing Park. The location of the pedestrian crossing and other requirements should be discussed with DPR.
7. It appears that Schuler cannot use the Gentry retention basin to address the East Kapolei Project's retention requirements since Gentry's revised retention basin plan presently indicates sufficient capacity for only the Gentry development. On-site retention would be required for Schuler's East Kapolei Project.

Please note that the Preliminary Drainage Study for the West Loch Drainage Basin, East Kapolei Project, dated January 18, 1995 and submitted by Gray Hong, Bills & Associates, Inc., is still being reviewed. We will inform you of our comments on the drainage study upon completion of the City's review.

If you should have any questions, please call Tyler Sugihara of the Division of Engineering at 523-4932.

Very truly yours,

  
KENNETH E. SPRAGUE  
Director and Chief Engineer

TS:MT:tt

cc: Gray, Hong, Bills & Associates, Inc.  
Department of Housing and Community Development  
(Attention: Mr. Randy Wong)  
Department of Parks and Recreation  
(Attention: Mr. Donald Griffin)  
Gentry Companies  
(Attention: Mr. Ronald Uemura)  
State Department of Transportation  
(Attention: Mr. Francis Nishioka)

CONCUR:



For DONA HANAIKE, Director  
Department of Parks and Recreation

CONCUR:



RONALD LIM, Director  
Department of Housing and Community  
Development

Helber Hastert  
Planners

April 24, 1996

Mr. Kenneth E. Sprague  
Director and Chief Engineer  
Department of Public Works  
City and County of Honolulu  
650 S. King St.  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Memos dated February 22 and March 7, 1996**

Dear Mr. Sprague:

Thank you for your memos to Ms. Cheryl Soon, Chief Planning Officer, dated February 22, 1996 and March 7, 1996 in response to the East Kapolei Project DEIS. We also note your previous letter to Schuler Homes, Inc., dated June 5, 1996, which was included with your recent correspondence. The following is in response to your comments:

**February 22, 1996 Memo to Cheryl Soon**

No comment

**March 7, 1996 Memo to Cheryl Soon**

1. We acknowledge that the Oahu Sugar Company's easement 2680 will be terminated by the City.
2. Should drainage easements be required to be dedicated to the City and County of Honolulu, they shall be limited to the width of the improved channel (from outside wall to outside wall). Since the drainage channel runs through the land owned by the City, an easement may not be required.
3. A maintenance ramp for the channel will be included in the design as required.

**June 5, 1996 Letter to Harvey Goth, Schuler Homes, Inc.**

1. same as #1 above.
2. The proposed drainage corridor is along the cane haul road, as opposed to a route through the City's elderly housing project. In a March 7, 1996 memo to Cheryl Soon, the Department of Housing and Community Development (DHCD) noted it had no objections to the use of the former cane haul road as the corridor connecting to DHCD's existing 4-acre detention basin and the proposed Ewa by Gentry-East open drainage channel.

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Helber Hastert

Planners

Mr. Kenneth E. Sprague

April 24, 1996

Page 2

3. An easement from the City for the drainage right-of-way along the cane haul road will be requested if required. Since the lot is owned by the City, the easement may not be required.
4. The applicant will discuss and obtain concurrence for the proposed drainage right-of-way pathway from the City Department of Transportation Services and the State Department of Transportation.
5. The applicant will work with the Department of Parks and Recreation (DPR) to provide acceptable improvements to the land adjacent to the drainage pathway to allow proper maintenance of the area.
6. A pedestrian overpass between the West Loch development and the new Asing Park is recommended in the *Preliminary Drainage Study for the West Loch Drainage Basin* submitted to the DPR for review and comment. The proposed overpass incorporates review comments made by the DPR in December 1994.
7. As stated in the attached Gentry letter dated April 16, 1996, the East Kapolei project area was included in the basis for design of the Ewa by Gentry-East detention facility. The *Drainage Report for Ewa by Gentry-East, Phase 1 Offsite Drainage Plan* prepared by Park Engineering, Inc. indicates that the ultimate design will accommodate the entire tributary area. Figure 4-1 "Drainage Map" of the same report shows that the East Kapolei project area is included in the tributary area. Schuler Homes, Inc. and Gentry are currently working together to confirm the watershed area and HGL, and are negotiating terms for the construction of a joint detention basin. The 31-acre parcel will be incorporated into the design for additional storage.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners



Leslie Kurisaki  
Project Planner

attachment

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

THE GENTRY COMPANIES



April 16, 1996

Mr. Harvey Goth  
Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813

Dear Mr. Goth:

Re: *East Kapolei Development*  
*West Loch Drainage Basin*

This letter is to confirm that the Ewa by Gentry - East Offsite Drainage project is being designed to handle the tributary area for the East Kapolei Development currently being processed for approval as outlined in Gray, Hong, Bills & Associates, Inc.'s report dated December 1, 1995.

Very truly yours,

GENTRY HOMES, LTD.

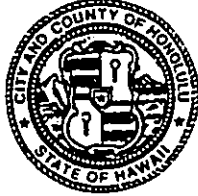
Randolph K. Ouye,  
Senior Vice President/  
Chief Operating Officer

RKO:sacm

/kapolei-wewa



POLICE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**  
801 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111



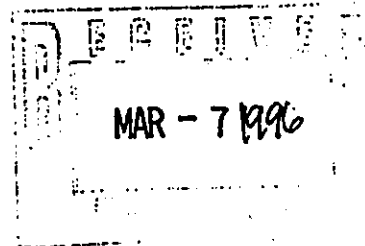
JEREMY HARRIS  
MAYOR

MICHAEL S. NAKAMURA  
CHIEF

HAROLD M. KAWASAKI  
LEE DONOHUE  
DEPUTY CHIEFS

OUR REFERENCE BS-DL

March 5, 1996



TO: LIN F. WONG, COMMUNITY PLANNING BRANCH  
PLANNING DEPARTMENT

FROM: MICHAEL S. NAKAMURA, CHIEF OF POLICE  
HONOLULU POLICE DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE EAST KAPOLEI PROJECT

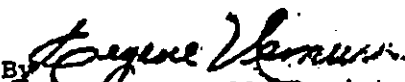
Thank you for the opportunity to review the subject project.

Section 6.8 correctly states the needs of the Honolulu Police Department as a result of the development. Increased staffing for the patrol district encompassing East Kapolei is crucial to the maintenance of public safety. In recent years the police force has not grown in proportion to the population. We have found ways to work more efficiently and have shifted officers from place to place, but there is a limit to the department's elasticity. When police coverage gets stretched too thin, the public begins to suffer.

The draft EIS on page 6-20 states that, "the need for police services in the project area is not an impact of the project, but simply a consequence of expected population growth." There is some truth in this, of course, but the bottom line is that the residents who will live in East Kapolei will need police services that cannot be provided with current staffing levels. HPD is taking every opportunity to spell out that message very clearly--in responses to EISs, in the City budget process, and in our discussions with community leaders. Other public services such as water, power, wastewater, and fire protection must be in place before residents move into a development. This is not true of police protection yet, but it should be.

We will continue working through all available routes to see that police protection will be available for East Kapolei. We would appreciate your support for those efforts. By working together, HPD and the community can provide safe environments for the people of Oahu.

MICHAEL S. NAKAMURA  
Chief of Police

By   
EUGENE UEMURA, Assistant Chief  
Administrative Bureau

cc: Ofc. of Environmental Quality Control  
Mr. Mike Angotti, Schuler Homes, Inc.  
Ms. Leslie Kurisaki, Helber Hastert & Fee, Planners

Helber Hastert  
Planners

April 8, 1998



Chief Michael S. Nakamura  
Chief of Police  
Police Department  
City and County of Honolulu  
801 S. Beretania Street  
Honolulu, Hawaii 96813

Dear Chief Nakamura:

**East Kapolei Project, Ewa, Oahu, Hawaii  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated March 5, 1996**

Thank you for your memo to Ms. Lin Wong, City and County of Honolulu Planning Department dated March 5, 1996 responding to our request for comments on the above-referenced DEIS.

The developer acknowledges your concern that in recent years, the police force has not grown in proportion to the Ewa population, and shares your desire to ensure that adequate police protection will be available for East Kapolei. The developer will support your Department's efforts to increase staffing and other needed resources to serve the Ewa area.

We appreciate your review of the DEIS. Your memo will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

Helber Hastert & Fee  
Governor Center, Makai Tower

733 Bishop Street, Suite 2500  
Honolulu, Hawaii 96813

Telephone 808 515-2055  
Facsimile 808 515-2050

MAR- 4-36 MON 11:29 PLANNING DEPT C&C

F. 84/85

2/96-0419

1/2/CFPC

OAHU CIVIL DEFENSE AGENCY

**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813  
PHONE 523-6171

RECEIVED

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JEREMY HARRIS  
MAYOR

C&C HONOLULU



JOSEPH D REED  
ADMINISTRATOR

February 12, 1996

MEMO TO: CHERYL SOON, CHIEF PLANNING OFFICER

FROM: JOSEPH D. REED, ADMINISTRATOR *JDR*

SUBJECT: EAST KAPOLEI PROJECT, DRAFT ENVIRONMENTAL  
IMPACT STATEMENT

We previously submitted comments regarding the East Kapolei Project recommending the inclusion of Civil Defense sirens and hurricane mitigation design considerations in a memo dated February 14, 1995 (attached). It appears that these recommendations were not included in your letter to the consultant, dated December 29, 1995.

We continue to feel that it is extremely important for developers to include emergency notification and warning capabilities and natural and manmade hazard mitigation measures into planning and development considerations.

Although certain preliminary design concepts for the project have changed since our initial submission, our recommendation remains that two 115 dB solar powered sirens and the necessary infrastructure to support them be installed, and that hazard mitigation measures be included in all multi-use buildings in the development.

We would be pleased to discuss these recommendations further if there is a desire to do so. Our point of contact is Mr. Wayne Jones, Communications Officer, telephone number 523-4679.

Attachment

cc: Robert Fishman, Managing Director  
Roy Price, State Civil Defense

P. 05/05  
2/96-0422  
1/2/C PFD

RECEIVED

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C&C HONOLULU

February 14, 1995

MEMO TO: CHERYL SOON, CHIEF PLANNING OFFICER  
FROM: JOSEPH D. REED, ACTING ADMINISTRATOR  
SUBJECT: EAST KAPOLEI PROJECT - ENVIRONMENTAL IMPACT  
STATEMENT PREPARATION NOTICE (EISPN)

The Oahu Civil Defense Agency (OCDA) has reviewed the EISPN for the proposed project and are of the opinion that any zoning changes approved for the building of homes in this area should be approved only after an agreement between the City and/or State and the developer that the developer install adequate outdoor civil defense siren warning systems to provide emergency warnings of residents and workers in the area.

At this time, one siren located near Ewa Elementary School provides marginal coverage of Phase 1 of the project, but does not provide coverage of Phase 2.

We recommend that the developer install a minimum of two solar powered sirens of at least 115 Db rating and the necessary siren support infrastructure compatible with the existing civil defense siren system as a condition of approval of the necessary zoning changes. We further recommend that the sirens be located in areas that have been set aside for parks in each phase of the project.

We also, recommend that hurricane mitigation design considerations be included in any multi-use buildings. This would provide additional local neighborhood emergency sheltering capabilities for the community. These special considerations should also be given to any schools, parks, recreation facilities, or community centers planned for the project.

We are available to discuss these recommendations further if there is a desire to do so. Oahu Civil Defense point of contact is Mr Wayne Jones, telephone number 523-4679.

cc: Jeremy Harris, Mayor  
Robert J. Fishman, Managing Director  
State Civil Defense

Helber Hastert  
Planners

April 8, 1996

Mr. Joseph D. Reed, Administrator  
Oahu Civil Defense Agency  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Memo dated February 12, 1996**

Dear Mr. Reed:

Thank you for your memorandum to Ms. Cheryl Soon, Chief Planning Officer, dated February 12, 1996 in response to the East Kapolei Project Draft EIS. The developer will work closely with your agency to ensure that adequate civil defense siren warning systems are provided at the appropriate school/park sites.

We appreciate your review of the DEIS and your input. Your letter will be reproduced in the Final EIS.

Sincerely,

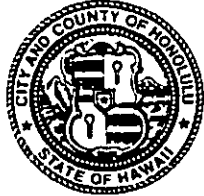
HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department

DEPARTMENT OF TRANSPORTATION SERVICES  
**CITY AND COUNTY OF HONOLULU**

PACIFIC PARK PLAZA  
711 KAPIOLANI BOULEVARD, SUITE 1200  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

CHARLES O. SWANSON  
DIRECTOR

1/96-00430R

March 8, 1996

MEMORANDUM

MAR 12 1996

TO: CHERYL SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

ATTN: LIN WONG

FROM: CHARLES O. SWANSON, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT  
EAST KAPOLEI PROJECT

Based on our review of the subject document and prior reviews (January 12, 1995, May 3, 1995 and December 22, 1995), we have the following comments which should be addressed in the Final EIS or subsequent documents:

1. The proposed scheduling of improvements to Farrington Highway and the "North-South" Road, in relation to the development of this project, should be provided. A preliminary schedule, based on the anticipated vehicular demand rate generated from this development and the surrounding land uses, should be used. This schedule should be updated during the progress of this development, as more detailed information becomes available, such as that resulting from the presently ongoing North-South Road Corridor Study. This study will define needed infrastructure improvements in the Ewa area.
2. The conceptual plan of the roadway surrounding the community park and its relation to the park is of particular concern. Documentation of the proposed alignment, based on nationally accepted design criteria, should be provided to our office for review and acceptance. We understand that the roadway is intended to primarily service park use and that through traffic will be discouraged from entering this area. As such, it appears that it may be more appropriate to integrate this segment of the roadway system for park purposes.

Cheryl Soon, Chief Planning Officer  
Page 2  
March 8, 1996

3. The overall design of the proposed loop road should be examined. The width of the roadway and its intersection design should be based on the vehicular carrying capacity of each facility. Curves within the roadway should be eliminated, wherever feasible. Pedestrian crossings at green ways should be located adjacent to proposed streets.
4. A roadway master plan should be provided to our department during the early stages of the project. The plan should show the general alignment of the major roadways, including the number of through and turning lanes; the approximate number of dwelling units or square footage of commercial/office space for each increment, whichever is appropriate; the roadway cross-sections; and a phasing plan for the development. Because the developer intends to use apartment zoning for the residential areas, the number of dwelling units for each area should be identified by type. We are assuming a fairly uniform distribution throughout the development and are basing roadway sections on this distribution. Any change in the distribution of these uses should be reflected in a revised roadway master plan. A revised plan, showing the location of the completed units and internal roadways, should be submitted annually.
5. Schematic plans of major intersections indicating laneage and the anticipated level-of-service at each approach should be provided. The analysis should include a determination of the lengths of left turn lanes and the need for separate right turn lanes. An analysis of signal warrants to determine the need to ultimately signalize street intersections should be provided since underground conduits will be required at the time of construction. This should be incorporated into the roadway master plan or updated traffic study, when it is submitted to this department.
6. The traffic study should be periodically updated and submitted to our office for review. We understand that the distribution of traffic from this development is predicated upon a number of factors which may or may not be accomplished. As the basis for determining when the updates should be submitted, we anticipate an update for each 2000 dwelling units or approximately every two years. The update should address any variation in the distribution of dwelling units submitted in the initial roadway master plan.

Cheryl Soon, Chief Planning Officer  
Page 3  
March 8, 1996

Should you have any questions regarding these comments, please call Faith Miyamoto of the Transportation System Planning Division at Local 6976.

  
\_\_\_\_\_  
CHARLES O. SWANSON

cc: Mr. Michael Angotti, Schuler Homes  
✓ Ms. Leslie Kurisaki, Helber Hastert & Fee  
Office of Environmental Quality Control



Helber Hastert  
Planners

April 11, 1996

Mr. Charles O. Swanson, Director  
Department of Transportation Services  
City and County of Honolulu  
Pacific Park Plaza  
711 Kapiolani Boulevard, Suite 1200  
Honolulu, Hawaii 96813



**East Kapolei Project**  
**Draft Environmental Impact Statement (DEIS)**  
Your Memo dated March 8, 1996

Dear Mr. Swanson:

Thank you for your memorandum to Ms. Cheryl Soon, Chief Planning Officer, dated March 8, 1996 in response to the East Kapolei Project DEIS. We have reviewed your comments and offer the following responses:

1. Proposed Scheduling of Improvements to Farrington Highway and North-South Road  
The Oahu Regional Transportation Plan (ORTP) identifies various highway improvements for Oahu for different time periods. The major arterials (and scheduled improvement timeframes) that would be impacted by the East Kapolei Project are North-South Road (Year 2001-2005), Farrington Highway (Year 1995-2000) and Kapolei Parkway (Year 1995-2000). These are all County facilities, under the jurisdiction of DTS.

Farrington Highway widening is occurring in several phases. The State Housing Finance and Development Corporation (HFDC) is taking a lead role in widening the segment between the Makakilo Interchange and the proposed North-South Road; the Makakilo Interchange to Kapolei Villages Golf Course Access Road segment is in final design with construction expected to begin around the end of this year. A Legislative funding request for the Golf Course Road to North-South Road intersection segment has been made with construction expected by 2000. The North-South Road to Fort Weaver Road segment of Farrington Highway (a segment of which fronts the project site) is identified in the ORTP as being widened in the 1995-2000 timeframe. The applicant will be required to accommodate the ROW widening, construct certain intersection improvements related to the project, and participate on a pro-rata share basis towards regional transportation improvements.

To compare anticipated project-generated vehicular demand levels with ORTP highway capacities, selected highway segments were considered. The critical capacity impact on the

Helber Hastert & Fee  
Grosvenor Center, Makai Tower

733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813

Telephone 808 545-2055  
Facsimile 808 545-2050

Herbert Eastert  
Planner

Mr. Charles O. Swanson  
April 11, 1996  
Page 2

ORTP improvements would occur at the intersection of the North-South Road with Farrington Highway. An estimate of the ratio of project-generated trips to North-South Road Intersection capacity is provided below, based on the following assumptions:

- Project-generated vehicular demand is based on a best-guess project absorption schedule (see Exhibit 7, *Limited Scope Update of the East Kapolei Market Assessment*, Atwater, December 1995).
- Capacity of the North-South Road/Farrington Highway intersection is based on build-out laneage as determined in the traffic impact report, and expressed in vehicles per hour. (Intersection capacity is a function of roadway and operational variables, and thus, the estimate is approximate).
- Project trip estimates are based on typical weekday afternoon peak hour since this period would generate the largest number of trips.

**Ratio of East Kapolei Trips to Intersection Capacity  
(Assuming Intersection Exists Today)**

<u>Year</u>	<u>% of Intersection Capacity</u>
1998	1%
1999	3%
2000	6%
2001 (Farr. Hwy & Kap. Pkwy completed*)	9%
2002	12%
2003	15%
2004	18%
2005 (N-S Rd. completed*)	22%
2006	25%
2007	29%
2008	33%
2009	37%
2010	41%
2011	45%
2012	46%
2013 (project buildout)	52%

\*ORTP Estimate

Hello, Master!  
Planner

Mr. Charles O. Swanson  
April 11, 1996  
Page 3

Currently, the City and State are undertaking an EIS for the North-South Road. Subject to funding, the road would likely be completed before the year 2005. Assuming the North-South Road construction starts in 1998 and takes four years, the project's absorption schedule indicates that the project traffic would consist of about 12% of the intersection's capacity during the afternoon peak hour when the North-South Road is completed.

2. The conceptual plan of the roadway surrounding the central park continues to be evaluated in order to meet accepted roadway design criteria while still meeting community planning objectives. The current scheme, which was reviewed with your staff on March 7, 1996, eliminates the 45-degree intersections at the corners of the park as well as the angled parking along the park frontage. Other issues were discussed at the meeting, and we are working toward incorporating the suggestions into our conceptual plans.

We also understand that the Institute of Transportation Engineers (ITE) will be issuing a report providing design guidance for neo-traditional communities in the next couple of months. Although we are not sure whether this document will address the specific design conditions present at East Kapolei, it may provide us with some nationally accepted design criteria and/or performance evaluations of similar roadway designs.

Your suggestion of integrating the inner loop road into the park would be appropriate if its sole function were to serve the park. However, it also serves as an internal linkage between the commercial areas surrounding the park and therefore, has a much broader user base than just park patrons.

We will continue to work with you and your staff in the evolution of the town center design and feel that acceptable solutions can be attained through this dialog as the planning and design proceeds.

3. We have not conducted any internal traffic studies to date, and therefore, laneage and intersection requirements for the outer loop road have not been determined. However, the fact that it is a loop road which is intended to provide a safe and efficient alternative for residential traffic to bypass the town center means that some curves must be provided. We will work with your staff to insure that these curves are designed to meet accepted safety standards. All pedestrian crossings of this loop road (including at the greenways) will occur at street intersections.
4. A roadway master plan will be submitted to your department during the early stages of the project. General alignment of major roadways, including the number of through and turning lanes; the approximate number of dwelling units; roadway cross-sections and a phasing plan will be provided. A revised plan, showing the location of the completed units and internal roadways will be submitted annually.

Helber Hastert  
Planners

Mr. Charles O. Swanson  
April 11, 1996  
Page 4

5. Schematic plans of major intersections indicating laneages and the anticipated level of service at each approach will be provided. An analysis of signal warrants to determine the need to signalize street intersections will be provided, and incorporated into the roadway master plan or updated traffic study when submitted to your department.
6. The traffic study will be periodically updated and submitted to your office for review. Updates for each 2,000 dwelling units would occur approximately every three to four years. Updates will address any variation in the distribution of dwelling units submitted in the initial roadway master plan.

We appreciate your review of the DEIS and the input and advise we've received from your staff over the past months. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners



Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

DEPARTMENT OF WASTEWATER MANAGEMENT  
**CITY AND COUNTY OF HONOLULU**  
650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

JEREMY HARRIS  
MAYOR



FELIX B. LIMTIACO  
DIRECTOR  
CHERYL K. OKUMA-SEPE  
DEPUTY DIRECTOR

In reply refer to:  
WCC 96-20

February 7, 1996

FEB 13 1996

**MEMORANDUM**

TO: MS. CHERYL D. SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: FELIX B. LIMTIACO, DIRECTOR  
DEPARTMENT OF WASTEWATER MANAGEMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR  
EAST KAPOLEI PROJECT, JANUARY 1996  
TMK: 9-1-17: por 4; 9-1-18: por 1; 9-2-2: por 1; 9-2-4: por 5; 9-1-10: por 2

Our comments to the subject Draft Environmental Impact Statement (EIS) are as follows:

We have not received a copy of the East Kapolei & Vicinity Wastewater Collection System Master Plan, dated December 6, 1995 for review as stated in Section 6.3 Wastewater, page 6-6 of the Draft EIS. Three copies of the master plan should be submitted to our department for review and approval.

The estimated peak flow of wastewater generated by the East Kapolei Project should be included in the Probable Impact section, page 6-6.

The secondary treatment system at Honouliuli WWTP is currently under construction and is projected to be completed by December 1996. It is designed to accommodate 13 mgd of sewage for secondary treatment.

If you have any questions, please contact Ms. Tessa Yuen of the Service Control Branch at 523-4956.

CHERYL K. OKUMA-SEPE

For FELIX B. LIMTIACO  
Director

cc: Schuler Homes, Inc. (Mr. Mike Angotti)  
✓ Helber Hastert & Fee, Planners (Ms. Leslie Kurisaki)

Helber Hastert  
Planners

April 8, 1996

Mr. Felix Limtiaco, Director  
Department of Wastewater Management  
City and County of Honolulu  
650 S. King St.  
Honolulu, Hawaii 96813



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 7, 1996**

Dear Mr. Limtiaco:

Thank you for your letter dated February 7, 1996 in response to the East Kapolei Project DEIS. Three copies of the East Kapolei and Vicinity Wastewater Collection system Master Plan have been submitted to your department for review and approval. The estimated peak flow of wastewater generated will be included in the Final EIS. The information you provided about the Honouliuli WWTP will also be included.

We appreciate your review of the DEIS. Your letter will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

MAR - 4 - 96 MON 11:28 PLANNING DEPT C&C

F. 03/05

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

2/96-0518  
1/2/CFPP

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MAR 23 PM 3:54



C&C HONOLULU

William A. Bonnet  
Manager  
Environmental Department

February 22, 1996

Lin Wong  
Planning Department  
City & County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813

Dear Ms. Wong:

Subject: East Kapolei Project

Thank you for the opportunity to comment on your January 1996 Draft Environmental Assessment report for the East Kapolei project, as proposed by the Schuler Homes, Inc. We have reviewed the subject document and would like to note that Section 6.10.1 (page 6-21) for the electrical system should be updated to reflect the completion of the Ewa Nui Substation, CIP-Wai'anae 138KV lines and the removal of the Ewa Substation. If you have any questions, please call Ronald Wong (543-7714), the originator of these comments.

HECO shall reserve further comments pertaining to the protection of existing powerlines bordering the project area until construction plans are finalized. Again, thank you for the opportunity to comment on this Draft Environmental Assessment.

Sincerely,

Helber Hastert  
Planners

April 8, 1996

Mr. William A. Bonnet  
Manager  
Environmental Department  
Hawaiian Electric Company, Inc.  
P.O. Box 2750  
Honolulu, Hawaii 96840-0001



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Your Letter dated February 22, 1996**

Dear Mr. Bonnet:

Thank you for your letter to Ms. Lin Wong, Planning Department, dated February 22, 1996 in response to the East Kapolei Project Draft EIS. As you requested, Section 6.10.1 of the Final EIS will incorporate the information on the completion of the Ewa Nui Substation, CIP-Waiiau 138 KV lines and the removal of the Ewa Substation. Your comments have been forwarded to the project engineers, and your letter will be reproduced in the Final EIS.

Sincerely,

HELBERT HASTERT & FEE, Planners

*Leslie Kurisaki*

Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.



THE GENTRY COMPANIES



March 7, 1996

MAR 11

Mr. Michael Angotti  
Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813

Re: DRAFT EIS FOR THE EAST KAPOLEI PROJECT

Dear Mr. Angotti:

We have reviewed the Draft Environmental Impact Statement (dated January 1996) for the East Kapolei Project and have no comments to offer at this time.

Thank you for the opportunity to comment.

Sincerely,

GENTRY HOMES, LTD.

Tosh Hosoda  
Senior Vice President of Planning

c: Ms. Lin Wong, Planning Department  
Ms. Leslie Kurisaki, Helber, Hastert & Fee Planners  
Mr. Gary Gill, OEQC

THE GENTRY COMPANIES



April 16, 1996

Mr. Harvey Goth  
Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813

Dear Mr. Goth:

Re: *East Kapolei Development*  
*West Loch Drainage Basin*

This letter is to confirm that the Ewa by Gentry - East Offsite Drainage project is being designed to handle the tributary area for the East Kapolei Development currently being processed for approval as outlined in Gray, Hong, Bills & Associates, Inc.'s report dated December 1, 1995.

Very truly yours,

GENTRY HOMES, LTD.

Randolph K. Ouye,  
Senior Vice President/  
Chief Operating Officer

RKO:sacm

/kapolei-wewa

Helber Hastert  
Planners

April 22, 1996

Mr. Tosh Hosoda  
Senior Vice President of Planning  
Gentry Homes, Ltd.  
560 N. Nimitz Highway  
Honolulu, Hawaii 96817



**East Kapolei Project  
Draft Environmental Impact Statement (DEIS) Comments  
Letters dated March 7, 1996 and April 16, 1996**

Dear Mr. Hosoda:

Thank you for your letter to Schuler Homes, Inc. dated March 7, 1996, noting that you have no comments to the Draft EIS at this time. We would also like to acknowledge the letter from Mr. Randolph K. Ouye, dated April 16, 1996, confirming that the Ewa-by Gentry-East Offsite Drainage project is being designed to handle the East Kapolei project. The letters will be reproduced in the Final EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

*Leslie Kurisaki*  
Leslie Kurisaki  
Project Planner

cc: Ms. Cheryl Soon, Planning Department  
Mr. Mike Angotti, Schuler Homes, Inc.

1996-Oahu-FEIS-  
East Kapolei II

~~PLANNER~~  
FILE COPY

FINAL  
ENVIRONMENTAL IMPACT STATEMENT

# EAST KAPOLEI PROJECT

E W A, O O A H U, O H A W A I I

VOLUME 2  
APPENDICES



SCHULER HOMES, INC.

APRIL 1996

RECEIVED  
96 MAY 13 AM 5:53  
HFC OF EAST OAHU  
QUALITY CONTROL

FINAL  
ENVIRONMENTAL IMPACT STATEMENT

# EAST KAPOLEI PROJECT

E W A, ◊ O A H U, ◊ H A W A I I

VOLUME 2  
APPENDICES

PREPARED FOR: SCHULER HOMES, INC.  
PREPARED BY: HELBER HASTERT & FEE, PLANNERS  
FOR SUBMITTAL TO: PLANNING DEPARTMENT CITY & COUNTY OF HONOLULU  
IN SUPPORT OF: EWA DEVELOPMENT PLAN LAND USE MAP AMENDMENT

APRIL 1996

**CONTENTS**  
**Volume 2**

- Appendix A** Letter from Stephen H. MacMillan, Chief Operating Officer, The Estate of James Campbell, dated October 30, 1995.
- Appendix B** Letter from Michael D. Wilson, Department of Land and Natural Resources, to Cheryl Soon, Chief Planning Officer, Planning Department, dated November 21, 1995.
- Appendix C** Memorandum from Don Hibbard, Administrator, State Historic Preservation Division, Department of Land and Natural Resources, dated September 22, 1994.  
  
Letter from Don Hibbard, Administrator, State Historic Preservation Division, Department of Land and Natural Resources, dated December 4, 1995.
- Appendix D** East Kapolei Project Market Assessment Report, October 1994;  
East Kapolei Project Limited Scope Update of the Market Assessment, December 1995. Gail W. Atwater, MBA, MURP, AICP
- Appendix E** Socio-Economic Impact Assessment of East Kapolei Residential Project, November 1994. Community Resources, Inc.  
Socio-Economic Impact Assessment of East Kapolei Residential Project, Update Memorandum, December 1995. Community Resources, a division of SMS Research and Marketing Services, Inc.
- Appendix F** Environmental Noise Assessment, East Kapolei Project, September 1994;  
Environmental Noise Assessment, East Kapolei Project (update), December 13, 1995. Darby & Associates
- Appendix G** East Kapolei Project: Impact on Agriculture, September 1994;  
East Kapolei Project: Impact on Agriculture (update), December 1995.  
Decision Analysts Hawaii, Inc.
- Appendix H** Oahu Biological Resources Survey Report, July 1994;  
Addendum, 1995. Evangeline Funk, Ph.D.

- Appendix I** Air Quality Impact Report, East Kapolei Project, October 4, 1994;  
Air Quality Impact Report, East Kapolei Project, December 18, 1995.  
J. W. Morrow.
- Appendix J** Potable Water Master Plan for the East Kapolei Area, October 1994;  
Addendum Report for the East Kapolei Potable Water Master Plan,  
December 1995. Tom Nance Water Resource Engineering.
- Appendix K** Traffic Impact Assessment Report for East Kapolei Project, October 1994;  
Updated Traffic Impact Assessment Report for East Kapolei Project,  
December 11, 1995. Pacific Planning and Engineering, Inc.
- Appendix L** The East Kapolei and Vicinity Wastewater Collection System Master Plan,  
February 15, 1995. Gray, Hong, Bills & Associates.
- Appendix M** Preliminary Drainage Study, West Loch Drainage Basin, East Kapolei  
Project, December 1, 1995. Gray, Hong, Bills & Associates.
- Appendix N** Proposed Draft Revisions to Ewa DP Special Provisions

A

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LETTER FROM STEPHEN H. MACMILLAN, CHIEF OPERATING OFFICER,  
THE ESTATE OF JAMES CAMPBELL, DATED OCTOBER 30, 1995



**THE ESTATE OF JAMES CAMPBELL**

October 30, 1995

Ms. Cheryl Soon  
Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 South King Street  
Honolulu, HI 96813

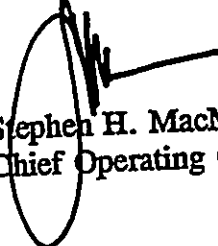
Dear Ms. Soon:

Subject: Development Plan Land Use Amendment Review at Kapolei, Ewa, Oahu

The Estate of James Campbell hereby authorizes Schuler Homes, Inc. to file a Development Plan Application for the 1996 Development Plan Land Use Amendment Review on approximately 577 acres of land at Honouliuli, Ewa, Oahu (TMK 9-1-17:04 Portion, 9-1-10:02 Portion, 9-1-18:01 Portion, 9-2-02:01 Portion and 9-2-04:05 Portion).

Should you have any questions regarding this matter, please feel free to contact Mr. David Rae at 674-3117.

Very truly yours,

  
Stephen H. MacMillan  
Chief Operating Officer

ks:01033200K10590

cc: Schuler Homes, Inc.

B

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LETTER FROM MICHAEL D. WILSON, DEPARTMENT OF LAND AND NATURAL  
RESOURCES, TO CHERYL SOON, CHIEF PLANNING OFFICER,  
PLANNING DEPARTMENT, DATED NOVEMBER 21, 1995.

WILLIAM J. BAYNE  
GOVERNOR OF HAWAII



**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**  
P. O. BOX 821  
HONOLULU, HAWAII 96808

CO:gb

November 21, 1995

**MICHAEL D. WILSON**  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
DEPUTY DIRECTOR  
GILBERT S. COLBERT-AGARAN

AGRICULTURE DEVELOPMENT PROGRAM  
AMBIENT RESOURCES  
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LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

Ms. Cheryl Soon  
Chief Planning Officer  
Planning Department  
City and County of Honolulu  
650 S. King Street  
Honolulu, HI 96813

Dear Ms. Soon:

**Re: Development Plan Land Use Amendment Review at Kapolei, Ewa, Oahu**

The Department of Land and Natural Resources hereby authorizes Schuler Homes, Inc., to file a Development Plan Application for the 1996 Development Plan Land Use Amendment Review on approximately 183 acres of land at Honouliuli, Ewa, Oahu (TMK 9-1-17:04 portion).

Should you have any questions regarding this matter, please feel free to contact Mr. Dean Uchida at 587-0446.

Very truly yours,

*Gilbert S. Colbert-Agaran*  
Michael D. Wilson

cc: Schuler Homes, Inc.

C

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MEMORANDUM FROM DON HIBBARD, ADMINISTRATOR, STATE HISTORIC  
PRESERVATION DIVISION, DEPARTMENT OF LAND AND NATURAL RESOURCES,  
DATED SEPTEMBER 22, 1994.

LETTER FROM DON HIBBARD, ADMINISTRATOR, STATE HISTORIC  
PRESERVATION DIVISION, DEPARTMENT OF LAND AND NATURAL RESOURCES,  
DATED DECEMBER 4, 1995.

JOHN WAHEE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 8TH FLOOR  
HONOLULU, HAWAII 96813

September 22, 1994

KEITH AHUE, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEPPELER II  
DONA L. HANAKE

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RESOURCES ENFORCEMENT

CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
DIVISION

LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

Joseph Kennedy  
Archaeological Consultants of Hawaii  
59-624 Pupukea Rd.  
Haleiwa, Hawaii 96712

LOG NO: 12769 ✓  
DOC NO: 9409TD21

Dear Mr. Kennedy:

SUBJECT: **Historic Preservation Review--Preliminary Concept Plan for East  
Kapolei Project (Schuler Homes, Inc.)  
Honouliuli, Ewa, O'ahu  
TMK: 9-1-17: por. 4**

Thank you for the opportunity to review this proposed project. A review of our records shows that there are no known historic sites at the project location shown on your map. These lands were commercially cultivated with sugar cane for many years and it is unlikely that significant historic sites will be found on them. We believe that this project will have "no effect" on historic sites.

If you have any questions please call Tom Dye at 587-0014.

Sincerely,

A handwritten signature in black ink, appearing to read "Don Hibbard".

DON HIBBARD, Administrator  
State Historic Preservation Division

TD:jk

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

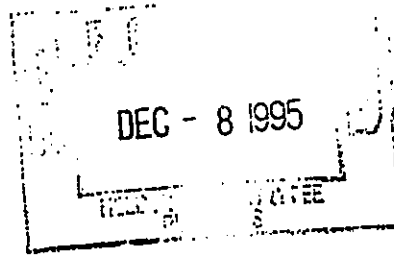
December 4, 1995

MICHAEL D. WILSON, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY  
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT  
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FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
DIVISION  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

Leslie Kurisaki  
Project Planner  
Helber Hastert & Fee  
733 Bishop Street, Suite 2590  
Honolulu, Hawaii 96813



LOG NO: 16007 ✓  
DOC NO: 9511TD31

Dear Ms. Kurisaki:

SUBJECT: East Kapolei Project  
Honouliuli, `Ewa, O`ahu  
TMK: 9-1-17: por. 4; 9-1-18: por. 1; 9-2-2: por. 1; 9-2-4: por. 5; 9-1-10: por. 2

Thank you for the opportunity to review the revised concept plan for this development with the new project boundaries. A review of our records shows that the new project boundaries take in old sugar cane lands. Thus, our original review of this project is adequate.

A review of our records shows that there are no known historic sites at the project location shown on your map. These lands were commercially cultivated with sugar cane for many years and it is unlikely that significant historic sites will be found on them. We believe that this project will have "no effect" on historic sites.

If you have any questions please call Tom Dye at 587-0014.

Aloha,

A handwritten signature in black ink, appearing to read "Don Hibbard". The signature is stylized and cursive.

DON HIBBARD, Administrator  
State Historic Preservation Division

TD:jk

D

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EAST KAPOLEI PROJECT MARKET ASSESSMENT REPORT, OCTOBER 1994;  
EAST KAPOLEI PROJECT LIMITED SCOPE UPDATE OF THE MARKET  
ASSESSMENT, DECEMBER 1995.

GAIL W. ATWATER, MBA, MURP, AICP

**East Kapolei Project**  
**Market Assessment**

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**Gail W. Atwater, AICP**  
**Planning Consultant**  
**October 1994**



East Kapolei Project  
**MARKET ASSESSMENT**

**Table of Contents**

<b>SECTION</b>		<b>PAGE</b>
<b>I</b>	<b>INTRODUCTION</b>	<b>I-1</b>
	Overview	I-1
	Purpose and Objectives	I-1
	Methodology	I-2
<b>II</b>	<b>EXECUTIVE SUMMARY</b>	<b>II-1</b>
<b>III</b>	<b>SITE DESCRIPTION</b>	<b>III-1</b>
	Introduction	III-1
	Site Location	III-1
	Site Boundaries and Access	III-2
	Property Visibility	III-5
	Surrounding Uses	III-5
	Regional Context	III-6
	The Second City at Kapolei	III-6
	The Evolution of Ewa	III-7
	Government Support for Second City	III-8
	University of Hawaii at West Oahu	III-10
	Site Description Conclusion	III-11
<b>IV</b>	<b>AREA REVIEW</b>	<b>IV-1</b>
	Introduction	IV-1
	General Trends	IV-1
	Hawaii Versus Mainland U.S. Economic	
	Trends	IV-1
	Transportation	IV-3
	General Trends Conclusion	IV-4

<b>IV</b>	<b>AREA REVIEW (continued)</b>	
	<b>Residential Indicators</b>	<b>IV-5</b>
	Population Growth	IV-5
	Household Formations	IV-9
	Income Trends	IV-10
	Residential Building Permit Trends	IV-11
	Oahu's For-Sale Residential Market	IV-14
	Residential Indicators Conclusion	IV-19
	<b>Commercial Indicators</b>	<b>IV-19</b>
	Growth in Gross State Product	IV-20
	Wage and Salary Employment	IV-21
	Unemployment	IV-26
	Consumer Prices	IV-27
	Retail Sales	IV-27
	Visitation and Tourism Expenditures	IV-28
	Commercial Indicators Conclusion	IV-30
	Area Review Conclusion	IV-31
<b>V</b>	<b>RESIDENTIAL</b>	<b>V-1</b>
	Introduction	V-1
	Market Study Area	V-2
	Supply and Demand Analysis	V-2
	Demand	V-2
	Supply	V-9
	Supply and Demand Calculation	V-24
	Market Position	V-26
	Absorption	V-31
	Residential Conclusion	V-37

**East Kapolei Project  
Market Assessment**

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<b>VI</b>	<b>RETAIL</b>	<b>VI-1</b>
	Introduction	VI-1
	Retail Trade Area Definition	VI-1
	Methodology	VI-3
	Supply	VI-3
	Demand	VI-6
	Supply and Demand Summary	VI-8
	Market Position	VI-9
	Retail Conclusion	VI-10

**APPENDICES**

<b>A</b>	<b>COMPETITIVE PRODUCT</b>	
	City of Kapolei	A-1
	Ewa by Gentry	A-2
	Ewa Marina	A-3
	Ewa Villages	A-4
	Ko Olina	A-6
	Makakilo	A-7
	Makaiwa Hills	A-8
	Royal Kunia	A-9
	Villages of Kapolei	A-10
	Waikele	A-12
<b>B</b>	<b>REFERENCES</b>	<b>B-1</b>
<b>C</b>	<b>LIMITING CONDITIONS</b>	<b>C-1</b>
<b>D</b>	<b>PROFESSIONAL QUALIFICATIONS</b>	<b>D-1</b>

LIST OF EXHIBITS

EXHIBIT	EXHIBIT NAME	PAGE
III-1	Location Map	III-3
IV-1	Population Trends, 1940-1990	IV-6
IV-2	Population Projections, State and Oahu (Series M-K)	IV-7
IV-3	Trends: Oahu Population and Housing Stock	IV-9
IV-4	Oahu Building Permit Trends 1962 - 1993	IV-12
IV-5	Long-Term Mortgage Loan Rates, 1972-1994	IV-14
IV-6	Increases in the Average Oahu Resale Prices	IV-15
IV-7	Trends in Average Resale Prices on Oahu: Single Family (1958-1994) and Multifamily (1972-1994)	IV-15
IV-8	Comparison of Single Family to Multifamily Housing 1988 - 1993	IV-18
IV-9	Comparison of Gross State Product and U.S. National Gross Domestic Product, 1982 - 1992	IV-21
IV-10	Trends in Wage and Salary Employment for the State of Hawaii and City and County of Honolulu, 1970-93	IV-22
IV-11	Annual Change in Wages per Employee	IV-23
IV-12	Composition of Employment on Oahu, 1985-2010	IV-24
IV-13	Hawaii Visitor Arrivals	IV-29

**East Kapolei Project  
Market Assessment**

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<b>EXHIBIT</b>	<b>EXHIBIT NAME</b>	<b>PAGE</b>
V-1	New Home Sales: Market Study Area Capture vs. Oahu	V-3
V-2	Calculation of Occupied Households	V-5
V-3	Calculation of Demand 1994 - 2010	V-9
V-4	Distribution of Housing Stock by Development Plan Area (June 30, 1993)	V-10
V-5	Distribution of Housing Stock by Market Study Area (1993)	V-13
V-6	Additions to Residential Supply - Market Study Area 1994 - 2010	V-15
V-7	Land Use Commission Approvals	V-18
V-8	Supply Summary 1994 - 2010	V-19
V-9	Housing Units Committed versus Proposed: Market Study Area	V-22
V-10	Calculation of Supply 1994 - 2010	V-24
V-11	Supply and Demand Summary	V-25
V-12	Existing Residential Products, 1994	V-27
V-13	Profile of Target Markets	V-28
V-14	Affordable Pricing Structure	V-30
V-15	Qualitative Evaluation: East Kapolei Project vs. Competitive Master Planned Communities	V-33
V-16	Hypothetical Absorption Schedule	V-36
V-17	Capture Rates of Future Demand	V-37

**East Kapolei Project  
Market Assessment**

<b>EXHIBIT</b>	<b>EXHIBIT NAME</b>	<b>PAGE</b>
VI-1	Retail Trade Area	VI-2
VI-2	Existing and Future Retail Supply - Retail Trade Area	VI-5
VI-3	Calculation of Additional Population to be Served	VI-7
VI-4	Calculation of Future Demand	VI-8
VI-5	Supply and Demand Calculation	VI-9

**Section I**  
**INTRODUCTION**

**Section I**

**INTRODUCTION**

**OVERVIEW**

Schuler Homes, Inc. proposes a residential development with minimal support retail uses on approximately 1022 acres of land in Ewa, Oahu. The subject property is divided into two contiguous parcels: a joint venture with Galbraith Trust (approximately 500 acres) in the southern portion and a parcel to be purchased from The Estate of James Campbell in the northern portion (approximately 522 acres).

Gail W. Atwater, AICP was contracted by Schuler Homes, Inc., to assess the market feasibility of residential and neighborhood retail developments on the property generally known as the East Kapolei Project. This report presents the results of that analysis.

**PURPOSE AND OBJECTIVES**

The purpose of the Market Assessment was to evaluate the overall market potential of the subject property. This has been accomplished through an estimate of the absorption of the proposed land uses and an assessment of the property's relationship to other Oahu master planned communities. It should be noted that this is a market analysis and not an assessment of financial feasibility.

The specific objectives of the evaluation were to:

- **Conduct a Site Review and Analyze Existing Conditions.** This included evaluating the site relative to its development potential and analyzing general economic trends and indicators supporting residential and support (neighborhood) commercial development on the subject parcel.



- **Analyze Supply and Demand Conditions for Residential Development.** The supply analysis included evaluating planned and proposed projects. Demand analyses included reviewing relevant trends, analyzing the oversupply or shortfall of supply versus demand and describing the products and target markets for the subject property.
- **Estimate Absorption and Pricing for Residential Development.** This analysis included testing the developer's assumptions of absorption and pricing against existing and estimated market conditions. Prices are stated in 1994 dollars.
- **Evaluate Market Potential for Neighborhood Commercial Development on the Subject Property.** This analysis was based on general rules-of-thumb and an inventory of existing and planned support commercial in the project vicinity.

## **METHODOLOGY**

To accomplish the above objectives, the scope of work included, but was not limited to:

- Discussions with Schuler Homes, Inc., Hawaiian Trust Company, Ltd. and other consultants on the Environmental Impact Statement analytical team regarding the project and the property.
- Several inspections and evaluations of the site and its surrounding area in order to determine its physical attributes and relationship to other properties in the market. This evaluation did not include any engineering or environmental considerations, but encompassed an evaluation of the site's accessibility, visibility, proximity to towns and other developments, physical layout and appearance and their potential effect on the marketability of the property.

**East Kapolei Project  
Market Assessment**

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- Analyses of economic and demographic data pertaining to the market area and an evaluation of the present economic climate. These analyses were used in the estimation of future growth potential in the residential and support commercial markets.
- Analysis of housing supply based on published data and interviews with real estate agents and developers of residential projects which could be potentially competitive with the subject property. Additions to supply were based on public and private sources of information.
- Calculation of demand with guidance from the City and County of Honolulu General Plan and Land Use Model, in addition to the State of Hawaii's Series M-K population projections and other demographic documents prepared by public and private sources.
- Estimations of the subject property's performance, using capture rates and taking into consideration its attributes and disadvantages relative to competing projects and the historic performance of similar developments.

**Section II**  
**EXECUTIVE SUMMARY**

**Section II**

**EXECUTIVE SUMMARY**

**Property  
Location**

One of the last major agricultural parcels remaining unplanned in Oahu's developing "second urban center" in Ewa, bordered by Farrington Highway to the north, the planned North South Road to the east, agricultural land to the west and the Ewa Villages golf course to the south. Site is approximately equidistant (2 to 2 1/2 miles) to Makakilo and Fort Weaver Road freeway interchanges.

**Size**

Approximately 1,022 acres, divided into two contiguous parcels: a joint venture with Galbraith Trust (approximately 500 acres) in the southern portion and a parcel to be purchased from The Estate of James Campbell in the northern portion (522 acres).

**Physical  
Attributes**

Relatively flat terrain on former coral plain which historically has been planted in sugarcane.

Limited access until construction of North South Road. Currently accessible through Farrington Highway which in turn provides access to H-1 via interchanges at Makakilo Drive to the west and Fort Weaver Road to the east.

Sunny, leeward-type climate

**Market Study  
Area**

Master Planned Communities within the Ewa Development Plan Area and along the western H-1 corridor including the communities of Waikele and Royal Kunia.

**Economic**

Moderate near term and strong long term growth trends in both commercial and residential indicators, with demonstrated pent-up residential and retail demand.

**Government  
Policy**

State and County governments have established population allocation policies and invested capital in support of developing a second urban center and affordable housing in Ewa.

**East Kapolei Project  
Market Assessment**

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**Residential**

Supply/Demand Shortfall, 1994 - 2010, Market Study Area	8,509 - 13,322 units
Demand for Additional Units, 1994 - 2010, Market Study Area (includes Ewa DP Area)	36,070 - 40,883 units
Demand for Additional Units, 1994-2010, Ewa DP Area Portion Only	28,856 - 32,706
Planned Units East Kapolei Project	2,590 Single Family - Market Priced 1,810 Townhomes - Market Priced 2,400 Multifamily - Low Density Units (DU) - Market 200 Multifamily - Medium DU - Market 2,000 Multifamily - Medium DU - Affordable (up to 80% of median household income) 1,000 Multifamily - Medium DU - Affordable (81-120% of median) 10,000 Total
Year Sales Begin	1997
Average Annual Absorption	650 - 700 units
Capture Rate of Market Study Area Residential Demand to 2010	25 to 30 percent
Capture Rate of Oahu Residential Demand to 2010	12 to 14 percent

**Retail**

Potential Need for New Support Retail Space by 2010	Up to 218,000 square feet within the deed restrictions of the subject property. Overall excess demand within subject's retail trade area is approximately 468,300 square feet by 2010.
Target Tenants	Supermarkets, drug stores, restaurants, surf and other small apparel shops, bars, photocopiers, dry cleaners.

**Additional Uses** Recreation: Several community parks.

**Section III**  
**SITE DESCRIPTION**

**Section III**

**SITE DESCRIPTION**

**INTRODUCTION**

**Oahu.** The subject property is located on the island of Oahu, whose name means "the gathering place" in Hawaiian. True to its appellation, the island serves as Hawaii's governmental, commercial and cultural center. Although the capital island possesses only ten percent of the State's land area, three-quarters of its population lives and works there.

**Ewa.** The subject property is located in the Ewa region of western Oahu. This region historically comprised the Hawaiian ahupuaa (mountain-to-sea division of land) known as Honouliuli. Much of this area has long been under the control of one major landowner, The Estate of James Campbell. According to government policy Ewa is destined to become the island's second urban center by early in the next century, with its focal point being the "City of Kapolei."

**Organization of this Section.** This section first discusses the project site in terms of location, boundaries, access, visibility and surrounding uses. This is followed by a presentation of regional context and plans for the second city.

**SITE LOCATION**

The East Kapolei Project site is located in the eastern area of Ewa. The property is currently in agricultural use which is being phased out of sugarcane production. It is one of the last major unplanned agricultural parcels south of H-1 freeway.

Schuler Homes, Inc., partly through a joint venture with Galbraith Trust, is proposing residential development on approximately 1022 acres of land at the project site. Of the 1022 acres:

- 500 acres are owned by the State of Hawaii and are planned as Phase I of the proposed project. These lands are proposed for exchange with Galbraith Trust land holdings

which lay north of the town of Wahiawa in Central Oahu. Under the terms of this agreement, the Ewa acreage would be urbanized in exchange for the opportunity to retain the agricultural use of Galbraith's Wahiawa lands.

- An additional 522 acres, contiguous with the state's parcel, will be purchased from The Estate of James Campbell by Schuler Homes, Inc. These lands also are proposed for residential use as Phase II of the proposed project.

The project site and its relationship to the island of Oahu are shown on the following page in Exhibit III-1, *East Kapolei Project - Location Map*.

## **SITE BOUNDARIES AND ACCESS**

### **Boundaries**

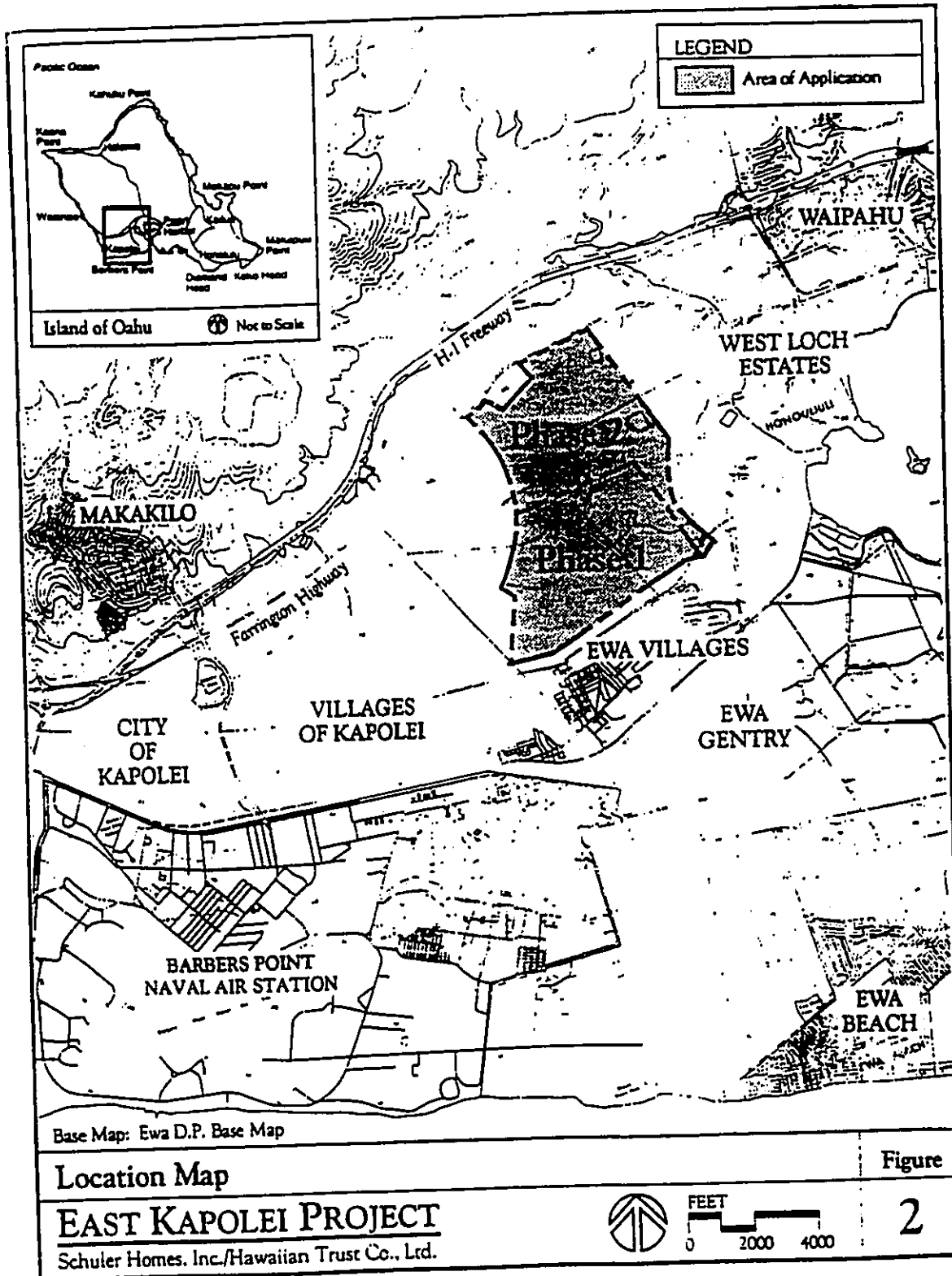
The subject property lies south of Farrington Highway between Makakilo Drive and Fort Weaver Road. The irregularly-shaped parcel is bounded by Farrington Highway to the north, the planned North South Road to the west, remnants of a cane haul road known as Pipeline Road and agricultural land to the east and the golf course associated with the Ewa Villages residential project to the south. The site is approximately equidistant (two to two and a half miles) to the H-1 freeway interchanges at Makakilo and Fort Weaver Road.

### **Access to the Site**

The subject site is adequately served by existing roads, at least for Phase I which is planned using the southernmost 500 acres. Future improvements will make access excellent. These improvements include the construction of the North South Road, completion of Kapolei Parkway and widening of Farrington Highway. Following is a review of the major points of access to the project site, both existing and planned.



Exhibit III-1  
East Kapolei Project - Location Map



*H-1 Freeway.* Oahu's first and primary interstate highway is located to the north of the parcel, providing a vital link to Central Oahu and the Primary Urban Center. There are two existing freeway interchanges in the subject property's vicinity: Makakilo Drive to the west and Fort Weaver Road to the east. Additionally an interchange is planned along the future North South Road.

*Farrington Highway.* This is a major arterial which will provide the primary access route for the subject development until construction of the North South Road. In the project vicinity, Farrington Highway is currently a two-lane, county-maintained highway that may be widened as an improvement associated with this project. After H-1, this road serves as the area's primary access to Waipahu and the Primary Urban Center. Farrington Highway also is the major local connection between the City of Kapolei and development in the West Loch Estates and Waipahu areas.

*North South Road.* This road is planned as the major feeder connecting H-1 with Farrington Highway in the north and a future section of the Kapolei Parkway in the south. The alignment of this road will approximate the western boundary of the subject parcel, as well as the eastern boundary of the planned campus of the University of Hawaii at West Oahu. It is expected that this road will facilitate regional transportation flow by alleviating traffic on Fort Weaver Road and Makakilo Drive.

*Kapolei Parkway.* Kapolei Parkway is partially constructed at this time. It is planned to provide a major connection between eastern Ewa and the City of Kapolei and the resort-oriented communities of Ewa Marina and Ko Olina.

*Project Access Roads.* Two access roads intersecting the North South Road are planned within the subject site.

## PROPERTY VISIBILITY

The subject property is visible but not easily defined when traveling southbound on H-1 and Farrington Highway. When traveling northbound, the project area is visible from the Ewa Villages golf course and residential areas.

The major view planes are toward downtown Honolulu and Diamond Head to the southeast and toward the Waianae Mountains to the north of the parcel. Due to the relatively flat topography, view planes of Honolulu will be obstructed by multi-story development for all parcels except those along the property's fringes. Views of the mountains will be obstructed to a much lesser degree.

## SURROUNDING USES

### Ewa Villages

To the south of the parcel are the existing clustered communities known as Ewa Villages. This residential area is separated from the subject parcel by a golf course being developed by the City and County of Honolulu, which plans to conduct a rehabilitation program for the existing "historic" plantation villages of Ewa. This master plan for Ewa Villages also includes development of additional single family residential units. The first new home models are nearing completion. For more information on Ewa Villages see Appendix A, *Competitive Product*.

### Other Uses

Aside from Ewa Villages, the lands surrounding the subject property all are currently in agricultural use. The most significant urbanization plan for these lands is the location of the University of Hawaii at West Oahu campus on the adjacent parcel to the west. This Site Description section concludes with

a discussion of specific plans for this campus and its possible impact on the subject property.

## **REGIONAL CONTEXT**

### **The Second City at Kapolei**

The development pattern of Oahu has always relied on employment and government services centered within the urban core of Honolulu. This pattern worked well until developable land dwindled in the central city and prices for commercial, industrial and residential land skyrocketed. Also, due to the building of bedroom communities throughout the island, traffic problems mounted between the outlying homes and the job center in Honolulu.

The location of a second city at Kapolei in the center of Ewa was conceived through a collaboration between The Estate of James Campbell, the State of Hawaii and the City and County of Honolulu. The Kapolei area includes land from Pearl Harbor's West Loch to Kahe Point and from the lower slopes of the Waianae Mountains to the West Oahu beaches and Barbers Point.

The main objectives of the building second city are:

*To direct commerce, jobs and industry to West Oahu;  
and*

*To direct population growth to "a vital new urban center  
where people can live, work and play."*

(Source: "Kapolei: A New City Comes to Life," Hawaii Investor, 1993)

A regional plan for the Ewa area, entitled the Kapolei Area Long Range Master Plan, has been developed The Estate of James Campbell. However, earnest planning for the area can be traced back almost forty years:

*Employment Base.* Development of an employment base in Ewa dates back to 1955 when planners advised The Estate of James Campbell to develop an industrial complex on the western tip of Oahu, utilize prime beachfront areas as resort destinations and encourage the siting of a new university within Ewa.

- The industrial concept evolved into the James Campbell Industrial Park which opened in 1959 and has been a major center for heavy industry on the island ever since.
- Ewa Marina and Ko Olina emerged as the planned resort developments.
- The location of a major campus of the University of Hawaii in Ewa has only recently begun to appear likely.

*Second Urban Center at Ewa.* The origins of the full "second city" concept date back to 1974 when planner Donald Wolbrink authored the comprehensive and prescient study entitled "Honouliuli: A Self-Contained City at Ewa." Current plans have much in common with this twenty year old study.

There are several critical differences between the second city and previous major developments on Oahu. First, there is a major regional plan which integrates the various land uses into an integrated whole, rather like the pieces of a mosaic creating a complete picture. This is not to be the building of one community, but an integration of many. Second, as the objectives above indicate, the second urban center is to be not only a residential development but also offer a range of employment opportunities. This employment-center orientation sets Kapolei apart from past developments which primarily provided housing and limited commercial facilities.

### **The Evolution of Ewa**

Ewa spent the first half of this century primarily as a sugar plantation bordered by the sea, Pearl Harbor, the rural community of Waianae and uninhabited hills and mountains.

In the late 1940s the U.S. military took over use of the site which is now the Naval Air Station at Barbers Point.

By the 1960s, James Campbell Industrial Park had been constructed and residential development had begun on the foothills of Makakilo led by Finance Realty Company, Ltd. The community of Ewa Beach was settled.

By the late 1970s large-scale residential development began with Gentry's Ewa development. A regional plan for Ewa was taking shape.

In 1989 the final concept was approved by the Honolulu City Council when it adopted the General Plan which recognizes Kapolei as the island's secondary urban center.

During the early 1990s the second city's master planned communities began construction and the commercial center started taking shape with the opening of the Kapolei Shopping Center and the office buildings of James Campbell Square, further infrastructure development and several major new office and retail complexes.

### **Government Support for the Second City**

**City and County of Honolulu.** The General Plan is "a comprehensive statement of objectives and policies which sets forth the long-range aspirations of Oahu's residents" and the strategies and actions to achieve them (*General Plan, 1992*). This Plan specifically states the intention to: "*Direct major economic activity and government services to the primary urban center and the secondary urban center at Kapolei*" (Objective G, Policy 1).

County actions are implementing this policy already: the Department of Housing and Community Development is sponsoring the project to redevelop and augment the community of Ewa Villages. In addition, planning is underway for a major County facility at the Kapolei Civic Center to provide regional municipal services and increase the region's employment base. This includes construction of Kapolei Fire Station, which is estimated to be operational in 1995. The Kapolei Police Station, located at the entrance to the City of Kapolei, is in the design stage.

**State of Hawaii.** The State of Hawaii also has demonstrated its support for urbanization of Ewa/Kapolei by a variety of actions, including:

- Joint ventures with various developers and landowners to provide the 4,200 residential housing units at the Villages of Kapolei master planned community;
- Purchase of a "State Land Bank" in the Kapolei Area for urbanization and other public purpose land uses, which contains 500 acres or about half of the subject property;
- Development of a regional state civic center to provide employment and regional services to the new second city; and
- Designation of Ewa as the site for construction of the University of Hawaii at West Oahu on a parcel of land adjacent to the subject property.

**U.S. Government.** The federal government will figure indirectly in the development of the second city at Kapolei through the land uses within its major holding in the area, the Naval Air Station at Barbers Point. This military base has defined land use in a significant portion of Ewa since World War II, but is slated for closure under the national Base Realignment and Closure Act. Plans for reuse are underway and are likely to play a significant role in shaping land use patterns within the southern Ewa region.

## The University of Hawaii at West Oahu

**Location Adjacent to Subject Parcel.** The State of Hawaii has expressed its intention to locate a second major Oahu campus of the University of Hawaii in Ewa. This will be a major force in the evolution of the subject development, as the designated campus site is directly across the planned North South Road from the proposed East Kapolei Project.

**Long Range Plans.** As discussed above, the concept of locating a major university campus in the Ewa region had its roots in the 1950s. Not until the 1990s, however, has this scenario truly begun to appear likely. The Estate of James Campbell (EJC) has provided lands for a campus to the State of Hawaii. This transfer of title contains conditions, however. The University of Hawaii at West Oahu must enroll 2,750 students at the new campus by the year 2006 or land ownership will revert to The Estate of James Campbell. EJC staff interviewed for this analysis quoted a City and County planning study which estimated 6,020 students at the campus by the year 2020.

Discussions with policy executives within the University of Hawaii administration indicated the following tentative timeline for development of the campus at Ewa:

*Five to Ten Years Out (circa 1999-2004)* - the campus is planned as a four-year baccalaureate (undergraduate) liberal arts college with limited masters-level study. Programs will duplicate those currently offered at the University of Hawaii at Manoa. Students are expected to be net additions to the system, taking the growth burden off the already at-capacity, 23,000 student Manoa campus.

*Ten to Fifty Years Out (circa 2005-2045)* - the campus could qualify as a "Carnegie Comprehensive Campus" providing full bachelors and masters level programs.

*More than Fifty Years Out (after 2045)* - the campus has the potential to evolve into a doctorate-granting university.



**Expected Impacts on Development of the Subject Parcel.** The location of the University of Hawaii at West Oahu campus adjacent to the proposed development is likely to have a number of ramifications.

First, the university is likely to result in increased demand for housing on the subject property. A portion of students, faculty and, to a lesser degree, university staff will likely favor living close to campus. Most students favor off-campus housing that facilitates walking or bicycle transportation within a two-mile radius of campus; the subject parcel is well within that radius.

Second, the university is likely to generate retail demand. In general, the second city will benefit from meeting the localized shopping needs of a university campus. In particular, the subject parcel's support commercial will be well positioned to benefit from some university-generated retail demand.

### **SITE DESCRIPTION CONCLUSION**

The project site is ideally situated to take advantage of the growth expected to occur in Oahu's second urban center. Access is currently adequate with prospects for becoming excellent with planned improvements. Surrounding uses are primarily agricultural, with the exception of the Ewa Villages to the south. The development of the second city at Kapolei and the location of the University of Hawaii at West Oahu will both contribute to activity and demand within the subject property.

**Section IV  
AREA REVIEW**

**Section IV**

**AREA REVIEW**

**INTRODUCTION**

The Area Review presents an analysis of major economic trends both in the State of Hawaii and the island of Oahu. Three sets of key indicators offer economic support for the proposed residential and support commercial development on the subject property:

- General Trends
- Residential Indicators
- Commercial Indicators

**GENERAL TRENDS**

**Hawaii versus Mainland U.S. Economic Trends**

**Hawaii Business Cycles.** Hawaii's economic growth over the past decades indicates the strength and resiliency needed for continued expansion of both housing and commercial markets. Over time, economic indicators such as employment, visitor expenditures and inflation have consistently exhibited more vigor than the Mainland United States.

An analysis of long term trends (50 years) appears to indicate an approximately nine-year business cycle in the State. In the 1980s Hawaii's economic growth rate far outpaced the rest of the nation. Hawaii economists argued it was not sustainable over the long run. Indeed it was not. The peak of this strong, some would say over-heated, development cycle appears to have occurred in 1990.

**Recent Recessionary Trends.** Historically, Hawaii's economic declines have been comparatively modest compared to those experienced on the Mainland and have lagged by twelve to eighteen months. According to the economists at Bank of Hawaii, the state's recent recession had three phases:

- (1) The early phase saw high inflation eroding income but continued growth in production and employment despite the Persian Gulf War.
- (2) The middle phase occurred from fall of 1991 to fall of 1992. During this time, an export-led contraction was caused by westbound tourism's decline [tourism is an "export" in economic terms]. This combined with a construction downturn which slowed employment growth and created the true "recession" period.
- (3) The final phase occurred after Hurricane Iniki and continued through much of 1993 when stagnation persisted but gradual improvement in unemployment took place.

Source: Hawaii 1993: Annual Economic Report

One prominent local economist interviewed for this analysis indicated that Hawaii's "recession" was not a recession at all, but merely a period of flat economic performance. This is supported by information on growth in jobs which experienced extremely low upward change as opposed to the net *loss* in jobs normally associated with a recessionary cycle. State of Hawaii and Oahu job trends are presented later in this section as Exhibit IV-10.

Stronger signs of economic recovery are being demonstrated in 1994, in which "there are enough positive forces at work to impart the most encouraging outlook in almost two years." This recovery is being fueled by an upturn in visitor arrivals and tourism expenditures that have "raised hopes that the three year tourism slump [is] at an end." (Source: First Hawaiian Bank Research Department, Supplement to Economic Indicators, May/June 1994)

**Long-term view.** Economists believe that the continuation of slower, more sustainable economic growth rate in Hawaii will "rely on internal rather than external forces." The local

economy has been buoyed from the harsher recession experienced elsewhere in the U.S. by:

- The lowest interest rates in thirty years;
- A continued low-inflation environment; and
- Sectoral strength in the areas of insurance, diversified agriculture, residential construction, health care and financial services. For example, growth in health care jobs was roughly equal to the loss of tourism jobs during the visitor industry downturn. (Source: Bank of Hawaii, 1994)

### **Transportation**

Oahu's strategic location between the West Coast and Asia places it 2,400 statute miles from San Francisco and 4,000 miles from Tokyo. Due to its location, Oahu serves as the gateway to both the Mainland U.S. and Asia/Pacific regions.

Supporting growth and development on Oahu is a transportation system which includes land, air and sea modes. While most of Hawaii's visitors and residents arrive and travel interisland by air, nearly all of the goods needed in the islands arrive through its harbors.

**Land transportation.** Hawaii maintains a system of 4,102 miles of interstate, state and county roads. Oahu has two interstate highways, H-1 and H-2 (which is currently being widened), with a third, H-3, currently under construction. Public mass transportation is limited to Oahu's TheBus service which served 79 million passengers in 1993.

The H-1 freeway provides multi-lane access to the subject property from the urban core and Central Oahu. Additional regional arterials such as Kapolei Parkway and the North South Road are planned for the Ewa region.

**Ocean transportation.** According to the State Department of Transportation's Harbors Division, four-fifths of the goods required by Hawaii are imported, and 98% percent of those arrive by sea. The interisland cargo system supplies Neighbor

Islands with over 5 million tons of goods per year. Oahu has two deep draft commercial harbors, Honolulu Harbor and Barbers Point. The Barbers Point Harbor is located in the Ewa region and supports commercial activity in the area. A third, the famous Pearl Harbor, is controlled by the U.S. Navy.

**Air transportation.** The advent of overseas air transportation revolutionized Hawaii's economy. Prior to the introduction of regular air service to Honolulu, access was limited to ocean liners and other forms of sea-based transportation. By 1990, only two out of every thousand arrivals to Hawaii was by ship. Almost all scheduled interisland passenger travel is now by air.

Facilitating the gateway position of Oahu is the Honolulu International Airport, which serves over 13 million overseas and interisland passengers annually. In addition, the location of a new reliever airport is under consideration at the site of the Naval Air Station at Barbers Point within the Ewa region. The opportunity to locate a civilian-use airport within Ewa will occur when military aviation is curtailed by the planned base closure. Location of such a commercial facility would provide additional economic stimulus to the Ewa region.

### **General Trends Conclusion**

The general economic trends presented in the preceding discussion lead to several conclusions:

*Hawaii versus Mainland economic trends* - Hawaii's business cycles tend to lag Mainland cycles by twelve to eighteen months and tend to be shallower during recessionary periods. For example, during the recent recession Hawaii largely experienced no growth rather than declining economic indicators such as those experienced in other regions of the United States. Further, during the recent decline in tourism the local economy showed a fair degree of strength within other sectors.

*Transportation* - Oahu and the subject region of Ewa are well-served by transportation infrastructure. The H-1 freeway provides vehicular access to both urbanized and newly-urbanizing areas of Oahu and intra-regional arterials are planned.

## RESIDENTIAL INDICATORS

Population growth can be closely correlated with household formation, which in turn increases the demand for housing. Specific social and economic indicators which support the demand for future residential development on Oahu include:

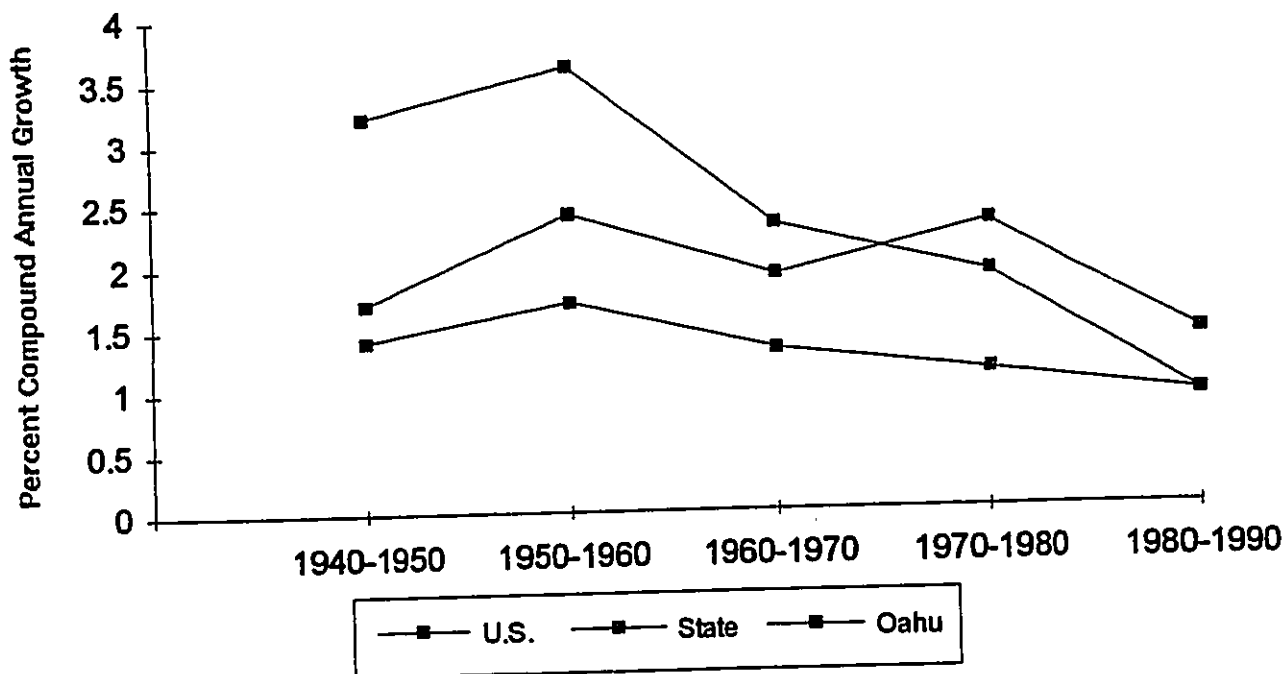
- Population growth
- Household formations
- Income trends
- Residential building permit trends
- Oahu's for-sale residential market
- Mortgage interest rates

### Population Growth

**Historical Trends.** Oahu has experienced population growth during every census period since 1950. Since the spike in growth following statehood in 1959, Oahu's percent growth rate of population has gradually tapered off while greater increases were seen on the Neighbor Islands, as shown in Exhibit IV-1, *Population Trends, 1940-1990* on the following page. Despite the deceleration in the rate of growth, the absolute increase in Oahu residents continues.

Exhibit IV-1  
East Kapolei Project

Population Trends, 1940-1990



**Oahu Population Projections.** Oahu's resident population is expected to grow by 20 percent in absolute numbers between 1990 and 2010, according to the State's Series M-K projections. Population trends illustrated in Exhibit IV-2, *Population Projections - State and Oahu (Series M-K)* on the following page can be summarized as follows:

- Compound annual growth in population in both the State and Oahu is expected to remain positive, with a range from 0.6 percent to almost 2 percent along the trend line shown in Exhibit IV-2.
- The lower end of these growth rates falls below the percentage growth experienced in the 1980s. However, as the base population increases, the absolute changes are not materially different.

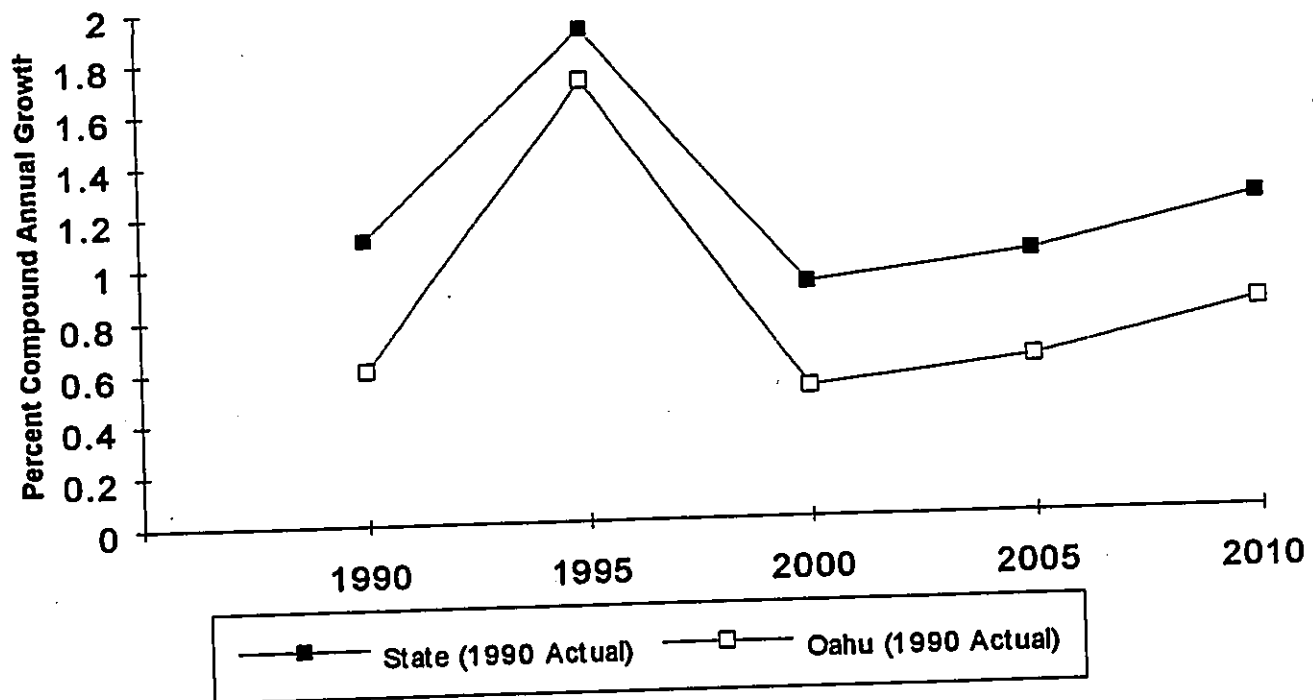


**East Kapolei Project  
Market Assessment**

- Between 1980 and 1990 Oahu's population grew by 73,666 persons. Between 1990 and 2000 absolute growth is expected to increase to 96,569 persons, before falling off to 66,700 persons in the 2000 to 2010 period. As such on average while the percentage change in population is expected to gradually decline, the absolute growth may actually approximate or exceed the level experienced in the 1980s.

**Exhibit IV-2  
East Kapolei Project**

**Population Projections  
State and Oahu (Series M-K)**



**Regional Population Projections.** The fastest growing region on Oahu between 1994 and 2010 will be the Ewa region, according to the island's General Plan. The allocation of future population on Oahu is guided by the General Plan's Population Objective C Policy 4, which states:

*Seek a year 2010 distribution of Oahu's residential population which would be in accord with the following table:*

Location	% of Year 2010 Islandwide Population	Population General Plan Range
PUC	45.1% - 49.8%	450,800 - 497,800
Ewa	12.0% - 13.3%	119,900 - 132,900
Central Oahu	14.9% - 16.5%	148,900 - 164,900
East Honolulu	5.3% - 5.8%	53,000 - 58,000
Koolaupoko	11.0% - 12.2%	109,000 - 121,900
Koolauloa	1.3% - 1.4%	13,000 - 14,000
North Shore	1.6% - 1.8%	16,000 - 18,000
Waianae	3.8% - 4.2%	38,000 - 42,000
<b>Total</b>	<b>95.0% - 105%</b>	<b>949,500 - 1,049,500</b>

Based on General Plan guidelines, the Planning Department projects regional population growth trends using its computerized Land Use Model. According to this model:

- The Ewa region's annual population growth rate is estimated to accelerate from 1.87 percent between 1980-1990 to 3.94 percent between 1990-2010.
- The growth rate of the Central Oahu region is projected to decline from 2.54 percent annually to 1.33 percent during the same time periods.
- The Oahu annual population growth rate is estimated to be less than one percent overall.

(Source: Forecast of Population, Housing and Employment on Oahu by Small Area 1990-2010, Planning Department, 1993, Table 3)

### Household Formations

New household formations will support the demand for future residential development on Oahu. New households will result from two major factors: the *rate of growth in housing stock* and the *decline of household size*.

**Rate of Growth in Housing Stock.** Exhibit IV-3, *Trends: Oahu Population and Housing Stock*, illustrates Oahu's historic and projected trends.

#### Exhibit IV-3 East Kapolei Project

#### Trends: Oahu Population and Housing Stock

Year	Oahu Population	Housing Stock
1980	762,565	230,214
1990	836,231	281,683
2010	999,500 <sup>1</sup>	359,827 <sup>2</sup>
Percent Change (1980-2010)	31%	56%
Compound Annual Growth (1990-2010)	0.90%	1.23%

<sup>1</sup> Series M-K and Oahu General Plan (midpoint)  
<sup>2</sup> Planning Department Land Use Model projection (Source: Forecast of Population, Housing and Employment on Oahu by Small Area 1990-2010, Table 4)

The following observations can be made relative to the information presented in the chart above:

- The rate of growth in the housing stock typically lags population growth in Hawaii, creating latent demand for new residential housing product.
- The increase in housing stock on Oahu is expected to be almost double the rate of population growth between 1980 and 2010. However, this may not be sufficient to alleviate the doubling up of households that occurs on Oahu.

**Decline in Household Size.** Household size in Hawaii ranked second among the fifty states in 1990 with 3.01 persons (by the census definition of households), reflecting among other factors the frequency of doubling up. However, the Planning Department anticipates a decrease in household size is expected over time to approximately 2.8 in 2010, which is conservative in the consultant's opinion. The decline in household size is expected to follow a national demographic trend toward smaller family units and the expectation that the availability of affordable housing on Oahu will enable many doubled-up families to acquire their own homes.

### **Income Trends**

Hawaii's total and disposable personal income more than doubled between 1980 and 1990, reflecting a rapidly growing economy (State of Hawaii Data Book, 1993-94, Table 13.4). However, according to statistics quoted by the Bank of Hawaii, real personal income growth in the state decelerated during the late 1980s, reaching a low in 1991. A slow upward trend began several quarters after the nationwide trend of renewed growth in real personal income (Hawaii 1993: Annual Economic Report). The trend of slow growth in personal income, when evaluated along with accelerating housing price trends, is a strong indicator for the development of affordable and moderate-priced housing.

### **Residential Building Permit Trends**

Exhibit IV-4, *Oahu Building Permit Trends*, illustrates the historic trends in permitting activity in the City and County of Honolulu from 1962 through 1993. Housing categories include single family detached, duplex, multifamily and total residential units permitted. The average annual permitting levels during this period were 2,493 single family units, 137 duplex units and 3,756 multifamily units.

Building permit trends over the past few years follow the real estate trend of decreasing production of single family homes during economic slumps and increasing production of multifamily homes. This pattern occurred in the 1990-91 time frame. In 1992 and 1993 conditions such as affordability and a favorable interest rate environment spurred renewed growth in the construction of single family homes.

Although the pattern of building permits does not present clearly definable real estate cycles as one might expect, real estate cycles are more apparent in the progression of resale housing prices discussed in the following section.

**East Kapolei Project  
Market Assessment**

**Exhibit IV-4  
East Kapolei Project**

**Oahu Building Permit Trends, 1962 - 1993**

Year	Single Family Detached		Duplex		Multi Family		Total Residential	
1962	3654		170		4076		7900	
1963	3354	-8.21%	190	11.76%	2891	-29.07%	6435	-18.54%
1964	3671	9.45%	90	-52.63%	2868	-0.80%	6629	3.01%
1965	4512	22.91%	132	46.67%	5551	93.55%	10195	53.79%
1966	2944	-34.75%	52	-60.61%	6320	13.85%	9316	-8.62%
1967	3005	2.07%	46	-11.54%	3159	-50.02%	6210	-33.34%
1968	3683	22.56%	330	617.39%	6043	91.29%	10056	61.93%
1969	3569	-3.10%	286	-13.33%	7285	20.55%	11140	10.78%
1970	3809	6.72%	212	-25.87%	3957	-45.68%	7978	-28.38%
1971	3771	-1.00%	70	-66.98%	4017	1.52%	7858	-1.50%
1972	3352	-11.11%	112	60.00%	6902	71.82%	10366	31.92%
1973	3008	-10.26%	312	178.57%	9745	41.19%	13065	26.04%
1974	1626	-45.94%	464	48.72%	11070	13.60%	13160	0.73%
1975	1078	-33.70%	112	-75.86%	4240	-61.70%	5430	-58.74%
1976	1326	23.01%	56	-50.00%	3142	-25.90%	4524	-16.69%
1977	2210	66.67%	84	50.00%	2389	-23.97%	4683	3.51%
1978	2075	-6.11%	260	209.52%	2111	-11.64%	4446	-5.06%
1979	3046	46.80%	134	-48.46%	1854	-12.17%	5034	13.23%
1980	1650	-45.83%	46	-65.67%	3365	81.50%	5061	0.54%
1981	768	-53.45%	42	-8.70%	1873	-44.34%	2683	-46.99%
1982	891	16.02%	32	-23.81%	2553	36.31%	3476	29.56%
1983	1562	75.31%	60	87.50%	1220	-52.21%	2842	-18.24%
1984	2199	40.78%	112	86.67%	942	-22.79%	3253	14.46%
1985	2313	5.18%	124	10.71%	1781	89.07%	4218	29.66%
1986	2024	-12.49%	112	-9.68%	2076	16.56%	4212	-0.14%
1987	2684	32.61%	124	10.71%	785	-62.19%	3593	-14.70%
1988	2001	-25.45%	172	38.71%	1377	75.41%	3550	-1.20%
1989	2026	1.25%	124	-27.91%	1852	34.50%	4002	12.73%
1990	2054	1.38%	150	20.97%	1171	-36.77%	3375	-15.67%
1991	1335	-35.00%	70	-53.33%	3885	231.77%	5290	56.74%
1992	2326	74.00%	40	42.86%	2954	31.52%	5320	0.57%
1993	2223	4.43%	31	47.50%	2290	22.48%	4544	14.6%

Source: Building Department, City and County of Honolulu

**The Trend toward Affordability.** A pronounced trend toward affordability has been seen recently in housing, especially on Oahu. Bank of Hawaii, in its publication Construction in Hawaii 1994, presents its own analysis of statewide building permit data which reflects a strong indication of greater affordability in both single family and multifamily new residential product.

*Single family product.* Developers appear to be holding the line on construction costs for single family homes. Over the past four years the estimated per-unit construction cost of single family units increased only 1.9 percent annually, from \$120,000 to \$122,286.

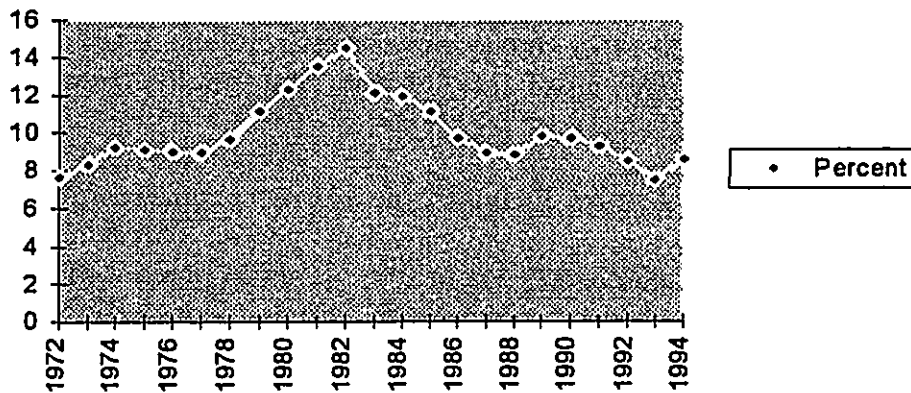
*Multifamily product.* Estimated unit construction cost for multifamily homes has fallen radically from a high of \$137,242 in 1991 to a low of \$77,341 in 1993. This 44 percent drop indicates that multifamily construction is "decidedly in the affordable range." Oahu accounted for 82 percent of this impact during 1993.

**Interest Rate Trends.** Affordability has also been supported by the lowest long-term interest rates since 1973, as shown in the trend line in Exhibit IV-5, *Long Term Mortgage Loan Rates: 1972-1994* on the following page. Interest rates have an important impact on affordability for many buyers, where a slight change in rates makes the difference between continuing to rent and being able to buy a new home.

Interest rates also affect the so-called "gap group" of buyers. The gap group includes families and individuals who do not qualify for affordable housing based on income, can afford higher monthly payments due to their family income, but find it difficult to come up with a down payment.

Exhibit IV-5  
East Kapolei Project

Long-Term Mortgage Loan Rates, 1972-1994



Source: Statistical Abstract of the U.S., 1981, 1993

### Oahu's For-Sale Residential Market

**Overall Resale Market.** Oahu has experienced an upward trend in the price of resold residential units over time. According to purchased data from Prudential Locations, Inc., compound annual growth (CAG) rates of the average prices of residential resales were 12.5 percent per year for single family homes and 6.4 percent for multifamily homes, as shown in Exhibit IV-6, *Increases in Oahu's Average Resale Prices* on the following page:



**East Kapolei Project  
Market Assessment**

**Exhibit IV-6  
East Kapolei Project**

**Increases in the Average Oahu Resale Prices**

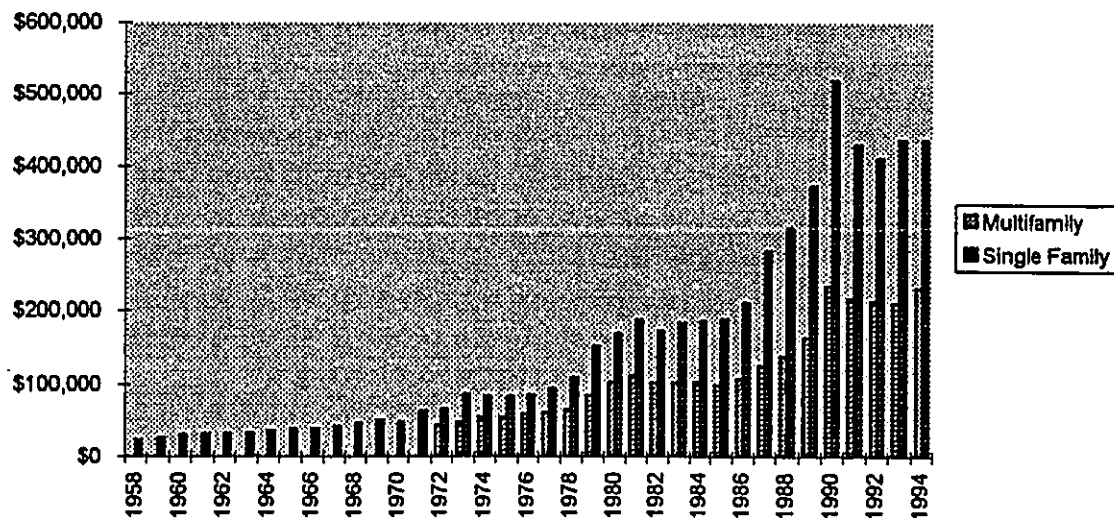
Time Frame	Type of CAG Product	Low	1993	Rate
1958 - 1993	Single Family	\$23,000	\$436,279	12.5%
1972 - 1993	Multifamily	\$44,000	\$209,650	6.4%

Source: Prudential Locations, Inc.

Year-by-year residential resale pricing trends on Oahu are presented graphically below in Exhibit IV-7, *Trends in Average Resale Prices on Oahu: Single Family (1958-1994) and Multifamily (1972-1994)*.

**Exhibit IV-7  
East Kapolei Project**

**Trends in Average Resale Prices on Oahu: Single Family (1958-1994) and Multifamily (1972-1994)**



Data Source: Prudential Locations, Inc.

The trend line of the previous chart indicates a series of real estate cycles of approximately nine years in duration with minor subcycles. It also shows that prices tend to move up during economic upswings and stabilize rather than decline during slower growth periods. The data reflect few major dips, with the exception of 1991 which followed the spike in prices apparent in 1990.

The cyclical nature of the Hawaii real estate market is corroborated by Dr. Michael Sklarz of Prudential Locations, Inc., who in 1994 supported "the notion that the Hawaii real estate market follows an 8 to 10 year cycle which is apparent when one analyzes longer term time series." He added:

"While no two cycles are exactly the same, this approach does provide a potential roadmap for the future." Sklarz maintains that:

- Using the assumption of an eight-to-ten year cycle, the market should gradually increase to a peak in 1996-97 and rising prices should be seen in the 1997-98 period.
- Despite these expected upturns in the market, the rate of increase is expected to be "considerably slower" than the pace of the late 1970s or late 1980s.

The historical pattern of eight-to-ten year cycles should be interpreted with the proviso that future fluctuations in cycles may not be as pronounced as in the past. This could be true for several reasons:

1. The relatively few developers involved in large-scale development have the resources to keep up production through varying market conditions.
2. There is a greater diversity of product and price ranges than in the past, including a range of affordable in addition to traditional market-priced offerings.

These reasons indicate that although real estate cycles are likely to persist, market conditions may cause less variation than in the past. This is because developers may be able to switch between a wider array of products and price ranges as the type

of demand varies and thereby maintain production rates at a more stable level.

**Proportion of Single Family versus Multifamily Residential Resales.** On the following page, Exhibit IV-8, *Comparison of Single Family to Multifamily Housing 1988-1993*, shows that the proportion of single family detached to total residential units on Oahu has steadily decreased over time. This has resulted from a number of factors, including:

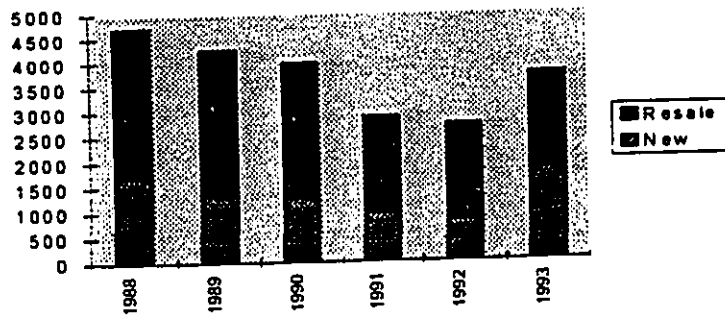
- The limited supply of urban-zoned land for development;
- An increase in the number of single parent families;
- Decline in housing affordability as growth in housing prices outpaced growth in income for many Oahu residents, forcing them into more affordable attached units; and
- An increase in low or medium density multifamily product offerings, as developers responded to affordable housing requirements by taking advantage of the lower per-unit construction costs associated with multifamily units.

**East Kapolei Project  
Market Assessment**

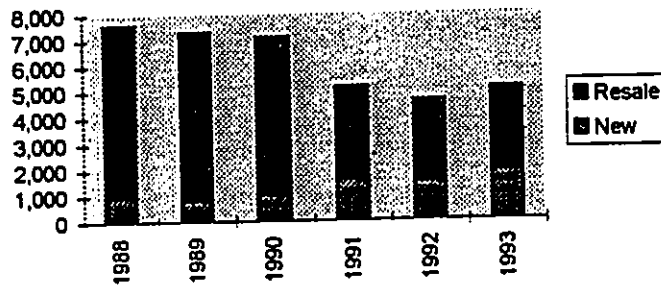
**Exhibit IV-8  
East Kapolei Project**

**Comparison of Single Family to Multifamily Housing 1988 - 1993**

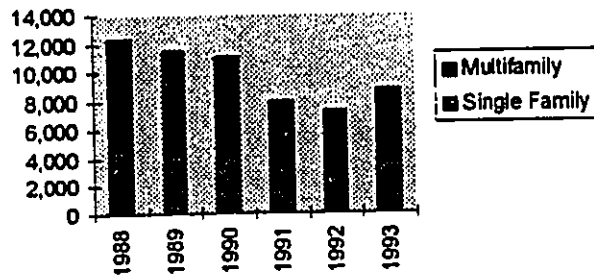
**Single Family**



**Multifamily**



**Total Residential**



### Residential Indicators Conclusion

The residential indicators presented above lead to the following conclusions relative to the economic viability of the proposed project:

*Population growth* - Oahu's General Plan and Land Use Model forecast the most rapid population growth in the subject property's region of Ewa.

*Household formations* - The combination of increasing housing stock and decreasing household size will create demand for additional housing in the future on Oahu.

*Income trends* - After dipping in the early 1990s, real personal income in Hawaii has been rising very slowly. This slow rise in real income, combined with accelerating home prices, creates a need for affordable and moderate-priced housing.

*Residential building permit trends* - Trends over the last 32 years show an economic cycle of 8-10 years which may have less pronounced fluctuations in the future. Building permit trends also indicate a trend toward greater affordability, based on construction cost statistics.

*Oahu's for-sale residential market* - Prices for Oahu real estate have continued to grow since 1958 when the data series began, with approximately nine-year cycles. The past several years have shown a trend toward a higher proportion of multifamily units.

### COMMERCIAL INDICATORS

Trends in the following indicators appear to support demand for further development of commercial space on Oahu:

- Growth in Gross State Product (GSP)
- Wage and salary employment
- Unemployment
- Consumer prices
- Retail sales
- Visitation and tourism expenditures

Commercial demand on Oahu is an important element of the economic analysis with regard to the subject development for two reasons. First, it will influence the development of the second city at Ewa as a true "growth pole" or secondary urban agglomeration, complete with a wide-ranging employment base. To a lesser degree commercial demand also will influence the demand for the neighborhood retail planned for the subject property. The strongest factors in support of the subject property's commercial potential will be proximity to housing and the university campus.

### **Growth in Gross State Product**

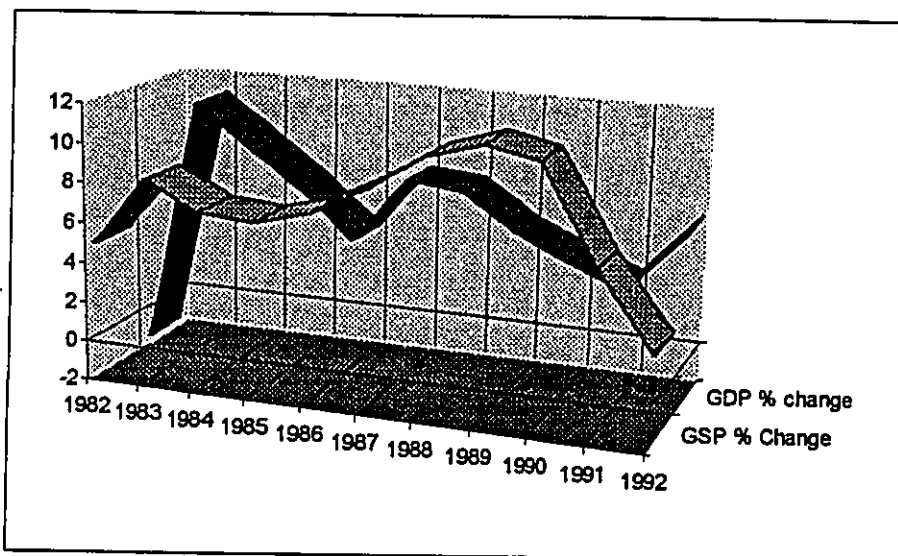
The Gross State Product (GSP) is an indicator of economic prosperity in a region. During the last half of the 1980s, Hawaii consistently experienced over five percent real annual growth in its GSP.

Exhibit IV-9, *Trends: Hawaii Gross State Product Versus U.S. Gross Domestic Product, 1982-1992*, illustrates the following:

- Growth continues to be positive (above zero), however the 1991-92 figures indicate that it has subsided from the brisk growth rate of the 1980s.
- Hawaii's business cycles tend to lag in time behind the Mainland's macroeconomic trends.

Exhibit IV-9  
East Kapolei Project

Comparison of Hawaii Gross State Product  
and U.S. National Domestic Product, 1982 - 1992



Sources: *Gross State Product*: State of Hawaii Data Book, 1993-94, Table 13.2  
*Gross Domestic Product*: "Economic Indicators, June 1994," prepared for the Joint Committee by the Council of Economic Advisers, 103rd Congress, 2d Session

### Wage and Salary Employment

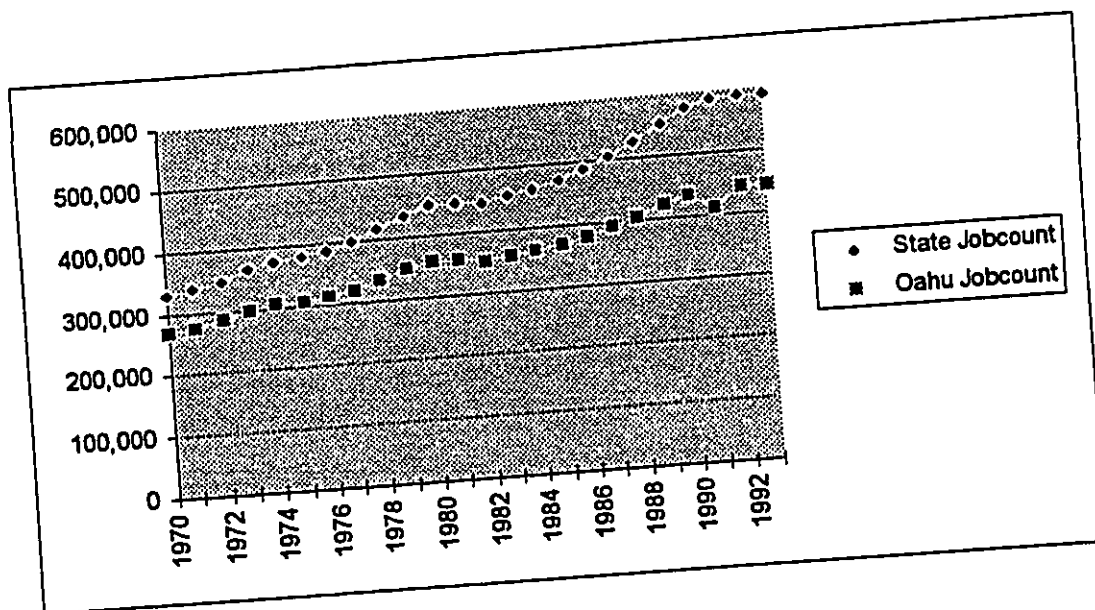
**Jobs.** Hawaii's long-term employment indicators show a basically healthy state economy, although one which is not immune to corrections such as the recessions in 1982 and 1991-92. Exhibit IV-10, *Trends in Wage and Salary Employment for the State of Hawaii and City and County of Honolulu, 1970-1993* reveals the following trends:

- Recent data indicate a basically flat trend of jobs with a 0.2% dip occurring in 1993.
- On a statistical basis as Oahu goes, so goes Hawaii. The close correlation that exists between shifts in economic performance on Oahu and the State as a whole is illustrated in the employment trend lines.

Job growth may become positive again in 1994 with the resurgence in visitor industry activity, although growth will likely be modest compared to the pace of the late 1980s.

Exhibit IV-10  
East Kapolei Project

Trends in Wage and Salary Employment for the State of Hawaii and City and County of Honolulu, 1970-1993



Source: State of Hawaii Data Book, 1993-94, Table 12.6

**Annual Wages per Employee.** According to the Department of Business, Economic Development and Tourism, Hawaii ranked twelfth among the fifty states in annual wages per employee for all workers in 1992. As shown in Exhibit IV-11, *Annual Change in Wages per Employee*, wages per employee exhibited annual increases from 1982 through 1991, the last year for which this data was available. After a dip in the percent increase between 1990 and 1991, wages rebounded in 1992.



**East Kapolei Project  
Market Assessment**

**Exhibit IV-11  
Annual Change in Wages Per Employee**

Year	Total Annual Wages/Employee (\$)	Percent Change Year Over Year
1982	15,353	
1983	16,108	+4.9%
1984	16,701	+3.7%
1985	17,329	+3.8%
1986	18,101	+4.5%
1987	19,091	+5.5%
1988	20,444	+7.1%
1989	21,624	+5.8%
1990	23,167	+7.1%
1991	24,104	+4.0%
1992	25,613	+6.3%

Source: State of Hawaii Data Book, 1993-94, Table 12.25

**Employment Composition.** Equally as important as the level of overall employment to Oahu's economy is the type of employment. An analysis of predicted job growth on Oahu and its composition is presented on the following page in Exhibit IV-12, *Composition of Employment on Oahu, 1985 - 2010.*

**East Kapolei Project  
Market Assessment**

**Exhibit IV-12  
East Kapolei Project**

**Composition of Employment  
on Oahu, 1985-2010**

Employment Island of Oahu (in thousands)	1985	1990	% Chg	1995	% Chg	2000	% Chg	2005	% Chg	2010	% Chg
Manufacturing	5.7	6.7	18%	7.1	6%	7.7	8%	8.2	6%	8.7	6%
Transp. commun, utilities	27	29.7	10%	31.2	5%	32.3	4%	32.8	2%	33	1%
Trade (excl. eating/drinking)	60.4	70.3	16%	76	8%	77.6	2%	83.7	8%	86.7	4%
Eating and drinking	31.5	36.6	16%	38.5	5%	40.1	4%	41.1	2%	42.2	3%
Banking and finance	26.9	29.4	9%	32.1	9%	33.4	4%	34	2%	34.8	2%
Services, other	71.1	86.8	22%	100	15%	111	11%	119.8	8%	129	7%
Government											
State/local	47.8	50.1	5%	52.6	5%	54.8	4%	55.8	2%	56	0%
Federal	31.4	31.3	0%	31.7	1%	32.1	1%	32.5	1%	32.9	1%
Total	79.2	81.4	3%	84.3	4%	86.9	3%	88.3	2%	88.9	1%
Self-employed	24.7	26.3	6%	31.2	19%	33.7	8%	35.7	6%	37.7	6%

Source: Department of Business Economic Development and Tourism, Series M-K

As shown in the previous table, the greatest increases are expected in service, manufacturing and retail trade jobs. These trends will support the planned neighborhood retail land uses on the subject property.

**White Collar Employment.** Office demand can be related to increases in white collar employment categories. The primary white collar employment category is the finance, insurance and real estate sector. Since a portion of the service sector is typically housed in office space, the growth in these categories

**East Kapolei Project  
Market Assessment**

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should support a moderate level of continued office development.

The advent of the second city at Ewa/Kapolei is likely to cause some regional redistribution of white collar employment due to the following plans:

- The State of Hawaii has a master plan for its civic center in Kapolei. The center will initially consist of six state office buildings encompassing 1.2 million square feet of space and 567,000 square feet of space for judiciary, library and history museum facilities. The first Kapolei state office building with 120,000 square feet of useable floor space is expected to be ready for occupancy in late 1997 or early 1998.
- Major new Bank of Hawaii office building facilities will accommodate 1,200 white collar workers within a 250,000 square foot building.
- Location of the University of Hawaii at West Oahu campus within the second city area eventually will bring with it a full complement of faculty and administrative staff.
- Location of a civic center at the City of Kapolei will provide regional municipal services by the City and County of Honolulu.

**Manufacturing.** Manufacturing sector growth is expected to be one of the largest in the Oahu employment market. This strong growth, combined with decreases in the supply of industrial space, should sustain demand for light industrial land on Oahu.

The subject region is well positioned to take advantage of growth in manufacturing and industrial activity because of the existing James Campbell Industrial Park and the addition of the light industrial/warehouse-oriented Kapolei Business Park. Jobs in these areas will in turn result in housing and retail demand within the market study area.

**Wholesale and retail employment.** Wholesale and retail employment growth has the greatest effect on the demand for

retail space. According to Exhibit IV-12 above, this sector is projected to have a roller coaster future.

- A stabilizing force may be the additional demand which comes from growth in the service sector, restaurant employment and banking and financial services. Often these businesses choose retail locations in order serve the public.
- Employment in warehousing could be somewhat destabilized due to the advent of volume discounters in Hawaii, whose method of doing business eliminates much of the warehousing and distribution component. However, such discounters still remain a relatively small proportion of the total retail scene in Hawaii.

The fluctuation in retail employment on Oahu is derived to a significant degree from fluctuations in tourism-related demand. The neighborhood retail type of commercial development planned for the subject property will be less susceptible to these fluctuations because it will service the immediate residential area and the future university campus.

### **Unemployment**

Throughout the 1980s and into the 1990s, Hawaii's employment trends have exhibited strength relative to Mainland performance. The highest unemployment rate in Hawaii between 1987 and 1992 was equal to the lowest Mainland unemployment rate.

According to Bank of Hawaii economists writing in Hawaii 1993: Annual Economic Report, the following trends are evident with regard to unemployment in Hawaii:

- In 1989, Hawaii ranked 49th in the nation for business failures. By 1993 business failures, loan delinquencies and foreclosures had risen but still placed the state among the better performing states, even those where economic recovery had begun.

- Already low, Hawaii's unemployment rate may continue to decline gradually during 1994 as the economic recovery continues to take hold.

### Consumer Prices

Consumer prices on Oahu have exceeded national trends in the recent past, although the trend is still one of low inflation. For example, Oahu experienced a 3.3 percent change in consumer prices from 1992-93, compared to 4.7 percent between 1991-2 and 10.5 percent in the previous Hawaii recessionary period in 1980-81.

### Retail Trends

It has long been stated that Oahu is underserved with regard to retail space. This is illustrated both by square feet per resident estimates and sales per square foot of retail space indicators. This continuing demand will support anticipated neighborhood retail operations on the subject property well into the future.

**Retail Sales Performance.** Hawaii's retail sales performance has been consistent with other positive economic trends in both real terms (i.e., constant dollars) and when compared to Mainland markets. For example, Mainland retail sales fell dramatically in 1990 while Hawaii's sales continued to be robust but at a slightly lower level.

Hawaii's healthier retail climate is the result of a number of factors:

- Limited supply of retail space in the islands compared to relatively overbuilt areas of the Mainland.
- Limited supply which creates higher per square foot retail expenditures.
- Tourism expenditures which bolster the local retail trade by increasing the retail market significantly beyond demand generated by residents. In 1993 it was estimated that retail spending from tourists accounted for between 20 and 25

percent of total retail sales in the state. (Bank of Hawaii, Hawaii 1993: Annual Economic Report).

**Structural change in Hawaii retail trade.** Hawaii retail sales remained stable throughout the recent recessionary period. According to Bank of Hawaii, this reflected "a greater underlying strength of the economy and less dependence on visitor purchases than has tended to be assumed."

The State of Hawaii followed the rest of the nation's trend toward large discount and wholesale outlets by almost a decade. This has significantly altered the pricing structure for retail goods and the type of goods being purchased by residents and visitors alike (Bank of Hawaii, Hawaii 1993: Annual Economic Report). For example, Hawaii residents have become more price-conscious and make regular bulk purchases of staple commodities at warehouse discounters. This has affected the pricing of retail goods at smaller stores, which must try to compete.

Hawaii is capitalizing on another national trend at the present time: the enhanced purchasing power provided by recent devaluation of the dollar relative to major world currencies. While not a coveted trend, the dollar's loss has been retailers' gain because visitors have greatly increased their level of purchasing (Time, September 5, 1994, "Shopping Spoken Here"). Locally, visitor traffic to the discount stores and manufacturers' outlets such as Waikale Power Center has resulted in some redistribution of retail expenditures from prior favorites such as duty free shops (Hawaii Investor, September 1994, "A Yen for Waikale").

### **Visitation and Tourism Expenditures**

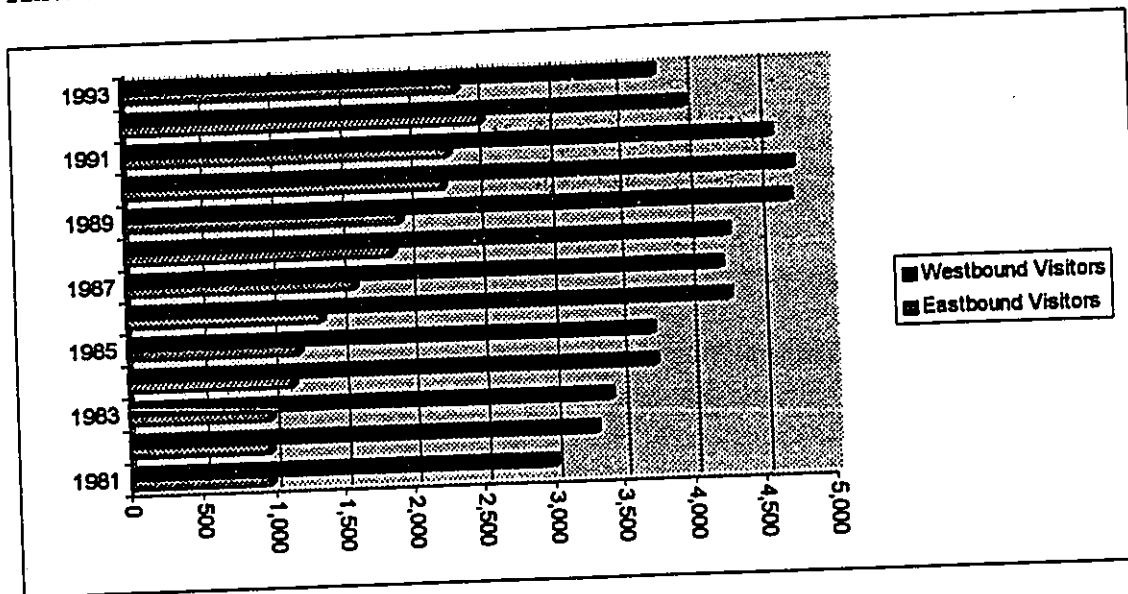
**The Economic Impact of Tourism.** The Hawaii economy benefits greatly from its role as a major tourist destination. Tourists support local employment directly through employment in service industries and indirectly in construction and other job categories. Continuing demand for tourism on Oahu is significant to the subject property in several ways:

- Oahu has been able to provide a more steady source of employment for its tourism work force than other islands and will therefore continue to support the demand for residential development.
- The resort-oriented communities of Ko Olina and Ewa Marina will contribute to the Ewa/Kapolei regional economy through an infusion of visitor expenditures.
- Oahu visitors make purchases which will continue to sustain retail demand throughout the island.

**Visitor Arrivals.** Over time the distribution between Mainland U.S. (westbound) and Japanese and Asian (eastbound) visitors has changed dramatically. Exhibit IV-13, *Hawaii Visitor Arrivals*, illustrates this contrast as well as the decline in visitors experienced in 1991 and 1992 during the Mainland and Japanese recessionary periods.

**Exhibit IV-13  
East Kapolei Project**

**Hawaii Visitor Arrivals**



Source: State of Hawaii Data Book, 1993-94 Table 7.3

**1994 Results.** Visitor counts for the first half of 1994 show a significant upturn to levels not seen for the past three years. This will in turn result in increased visitor expenditures.

**Commercial Indicators Conclusion.** Based on the preceding discussion, numerous factors appear to support demand for further development of commercial space on Oahu:

*Growth in Gross State Product* - growth continues to be positive and to lag Mainland business cycles.

*Wage and salary employment* - long term job growth has been strong, although recent statistics show a relatively flat trend. Job growth may increase in 1994 due to the recent surge in tourism. The Ewa region is likely to benefit from growth anticipated by the State's M-K projections in several categories, including white collar employment and manufacturing.

*Unemployment* - Hawaii has exhibited considerably more strength in this indicator than Mainland regions. Even during the recent recessionary period, business failures in Hawaii were among the better performing states.

*Consumer prices* - Hawaii exhibits relatively low inflation in consumer prices.

*Retail sales* - Hawaii's retail industry has been undergoing a structural transformation which is making room for discount retailers by changing shopping patterns and retail pricing.

*Visitation and tourist expenditures* - After a three-year slump, tourism arrivals and expenditures appear to be rebounding in 1994.



## **AREA REVIEW CONCLUSION**

The State of Hawaii, especially the island of Oahu, has demonstrated substantial growth in all sectors of the economy over time. Based on current and past economic trends, such growth is expected to continue for the foreseeable future and should support development of the site. Housing demand – especially for affordable product such as that being offered in the proposed development – has remained strong throughout the recent recessionary period and is expected to remain strong in the coming years.

**Section V**  
**RESIDENTIAL**

Section V

RESIDENTIAL

INTRODUCTION

The Oahu housing market provides a variety of residential products ranging from high rise luxury condominiums and oceanfront homes to older plantation homes and small ranches. This wide spectrum of homes is located over a broad geographic base extending from Honolulu's primary urban center to the rural communities of Leeward, Windward and the North Shore areas. The dramatic variety in residential products also contributes to great diversity in the price of housing.

While housing and its associated pricing vary greatly on the island of Oahu, one thing is universally known: Honolulu's housing ranks as the most expensive in the nation. Relatively low wages, high costs of living, a limited supply of land and high construction costs all lead to a shortage of affordable and gap housing for Honolulu's existing and future population. The demand for affordable housing is further illustrated by:

- *A relatively high ratio of renters to owners.* This proportion was 48 percent renters in the 1990 census (Source: U.S. Census Bureau).
- *The phenomenon of "pent-up demand."* In the 1990 census over 17,000 Oahu households or about 7% reported more than one "subfamily" (married couple with or without children living in a household with relatives). This is a figure which census experts consider understated (Source: U.S. Census Bureau).
- *High percentage of shared accommodations.* In 1992, it was estimated that about 22 percent of Hawaii households were either doubled up or sharing with unrelated families or individuals (Source: Hawaii Housing Policy Study, 1993).

**Organization of this Section.** This section of the Market Assessment presents the existing and future estimates of supply and demand for housing on Oahu. Included throughout this analysis are discussions regarding the market study area's relationship to the overall housing market. The section concludes with a description of the proposed property's development concept (which is dominated by a residential component of approximately 10,000 units), an estimate of the property's market position and estimated schedule of absorption.

## **MARKET STUDY AREA**

Based on an assessment of actively selling and proposed subdivisions it is the consultant's opinion that the relevant competitive supply for the subject property will come from the master planned communities within the Ewa Development Plan Area and along the western H-1 corridor including the communities of Waikele and Royal Kunia. These two communities are within the Central Oahu Development Plan Area.

## **SUPPLY AND DEMAND ANALYSIS**

The following discussion provides an explanation of the analysis of interaction between supply and demand within the residential market on Oahu and within the defined market study area.

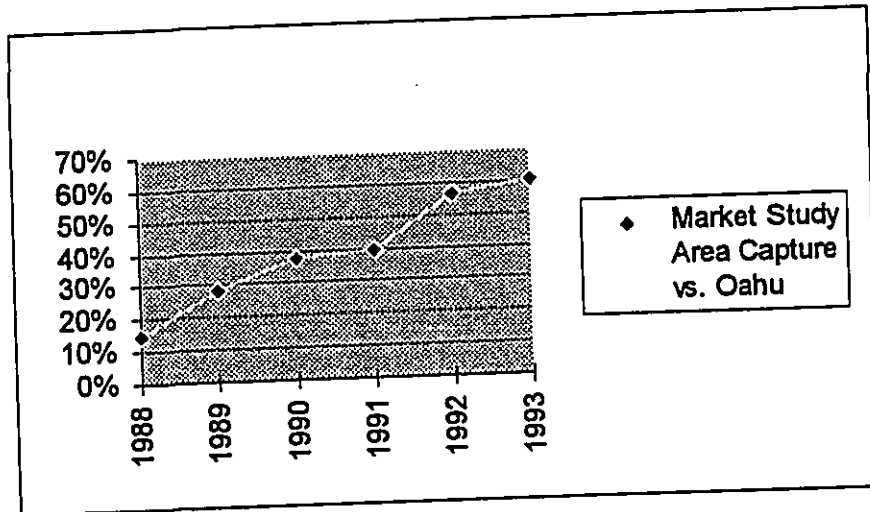
### **DEMAND**

The calculation of future demand for housing is a function of both population growth and a need for vacancy to provide a healthy real estate market. Once housing demand is calculated for Oahu, it must be allocated to the market study area to project future demand in the area of the subject property.

The demand for housing can be closely associated with the formation of new households within a growing population. In an undersupplied market area the direction of demand is typically affected by the location of the supply. Exhibit V-1, *New Home Sales: Market Study Area Capture vs. Oahu*, shows how the proportion of Oahu's new residential supply provided by the market study area quadrupled between 1988 to 1993 (from fifteen percent to over 60 percent).

**Exhibit V-1  
East Kapolei Project**

**New Home Sales: Market Study Area Capture vs. Oahu**



Source: Prudential Locations, Inc. (for raw data)

**Calculation of Market Study Area Demand**

The following sections discuss the expected sources of demand for additional residential units within the market study area. Demand factors include estimated growth in households (as a function of population and household size) and a provision for vacant units. The calculation of demand for additional housing in the market study area is based on the following analyses:

- (1) Estimation of future increases in households are based on future population;

- (2) Allowance for vacant units needed for a healthy real estate market;
- (3) Calculation of Oahu residential unit demand in 2010;
- (4) Allocation of Oahu demand to the market study area based on its forecast proportion of the island's population;
- (5) Adjustments to study area demand based on expected market conditions; and
- (6) Final calculation of demand within the market study area in 2010.

**(1) Estimation of Increases in Households**

*Estimated Occupied Housing Units by 2010: 352,000 units*

***Rationale***

The required number of occupied housing units that will be needed in the year 2010 -- approximately 351,551 units -- is a derived estimate based on:

(a) The Planning Department's Land Use Model projection of 359,827 units in 2010. This is based on a household size of approximately 2.8 persons. (Source: Forecast of Population, Housing and Employment on Oahu by Small Area 1990-2010, Table 4, "Housing Growth"); and

(b) Netting out the built-in vacancy factor of 2.3 percent which is included in the Land Use Model. The reason for this recalculation is to apply a more healthy vacancy rate of five percent to the estimation of Oahu housing demand.

The methodology for deriving occupied units is shown in Exhibit V-2, *Calculation of Occupied Households*.

Exhibit V-2  
East Kapolei Project

Calculation of Occupied Households

Total Oahu Unit Demand 2010 - Land Use Model	359,827
Built-in vacancy factor of Land Use Model	2.30%
Occupied Oahu households (net of vacancy factor)	351,551

(2) Allowance for Vacancy on Oahu

Estimated Number of Vacant  
Units as of December 31, 2010: 18,000 units

*Rationale*

A certain level of vacancy is considered healthy in any market area. This vacancy level allows the free movement of the population in and out of a community and within the community.

- According to the 1990 U.S. Census, the vacancy factor in the Honolulu residential market area was 5.87 percent. This factor included both owned and rented units.
- A rule of thumb of five percent for desirable vacancy level in residential communities is used by organizations such as the Urban Land Institute and the U.S. Department of Housing and Urban Development.

A vacancy rate of five percent for Oahu has been utilized in this analysis. This figure appears to be at a reasonable and conservative level. Applying this vacancy rate to the estimated demand for housing on Oahu, an additional 18,503 vacant units should be introduced into the market by 2010.

**(3) Calculation of Total Oahu Housing Demand  
(occupied units plus vacancy)**

*Expected Total Demand for Oahu  
by December 31, 2010:* *370,000 units*

**Rationale**

Based on the above discussion the total demand for new housing units on the island of Oahu in 2010 is estimated to be 370,054 units, which includes demand for 351,551 occupied units (derived in Step 1 above) plus an additional 18,503 to provide a healthy level of vacancy (derived in Step 2).

**(4) Market Study Area Allocation - Unadjusted**

*Expected Total Demand between  
June 30, 1993 and December 31, 2010  
in Market Study Area (includes existing units):* *53,000 to  
57,000 units*

*Expected Additional Demand between  
June 30, 1993 and December 31, 2010  
in Market Study Area (excludes existing units):* *36,000 to  
41,000 units*

**Rationale**

Through its General Plan, the City and County of Honolulu allocates a share of future Oahu population (and, consequently, housing demand) to each Development Plan (DP) Area. The range of percentage allocations to a DP Area is generally expressed in terms of low, mid and high points of projected population.

The market study area's percentage share of 2010 Oahu population and housing demand combines Ewa DP Area forecasts with those for Waikele and Royal Kunia from Central Oahu. The market study area share of total Oahu demand for housing is estimated between 14.23 (low), 14.88 (midpoint) and 15.53 percent (high). This range was derived by combining General Plan population projections for the Ewa DP Area with a proportion of Central Oahu growth as forecast by the Land Use Model's Traffic Analysis Zones for Royal Kunia and Waikele.



The foregoing analyses result in a range of unadjusted demand for the market study area of 52,661 residential units at the low end, 55,068 units at the midpoint or 57,474 units at the high end. Each of these estimates includes 16,891 existing units or a net of 36,070 at the low end, 38,477 units at the midpoint or 40,883 units at the high end (see Exhibit V-5 on page V-13 for detail of existing units).

**(5) Adjustments to Demand for the University of Hawaii at West Oahu** +300 units

Discussions with University of Hawaii (UH) officials indicate that there is likely to be additional demand for housing in the vicinity of the subject property resulting from the planned new campus at West Oahu. According to current estimates, there are expected to be approximately 4,000 mostly undergraduate students enrolled at the University of Hawaii at West Oahu in the year 2010. The estimate of 4,000 students in the year 2010 is based on:

- (1) The assumption that the State of Hawaii will meet student enrollment goals set by the Estate of James Campbell as a condition of the gift of land (2,750 students enrolled in 2006); and
- (2) Enrollment will steadily progress to levels estimated in Planning Department studies (6020 students in year 2020).

UH Manoa housing officials indicate that the Board of Regents has set a policy for commuter-oriented campuses such as Manoa and West Oahu of providing 25% of the students with on-campus housing. This means that approximately 3,000 students will need off-campus housing in 2010, although clearly many will continue to live at home and/or commute to campus. Housing officials further indicated that the highest demand for affordable rental situations is within two miles of campus, an area which includes the entire subject parcel.

University facilities planning officials indicated that construction of dormitories and on-campus faculty housing will

be a low priority during the first ten or so years, leaving students and a portion of the faculty in search of conveniently located, off-campus housing accommodations.

Demand for approximately 300 units on the subject property is estimated to accommodate groups of UH West Oahu students housed off-campus on the subject property plus a proportion of faculty and staff who will wish to relocate close to work.

#### (6) Calculation of Demand

Total adjusted demand for the market study area by 2010 is estimated at 52,961 to 57,774 units, including an existing inventory of 16,891 units. On the following page, Exhibit V-3, *Calculation of Demand, 1994 - 2010*, summarizes the foregoing discussion and includes comparative information on net demand (excluding existing inventory) in the market study area as a whole as well as its Ewa Development Plan Area portion.

**East Kapolei Project  
Market Assessment**

**Exhibit V-3  
East Kapolei Project**

**Calculation of Demand  
1994 - 2010**

Oahu Housing Units - 2010	359,827			Land Use Model (includes vacancy)
Oahu Occupied Units - 2010	351,551			Net of 2.3 percent vacancy rate Refer to Step 1
Vacancy Provision	18,503			Refer to Step 2
Total Demand for Oahu - 2010	370,054			Occupied units plus 5% vacancy provision Refer to Step 3
Study Area Allocation Factor (% of total Oahu)	14.23 Low End	14.88 Midpoint	15.53 High End	General Plan and Land Use Model Refer to Step 4
Study Area Demand (unadjusted)	52,661	55,068	57,474	Refer to Step 4
Adjustment for University Housing Demand	300	300	300	Refer to Step 5
<b>Total Adjusted Study Area Demand (Includes 16,891 existing units)</b>	<b>52,961</b>	<b>55,368</b>	<b>57,774</b>	
<b>Comparative Data</b>				
Net Additional Study Area Demand (total adjusted study area demand less existing units)	36,070	38,477	40,883	
Net Additional Demand - Ewa DP Area portion only	28,856	30,782	32,706	

**SUPPLY**

The analysis of the Oahu's housing supply is presented in the following steps:

- (1) Overview of the existing housing stock (supply) on Oahu;
- (2) Analysis of existing housing stock within the market study area;

**East Kapolei Project  
Market Assessment**

- (3) Expectation of future additions to supply within the market study area during the scope of the analysis; and
- (4) Adjustments to supply based on expected future conditions.
- (5) Calculation of supply based on the above steps.

**(1) Existing Supply on Oahu 295,000 units**

The most recent information regarding the supply of housing within the Development Plan areas on the island of Oahu was provided by the City and County of Honolulu's Planning Department and is summarized on the following page in Exhibit V-4, *Distribution of Housing Stock by Development Plan Area (June 30, 1993)*.

**Exhibit V-4, East Kapolei Project**

**Distribution of Housing Stock by Development Plan Area (June 30, 1993)**

Oahu Statistics by Development Plan Area - 1992	Existing Housing Stock as of June 30, 1993	Share of Housing Stock
Primary Urban Center	168,342	57.06%
Ewa	15,301	5.19%
Central Oahu	39,115	13.26%
East Honolulu	15,972	5.41%
Koolaupoko	35,189	11.93%
Koolauloa	3,970	1.35%
North Shore	5,837	1.98%
Waianae	11,288	3.82%
Total	295,014	100.00%

Source: Planning Department, September 1994

**Primary Urban Center** - As illustrated in Exhibit V-4 above, the majority of the island's population is located in the Primary Urban Center (PUC). The PUC is a 65,028-acre sector and is the third largest of the eight planning regions in terms of geographic area.

Approximately 36% of the PUC was designated for urban uses in 1993. The majority of the developed area within this district consists of higher density housing structures. This region will continue to be popular with island residents due to its proximity to Honolulu's central business district. However, housing prices in the region continue to be pushed out of reach financially for more and more Oahu residents. This is a function of rapidly increasing land and housing prices associated with developing in the PUC.

Ewa - The subject property is located within the Ewa Development Plan area, which encompasses about eight percent of Oahu's land. The Ewa region has been designated as Oahu's second urban center to alleviate pressure for development within the Primary Urban Center and Central Oahu. As such:

- According to Oahu's General Plan, the highest proportion of the island's development potential is by policy being directed to the Ewa Development Plan Area over the next 25 years.
- The Ewa region will be differentiated from other large residential communities on Oahu because it also is planned as a major employment center rather than bedroom community or communities serving the primary urban center.

The Ewa Development Plan Area accounted for approximately five percent of Oahu's housing stock in 1993. The Ewa region is a study in the contrast between old and new from many perspectives, including housing. Aging plantation and beach communities stand in contrast to new master planned communities which offer a variety of homes in many price ranges.

The relatively high proportion of affordable housing planned for the Ewa area and expected pricing structure for new homes is expected to result in significant levels of medium density development in the region. High density, high rise-type construction such as that found in the Primary Urban Center is

not likely, however, due to regional urban design standards which include a height limit of 150 feet.

**Central Oahu (H-1 corridor)** - This region is Oahu's second largest planning district based on geographic area and concentration of housing units. Due to their proximity to the subject property along the western H-1 corridor, two active developments in the Central Oahu Development Plan Area have been included within the market study area: Waikele and Royal Kunia. Each is a golf course-oriented community and according to this analysis 1,590 units have been completed or 4% of the existing Central Oahu housing stock.

The majority of the Central Oahu district's lands are in preservation, agricultural and military uses. Government policies and actions have supported continued agricultural use of Central Oahu's "prime" agricultural lands. For example, the 2,100 acres of Galbraith Trust lands being exchanged for 500 acres of the subject parcel are located within Central Oahu and are intended to be preserved for agricultural use as state lands.

General Plan population policies are also likely to curtail the pace of residential growth in Central Oahu as future housing demand is directed to Ewa.

<b>(2) Existing Supply within the Market Study Area</b>	<b>17,000 units (6/30/93)</b>
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The most important segment of supply is that which exists in the competitive market study area, defined as the master planned communities in the Ewa Development Plan area plus H-1 corridor projects of Waikele and Royal Kunia.

The Planning Department estimated that in June 1993 there were approximately 16,891 residential units within the designated market study area, including existing

**East Kapolei Project  
Market Assessment**

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neighborhoods and new home sales. The existing stock includes homes already sold within competitive projects such as:

- Ewa by Gentry
- Villages of Kapolei
- Makakilo
- West Loch Estates (in final phase)
- Royal Kunia
- Waikele

The breakdown of existing housing stock within the market study area is shown on the following page in Exhibit V-5, *Distribution of Housing Stock by Market Study Area (1993)*.

**Exhibit V-5  
East Kapolei Project**

**Distribution of Housing Stock by Market Study Area (1993)**

	Existing Housing Stock as of June 30, 1993	Share of Oahu Market
Ewa Development Plan Area	15,301	5.19%
Waikele (Traffic Analysis Zones 148.02, 148.03)	1,005	0.34%
Royal Kunia (Traffic Analysis Zones 146.01, 150.01)	585	0.20%
<b>Total Market Study Area</b>	<b>16,891</b>	<b>5.73%</b>
Total Oahu	295,014	100.00%

Source: Planning Department (August 1994)

(3) Additions to Supply within  
the Market Study Area

34,000 units

Projects which will be actively selling residential product within the market study area at the time the subject property is targeted for development must be considered in the analysis of supply and demand. These include:

- City of Kapolei
- Ewa by Gentry
- Ewa Marina
- Ewa Villages
- Villages of Kapolei
- Ko Olina
- Makakilo
- Makaiwa Hills
- Royal Kunia
- Waikele
- West Loch (will be completed prior to subject development)

A descriptive summary of the history and future plans for these major future additions to supply (projects of over 1,000 units) is presented in Appendix A, *Competitive Product*.

Estimations of future supply are shown the following table, Exhibit V-6, *Additions to Residential Supply - Market Study Area, 1994 - 2010*. It should be noted that the development schedule presented in Exhibit V-3 is only a general indicator of the timing of these planned projects. This is based on the "build-out" schedule which the developers have provided to the Planning Department and a review of the source information for tables which indicates that projects often slip on timing or are not built at all.



**East Kapolei Project  
Market Assessment**

**Exhibit V-6, East Kapolei Project  
Additions to Residential Supply - Market Study Area, 1994 - 2010**

Project	Area	Total Units in Project <sup>1</sup>	7/1/93-6/30/94	1995	1996-2000	2001-2005	2006-2010
City of Kapolei							
Makai	Ewa	2,000			500	1,000	500
Mauka	Ewa	750			250	500	
Ewa by Gentry	Ewa	5,622	503	1,069	4,050		
Ewa Marina	Ewa	4,850			2,109	2,335	406
Ewa Villages	Ewa	1,716		113	1,603		
Ewa Fairways	Ewa	1,300			360	720	220
Kapolei Knolls	Ewa	380			380		
Ko Olina, Phase 1 <sup>2</sup>	Ewa	2,500		280	Remainder of schedule unknown		
Ko Olina, Phase 2 <sup>3</sup>	Ewa	0		Delayed Indefinitely			
Makaiwa Hills <sup>4</sup>	Ewa	2,130				1,000	1,130
Makakilo							
Post 1986 phases	Ewa	1,707	10	102	1,096	499	
Makakilo Hts. (Palailai)	Ewa	404	69	136	199		
Makakilo Hts. (Schuler)	Ewa	550	148	172	230		
Royal Kunia - Ph 1	Central	1,748		350	1,398		
Royal Kunia - Ph 2	Central	2,000			1400	600	
Villages of Kapolei	Ewa	4,464	311	993	2,211	949	
Waikele	Central	1,530	532	578	420		
West Loch	Ewa	503	328	175			
<b>Total Future</b>		<b>34,154</b>	<b>1,901</b>	<b>3,968</b>	<b>16,206</b>	<b>7,603</b>	<b>2,256</b>
<b>Total Future Units to be Constructed</b>		<b>34,154</b>					
<sup>1</sup> Total units 7/1/93 - 2010							
<sup>2</sup> Planning Department estimate based on Land Use Model and current observations							
<sup>3</sup> Phase 2 Ko Olina "delayed indefinitely" per Planning Department, September 1994							
<sup>4</sup> Planning Dept. estimate of units based on Land Use Model; consultant estimate of timing							
Sources: Development Plan Annual Report, Fiscal Year 1994, Tables III-d and III-e							

**Ko Olina Assumptions.** Due to inconsistencies in the developer's reporting, it was necessary for the consultant to make certain assumptions regarding the Ko Olina project.

- The Development Plan (DP) Annual Report, Fiscal Year 1994, published developer-provided construction schedules which indicate that Ko Olina residential component has been "delayed indefinitely," apparently due to the developer's failure to respond to the Planning Department's annual survey of construction.
- Subsequent discussions with Planning Department staff indicate that based on the department's Land Use Model and recent observations, a reasonable estimate for Ko Olina appears to be approximately 2,500 units before the year 2010, this compared to the 8,700 reported in last year's survey and the zero showing in the Development Plan Annual Report, FY 1994.
- According to conversations with the developer, 280 units are planned for construction in 1994.

**Makaiwa Hills Assumptions.** Exhibit V-6 reflects a total of 2,130 units for Makaiwa Hills by the year 2010, which is the estimate used in the Planning Department's Land Use Model. This estimate is utilized in the analysis of future supply rather than the 1,066 units reflected in the Development Plan Annual Report, Fiscal Year 1994. The latter estimate was based on a Committee Report reflecting Development Plan Amendment approval of 305 acres and 1,066 units. The 2,130 unit figure used in the Land Use Model and this analysis is more reflective of the probable density of the approved acreage (approximately 7 units per acre versus 3 per acre reflected by 1,066 units).

**Government Projects -** The Planning Department recognizes a number of housing developments as being sponsored by government. These include:

- **City Projects:** Ewa Villages, West Loch Estates, and Ewa Fairways, sponsored by the City and County of Honolulu; and

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**East Kapolei Project  
Market Assessment**

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- **State of Hawaii Projects:** Villages of Kapolei, sponsored by the State of Hawaii's Housing Finance and Development Corporation;
- **Federal Projects:** An on-base, multi-family residential project of 120 units in the portion of Barbers Point Naval Air Station, which is to be retained for Department of Defense use following the planned base closure.

The government projects listed above were included in the estimation of future residential supply presented in Exhibit V-6 above, with the exception of Barbers Point. Planning Department staff advised against including this project in future supply as it was not intended to serve the local residential market.

**Projects Approved by the Land Use Commission -** In addition to reviewing advanced information on the projects included in future supply as reported to the City's Planning Department, the consultant reviewed the files of developments which have been submitted to the State Land Use Commission (LUC). The finding was that the majority of master planned communities presented as additions to future supply have received prior approval on the state level from the Land Use Commission, as shown in Exhibit V-7, *Land Use Commission Approvals*.

East Kapolei Project  
Market Assessment

Exhibit V-7  
East Kapolei Project

Land Use Commission Approvals

Project	Date of Approval	Docket No.	Acres
City of Kapolei Phase I	June 29, 1988	87-613	135
City of Kapolei Phase II	June 17, 1993	87-613	586
Ewa by Gentry	Year of 1974	N/A	331
Ewa by Gentry	May 8, 1989	88-627	673
Ewa Marina	October 17, 1990	89-651	403
Kapolei Knolls	November 20, 1989	88-628	77
Ko Olina, Phase 1	September 12, 1985	83-562	642
Ko Olina, Phase 2	February 14, 1991	90-655	372
Makaiwa Hills	October 28, 1993	92-687	1,700
Royal Kunia Phase 1	October 24, 1986	86-600	547
Royal Kunia Phase 2	December 9, 1993	92-683	504
Villages of Kapolei	August 23, 1988	88-622	830
Waikele	February 28, 1986	85-594	577
West Loch Estates	April 15, 1988	87-616	212

The acreage approved by the Land Use Commission suggests that for projects such as Makaiwa Hills, additional units beyond those shown in the Planning Department's construction estimates may be expected in some future period. In the absence of further specificity, the Planning Department's Land Use Model estimate Makaiwa Hills (2,130 units by 2010) was used to reflect the future for the purposes of this assessment.

**Unadjusted supply.** The unadjusted estimate of total supply for the market study area in the year 2010 is 51,045 units, as shown in Exhibit V-8, *Supply Summary, 1994-2010*.

East Kapolei Project  
Market Assessment

Exhibit V-8, East Kapolei Project, Supply Summary, 1994 - 2010

Project	Area	Total Units in Project <sup>1</sup>	7/1/93- 6/30/94	1995	1996- 2000	2001 2005	2006 2010
Existing (6/30/93)		16,891					
<b>City of Kapolei</b>							
Makai	Ewa	2,000			500	1,000	500
Mauka	Ewa	750			250	500	
Ewa by Gentry	Ewa	5,622	503	1,069	4,050		
Ewa Marina	Ewa	4,850			2,109	2,335	406
Ewa Villages	Ewa	1,716		113	1,603		
Ewa Fairways	Ewa	1,300			360	720	220
Kapolei Knolls	Ewa	380			380		
Ko Olina, Phase 1 <sup>2</sup>	Ewa	2,500		280	Schedule unknown		
Ko Olina, Phase 2 <sup>3</sup>	Ewa	0	Remainder Delayed Indefinitely				
Makaiwa Hills <sup>4</sup>	Ewa	2,130				1,000	1,130
<b>Makakilo</b>							
Post 1986 phases	Ewa	1,707	10	102	1,096	499	
Makakilo Hts. (Palailai)	Ewa	404	69	136	199		
Makakilo Hts. (Schuler)	Ewa	550	148	172	230		
Royal Kunia - Ph 1	Central	1,748		350	1,398		
Royal Kunia - Ph 2	Central	2,000			1,400	600	
Villages of Kapolei	Ewa	4,464	311	993	2,211	949	
Waialeale	Central	1,530	532	578	420		
West Loch	Ewa	503	328	175			
<b>Total Future</b>		<b>34,154</b>	<b>1,901</b>	<b>3,968</b>	<b>16,206</b>	<b>7,603</b>	<b>2,256</b>
<b>Total Future Additions<sup>1</sup></b>		<b>34,154</b>					
<b>Existing Stock</b>		<b>16,891</b>					
<b>Total Unadjusted Supply</b>		<b>51,045</b>					
<sup>1</sup> Total units 7/1/93 - 2010							
<sup>2</sup> Planning Department estimate based on Land Use Model and current observations							
<sup>3</sup> Phase 2 Ko Olina "delayed indefinitely" per Planning Department, September 1994							
<sup>4</sup> Land Use Model estimate of units; consultant estimate of timing							
Sources: Future: Development Plan Annual Report, Fiscal Year 1994, Tables III-d and III-e (obtained pre-publication from Planning Department); Existing stock: Planning Department							

#### **(4) Adjustments to Supply**

Adjustments to future supply calculations were necessary to ensure that the analysis conforms to the most likely future conditions. These included (a) an adjustment for timing which is caused by projects not meeting their intended development schedules and (b) allowance for the occupancy of resort area residential units by non-residents.

##### **(a) Adjustment for Timing of Additions (5,000) units to Supply**

In practice the construction of units included in future additions to supply may not occur according to planned development schedules. In fact, history has shown this to be consistently true. Delay can result from a variety of factors, including:

- **Timing of construction vs. schedule.** Over the past several years, the projects of Ko Olina, Ewa by Gentry, Ewa Marina, and Royal Kunia each have experienced difficulties in meeting the schedules published in the Planning Department's Development Plan Annual Report. If these developer-provided construction schedules were taken at face value with no analysis or adjustment, there could be a danger of disapproving viable projects.
- **Recent market conditions.** Recent upturns in interest rates, the recession in Hawaii and cyclical downturn in the residential market probably have accounted for some delays. Scarce investment capital for developer financing also has been a factor. Several projects reflected in the estimate of unadjusted future supply have fallen prey to these conditions.
- **Delays in the provision of needed infrastructure.** In a situation where so much new infrastructure is required, delays in government financing of off-site improvements can delay housing construction. Although this situation is clearly beyond the control of the developer, it still results in construction delays and affects the timing of future residential supply.

**Committed versus Proposed Residential Units.** There is an important distinction between the level of "committed" versus "proposed" projects. The Planning Department categorizes new development using the following definitions:

*Committed projects are considered certain to occur, because they are either under construction, have building permits in place, or are government projects whose completion is assumed. They are directly assigned to the location specified based on the schedule provided, subject only to the condition of not exceeding islandwide demand.*

*Proposed projects are not considered certain. They consist of projects with known characteristics and schedules as given by developers. Their completion is dependent on the interaction between supply and demand factors.*

*Source: Forecast of Population, Housing and Employment on Oahu by Small Area 1990 - 2010, Planning Department, 1993.*

Figure V-9, *Housing Units Committed Versus Proposed: Market Study Area*, indicates that in September 1993 only 21 percent of the future supply in the primary competitive area was "committed." The implication is that nearly four-fifths of the additions to future supply reflects the characteristics and schedules proposed by developers, which are by no means assured.

East Kapolei Project  
Market Assessment

Exhibit V-9  
East Kapolei Project

Housing Units Committed versus Proposed: Market Study Area

Project Name	Proposed <sup>1</sup>	Committed <sup>2</sup>	Total proposed or committed	Percent Committed
Ewa				
Ewa by Gentry	6,364	0	6,364	0%
Ewa Marina	4,800	0	4,800	0%
Ewa Villages	120	0	120	0%
Kapolei Knolls	475	0	475	0%
City of Kapolei (makai)	2,299	0	2,299	0%
City of Kapolei (mauka)	1,044	0	1,044	0%
Villages of Kapolei	0	5,004	5,004	100%
Ko Olina	9,509	0	9,509	0%
Makakilo	961	404	1,365	30%
Makaiwa Hills <sup>3</sup>	0	0	0	0%
Central Oahu				
Waikale	1,268	1,915	3,183	60%
Royal Kunia	2,452	252	2,704	9%
<b>Total</b>	<b>29,292</b>	<b>7,575</b>	<b>36,867</b>	<b>21%</b>

<sup>1</sup>"Proposed projects" are not considered certain but have known characteristics and schedules  
<sup>2</sup>"Committed projects" are assumed "certain to occur" by the City and County of Honolulu  
Sources: For definitions: Forecast of Population, Housing and Employment on Oahu by Small Area, 1990-2010, Planning Department, 1993; For estimates: "Proposed and Committed Projects Beyond 1990 by DP Area," Planning Department, September 1993)  
<sup>3</sup>Makaiwa Hills was excluded from the source of 1993 estimates due to timing

**Construction Timing Conclusion.** As indicated previously, the additions to supply which are published by the Planning Department reflect both committed and proposed projects. In 1993 only 22 percent of the major study area project units were committed (Exhibit V-9, *Committed versus Proposed Projects*). Further, the experience of the past few years has been that several major developers have fallen behind their intended production schedules. Lastly, recent increases in long-term interest rates may affect the ability of residential product to be



sold over the next few years, causing a further extension of project schedules.

Based on the above assessment of timing, an estimate of 15 percent slippage in project build-out schedules has been assumed. This assumption is reflected as a deduction from additions to supply expected in the year 2010 based on habitual delays in actual development as compared to the schedules reported by developers. This deduction for timing is further supported by Exhibit V-9 which indicates that nearly four out of every five the units reflected in the additions to supply is considered "proposed" as opposed to "committed."

**(b) Adjustment for Non-Resident                      (1,470) units  
Occupancy**

Two of the major projects within the study area have been planned as both resort and residential communities -- Ko Olina and Ewa Marina. As a part of this analysis property managers at similar projects were interviewed. They indicated that over time residentially-zoned units near resorts are prone to be removed from local-serving residential supply for at least two reasons:

- (1) Units are purchased by non-residents and left vacant, and/or
- (2) "Residential" units are absorbed by visitors via long-term rentals and therefore are unavailable to local residents. In one situation, a source estimated that over time at least 80 percent of residential units in resort communities no longer serve the local market after the first two to three years.

Based on the foregoing assessments, an adjustment of 20 percent or 1,470 future units planned for the resort-oriented communities of Ewa Marina and Ko Olina has been assumed. This deduction from future supply is used to reflect the absorption of units by non-residents. This appears to be conservative, based on interviews with property managers indicating up to 80 percent of units being effectively removed

**East Kapolei Project  
Market Assessment**

from local residential supply due to non-resident occupancy in comparable situations.

**(5) Calculation of Supply**

Total adjusted supply for the market study area is estimated at 44,452 units by 2010, including 16,891 existing units. Exhibit V-10, *Calculation of Supply, 1994-2010*, summarizes the foregoing discussion.

**Exhibit V-10  
East Kapolei Project**

**Calculation of Supply  
1994 - 2010**

	Units	Notes
Existing Housing Inventory - Study Area	16,891	Refer to Step 2; Exhibit V-5
Additions to Future Supply	34,154	Refer to Step 3; Exhibit V-6
Deduction for Timing of Additions to Future Supply (15%)	-5,123	Refer to Step 4(a)
Deduction for Non-Resident Occupancy	-1,470	Refer to Step 4(b)
<b>Adjusted Supply for the Year 2010 - Market Study Area</b>	<b>44,452</b>	

**SUPPLY AND DEMAND CALCULATION**

Exhibit V-11, *Supply and Demand Summary*, presents the estimated supply and demand relationship for the market study area.

Based on these calculations it would appear that adequate demand would exist for residential development on the subject property. These conclusions were confirmed by interviews in the local community and with developers and real estate agents active in the Oahu residential market.

**East Kapolei Project  
Market Assessment**

**Exhibit V-11  
East Kapolei Project**

**Supply and Demand Summary**

	Low	Midpoint	High	
<b>Demand Calculation</b>				
1 Unadjusted Study Area Demand	52,661	55,068	57,474	Refer to Exhibit V-3
2 Adjustment for University of Hawaii at W. Oahu	300	300	300	Refer to Exhibit V-3
3 Total Adjusted Demand - Market Study Area	52,961	55,368	57,774	Includes 16,891 existing units
<b>Supply Calculation</b>				
4 Existing Inventory - Study Area	16,891	16,891	16,891	Refer to Exhibit V-5
5 Additions to future supply	34,154	34,154	34,154	Refer to Exhibit V-6
6 Deduction for Timing of Additions to Future Supply (15%)	-5,123	-5,123	-5,123	Consultant estimate
7 Deduction for Non-Resident Occupancy	-1,470	-1,470	-1,470	Consultant estimate (applies only to Ewa Marina and Ko Olina)
8 Adjusted Supply for the Year 2010 - Market Study Area	44,452	44,452	44,452	Includes existing units (Line 4)
<b>Conclusions</b>				
9 Total Market Study Area Demand (1994-2010)	52,961	55,368	57,774	Line 3
10 Total Market Study Area Supply (1994-2010)	44,452	44,452	44,452	Line 8
11 Estimated Shortfall - Market Study Area (1994-2010)	8,509	10,916	13,322	Line 3 less Line 8
12 Additional demand - Market Study Area (1994-2010)	36,070	38,477	40,883	Total demand (Line 3) less existing (Line 4)
13 Additional demand - Ewa Development Plan Area Only (1994-2010)	28,856	30,782	32,706	Excludes Royal Kunia, Waikele and existing units

## MARKET POSITION

### Product Survey

The first step in determining the potential market performance of the subject property was to survey products in master planned communities offered for sale in the competitive study area. The projects were surveyed as a guideline for evaluating the product sizing, pricing and absorption proposed by the developer, Schuler Homes, Inc.

Once the existing products were identified and surveyed, a list of comparable products was prepared for the proposed East Kapolei Project. These comparables served as guidelines for potential products which could be developed in the subject project's subdivisions and indicators of their potential performance.

Exhibit V-12, *Existing Residential Products, 1994* on the following page provides an overview of subdivisions which are currently active or have recently been completed within the market study area.

East Kapolei Project  
Market Assessment

**Exhibit V-12, East Kapolei Project, Existing Residential Products, 1994**

Master Planned Community Subdivision	Developer	Area	Type	Number	Monthly Absorp.*	Living Area (sq ft)			\$(1000s)		
						Min	Max	Avg	Min	Max	Avg
Ewa by Gentry		Ewa	SFD	184	13	945	1671	1308	259	310	285
Sun Terra on the Park (market)	Gentry	Ewa	SFD	72	18	945	1671	1308	259	310	285
Sun Terra South (market)	Gentry	Ewa	SFD	305 (R)	N/A	1055	1648	1352	245	295	270
Summerhill (gap) <sup>1</sup>	Gentry	Ewa	SFD	138	Lottery	407	710	559	90	150	120
Coronado (affordable) <sup>2</sup>	Gentry	Ewa	SFA	699	31						
Currently offered - total project											
Villages of Kapolei		Ewa	SFD	327	11	1730	2248	1989	280	350	315
Malanai (market)	HFDC	Ewa	SFA	88	Lottery	1118	1266	1192	96	130	113
Malanai Iki (affordable)	HFDC	Ewa	SFA/D	472	32	915	1510	1213	270	282	276
Kekuilani (market)	HFDC	Ewa	SFA/D	472	Lottery	800	1800	1300	99	177	138
Kekuilani (affordable)	HFDC	Ewa	SFA/D	120	12	1118	1430	1274	275	398	337
Aiehoa market	HFDC	Ewa	SFD	203	Lottery				190	230	210
Aiehoa affordable	HFDC	Ewa	SFA/D	1682	55						
Currently offered - total project											
West Loch		Ewa	SFD	43	7	1420	2072	1746	388	438	413
Fairway Masters	Zane	Ewa	SFD	43	7						
Currently offered - total project											
Makakilo		Ewa	SFD	96	10	1394	1787	1591	326	393	360
West Hills	Fin. Realty	Ewa	SFD	48	1	1370	1818	1594	376	404	390
Royal Ridge	Fin. Realty	Ewa	SFD	148	12	750	980	865	183	212	198
Westview	Schuler	Ewa	SFA	292	23						
Currently offered - total project											
Royal Kunia		Central	SFD	146	146(R)	800	2051	1426	250	400	325
Phase I - SFD	CCHH	Central	SFA	248	lottery	770	1000	885	183	205	194
Phase I - SFA (affordable)	CCHH	Central	SFA	394	N/A						
Currently offered - total project											
Waikale		Central	SFA	204	20	796	918	857	229	239	234
ParkGlen	Schuler	Central	SFA	118	26	829	965	897	198	244	221
Highlands	Schuler	Central	SFA	126	24	1183	1664	1425	309	325	317
Royal Pines	Schuler	Central	SFD	67	20	1329	1663	1496	356	437	397
Signature	Schuler	Central	SFD	117	9	1336	1664	1500	355	445	400
Champions	Schuler	Central	SFD	632	99						
Currently offered - total project											

SFA= single family attached; SFD= single family detached; CCH = Castle & Cooke Homes Hawaii; Fin. Realty= Finance Realty  
HFDC=Housing Finance and Development Corporation; R=reservations; \* based on realtor interviews  
<sup>1</sup> Summerhill has been on the market for two months and all units are reserved; <sup>2</sup> Excludes an additional 118 affordable rental units

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### Profile of Target Markets

As part of this analysis, a written survey regarding target markets was conducted among real estate agents currently selling residential products within the market study area. Based on information provided by the developer concerning the range of products to be offered at the subject property, the target markets for the proposed project are expected to be as shown in Exhibit V-13, *Profile of Target Markets*:

**Exhibit V-13**  
**East Kapolei Project**

**Profile of Target Markets**

Residential Product	Age Range	Ownership History
Multifamily	All	First time
Affordable	25-45	First time and move up
Gap	25-45	Move up
Market		
Single Family	30-40	Move up

### Residential Pricing Overview

The proposed community is anticipated to be developed in conformance with draft guidelines for development agreements between the City and County of Honolulu and residential developers. These draft *Rules for Unilateral Agreements Requiring Affordable Housing* are dated August 1994 by the Department of Housing and Community Development. They currently provide for 30 percent of a development's housing component to be affordable and the remainder to be offered at market rates.

Prices for affordable and market-priced homes within the subject property were calculated by the East Kapolei Project's developer, Schuler Homes, Inc. Based on a comparison with

prices in competitive communities, they appear to be reasonable.

### **Affordable Product Pricing**

For the purpose of this analysis, affordable residential product is defined as those new homes which are priced to meet the financial qualifications of families whose incomes are up to 120 percent of the Oahu median, which in 1994 is assumed to be \$53,000 for a family of four.

**Divisions within the Affordable Category.** In order to comply with City and County's draft unilateral agreement guidelines, the project's developer will make two divisions within the affordable product in the proposed development.

*Ten percent* of the development's product will be priced for families with income levels up to 80 percent of Oahu's median.

*An additional twenty percent* of the product will be priced to accommodate families in the 81-120 percent of median income brackets.

**Pricing Assumptions.** Draft pricing assumptions for unilateral agreements entered into by the City and County include:

1. A ten percent down payment.
2. Interest rate: one-year average of thirty-year U.S. Treasury bills plus one-half percent (currently calculated at 7.5 percent using this guideline).
3. If the developer secures lower interest rates than the above, the developer must adjust prices accordingly.
4. Thirty-three percent (33%) of the purchaser's gross monthly income allocated for housing payments (principal, interest, real property taxes, insurance, etc.).

**East Kapolei Project  
Market Assessment**

(Source: Summary, Unilateral Agreements: Affordable Housing Rules [Draft], City and County of Honolulu, August 1994)

The developer's pricing is slightly more conservative. In addition to the above guidelines, Schuler Homes, Inc. has provided for an allowance of \$200 per month above the 33 percent of income requirement. This extra allowance could be used to cover maintenance or community association dues for multifamily units. A minimum of two bedrooms per unit is also assumed by the developer for the affordable product.

Exhibit V-14, *Affordable Pricing Structure* shows the developer's assumed pricing of affordable product based on the guidelines discussed above for the East Kapolei Project. Prices are presented in 1994 dollars.

**Exhibit V-14  
East Kapolei Project**

**Affordable Pricing Structure**

Family Size		2	3	4	5	6	7	8
Percent of Median Annual Income	80%	\$33,920	\$38,160	\$42,400	\$45,792	\$49,184	\$52,576	\$55,968
	Home Prices	\$116,448	\$134,977	\$153,506	\$168,329	\$183,152	\$197,975	\$212,798
Percent of Median Annual Income	100%	\$42,400	\$47,700	\$53,000	\$57,240	\$61,480	\$65,720	\$69,960
	Home Prices	\$153,506	\$176,666	\$199,827	\$218,356	\$236,885	\$255,414	\$273,942
Percent of Median Annual Income	120%	\$50,880	\$57,240	\$63,600	\$68,688	\$73,776	\$78,864	\$83,952
	Home Prices	\$190,563	\$218,356	\$246,149	\$268,384	\$290,618	\$312,853	\$335,087
Source: Schuler Homes, Inc. Assumes mortgage rate of 7.5%								

**Market-Priced Product Pricing**

Four types of market-priced residential units are planned for the subject property:

- *Single family homes* with an average of 1,500 square feet of living area, an average price of \$285,000 and average density of 7 units per acre.



- *Townhomes* with an average of 1,200 square feet, an average price of \$235,000 and density of 11 units per acre.
- *Low density multifamily homes* with 800-900 square feet, at \$208,000 and constructed at a density of 15 units per acre.
- *Medium density multifamily homes* with 800 square feet, at \$185,000 and density of 20 units per acre.

These products are included for illustrative purposes; actual products developed could vary significantly. These variances could be caused by a change in consumer style preferences and/or unforeseeable changes in the economic, market and financial conditions in the market area. All prices are expressed in 1994 dollars with no adjustment for inflation.

## ABSORPTION

Once the product types and target markets were identified for each of the neighborhood areas, a potential absorption schedule was prepared using the following assumptions:

- At least four different residential product types would be active at a time.
- As each product type is built out it would be replaced with a similar product.

The schedule for Phases I and II has been provided by the developer, Schuler Homes, Inc. The hypothetical absorption was based on both quantitative and qualitative factors presented in the following sections.

**Quantitative factors.** Analysis of potential absorption considered:

- Research of products which have been on the market for extended periods including Ewa developments presented above in Exhibit V-11;
- A cross-check of the overall sales rates of comparable master planned communities for the past six years obtained from Prudential Locations, Inc.; and
- Historical Oahu sales and construction performance of the subject project's developer, Schuler Homes, Inc.
- The build up and decline of sales velocity at the beginning and end of phases within a master planned community.

**Qualitative Factors.** Exhibit V-15, *Qualitative Evaluation*, provides an overall ranking of the East Kapolei Project vis-a-vis competitive developments. Factors evaluated include access to the property, views, neighborhood ambiance, on-site amenities and the diversity of home design choices offered.

**East Kapolei Project  
Market Assessment**

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**Exhibit V-15  
East Kapolei Project**

**Qualitative Evaluation: East Kapolei Project vs. Competitive Master  
Planned Communities**

<b>Community</b>	<b>Access</b>	<b>Views</b>	<b>Neighborhood</b>	<b>Amenities</b>	<b>Design Choices</b>	<b>Overall Ranking</b>
Ewa by Gentry	Similar	Similar	Slightly superior	Similar	Inferior	Slightly inferior
Makakilo	Inferior	Far superior	Similar	Similar	Slightly superior	Similar
Royal Kunia	Superior	Superior	Similar	Superior	Superior	Superior
Villages of Kapolei	Slightly superior	Similar	Slightly superior	Superior	Similar	Slightly superior
Waialeale	Superior	Superior	Superior	Far superior	Similar	Superior
West Loch	Similar	Superior	Similar	Slightly superior	Similar	Slightly superior

**Comparison to Ewa projects.** The subject development is likely to compare with other Ewa-area master planned communities as follows:

- The Ewa by Gentry project is expected to be particularly competitive with the proposed development. This assessment is based on its similarity to the subject parcel in terms of location, topography, climate and target markets. However, based on the previous analysis, the subject development may sell at a slight premium vis-a-vis the Ewa by Gentry project based on the greater diversity of product expected within the subject development.

- The Villages of Kapolei project also resembles the proposed development by virtue of its affordable component and diversity of product types. It is expected to offer similar retail amenities, but its golf course could cause the Villages of Kapolei to sell at a slight premium vis-a-vis the subject development.
- Additional competition is expected from single family and multifamily components of the Makakilo development. This development is qualitatively ranked "similar" to the East Kapolei Project.
- Although it is still actively selling, West Loch Estates is planned to be built-out before the subject property could commence.

**Comparison to Waikele and Royal Kunia.** The Central Oahu community of Waikele is likely to continue to outsell all current competitors within the market study area. It also is likely to outsell the subject property in the future. This is due to its favorable location, topography, views and exceptional amenities, including the Waikele Power Center retail complex and golf course.

Royal Kunia is likely to sell at a premium vis-a-vis the subject as well. This is due to its topography, climate, access to H-1 freeway, views and on-site amenities.

### **Hypothetical Absorption Schedule**

Exhibit V-16, *Hypothetical Absorption Schedule*, presents an absorption schedule based on the timing and absorption assumptions discussed above. Several caveats must be presented with regard to the hypothetical absorption schedule:

- The schedule represents only one of many potential scenarios which could actually occur.

**East Kapolei Project  
Market Assessment**

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- The actual schedule may differ significantly based on future market or financial conditions.
- The hypothetical absorption schedule reflects only market-related factors and does not account for soil conditions, financial optimization or engineering factors.

The schedule which follows is intended to reflect the build up and decline of absorption during the beginning and end of phases. This cycle of activity is typical in the construction of master planned communities.

**Exhibit V-16  
East Kapolei Project**

**Hypothetical Absorption Schedule**

Product Type - Target Market	Density (units/ac)	Number of Units	Avg Price (\$000)	Absorp per mo'	Absorp per yr	2004 Total															2011 Total		
						1997 Yr1	1998 Yr2	1999 Yr3	2000 Yr4	2001 Yr5	2002 Yr6	2003 Yr7	2004 Yr8	2005					2006				
Single Family - Market	7	2,590	\$285,000	13	156	120	195	195	195	195	195	195	5	1295	115	195	195	195	195	195	205	1295	
Townhome - Market	11	1,810	\$235,000	9	108	75	135	135	135	135	135	20	905	95	135	135	135	135	135	135	135	135	905
Low Density - Market	15	2,400	\$208,000	25	300	90	180	180	180	180	180	30	1200	120	180	180	180	180	180	180	180	180	1200
Medium Density - Market	20	200	\$185,000	2	24	5	15	15	15	15	15	5	100	20	15	15	15	15	15	15	5	100	
Medium Density - Affordable	20	1,000	\$133,000	3	36	35	75	75	75	75	75	15	500	50	75	75	75	75	75	75	75	75	500
Up to 80% of median	20	2,000	\$175,000	6	72	75	150	150	150	150	150	25	1000	100	150	150	150	150	150	150	150	150	1000
Up to 120% of median		10,000			400	750	750	750	750	750	750	100	5000	500	750	750	750	750	750	750	750	750	5000

<sup>1</sup> average monthly absorption = total per product/96 mo. in phase I

## RESIDENTIAL CONCLUSION

**Average Annual Absorption.** Based on the estimated 15-year sell out of the 10,000 residential units in the proposed development (which includes 9,250 units before 2010), an average annual absorption rate of between 600 and 700 units appears to be reasonable. This estimate compares favorably with the experience of other communities and with the developer's assessment of annual sales potential.

**Anticipated Capture Rates - Market Study Area.** In order to assess the subject development's potential to capture future residential demand, a comparative analysis was conducted using five-year sales performance of comparable master planned communities within the market study area (raw data source: Prudential Locations, Inc.). Projects included in this analysis included Ewa by Gentry, Makakilo, Waikele and West Loch Estates. The results of this investigation showed average project capture rates during active sales periods ranging from approximately 15 percent of new home sales within the market study area to approximately 44 percent.

The subject property's estimated capture rates for future housing demand in the market study area are estimated to range between 20 and 30 percent per year. Based on the capture rates of comparable developments (15 to 44 percent), the range of capture rates assumed for the proposed development appears to be conservative.

As shown below in Exhibit V-17, *Capture Rates for Future Demand*, a capture rate of 25% of the market study area would indicate sales of 9,510 units at the midpoint of population projections. This compares favorably to the 9,250 units proposed within the subject property by the year 2010.

**Exhibit V-17**  
**East Kapolei Project, Capture Rates of Future Demand**

	Low Point	Midpoint	High Point
Study area future demand (market study area demand less existing supply)	36,070	38,477	40,883
Study area capture rate @ 20%	7,214	7,695	8,177
Study area capture rate @ 25%	9,018	9,619	10,221
Study area capture rate @ 30%	10,821	11,543	12,265

**East Kapolei Project  
Market Assessment**

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**Anticipated Capture Rates - Total Oahu Demand.** The estimated capture rate for the subject property falls within the 12 to 14 percent range of the total Oahu demand for new housing units in 2010.



**Section VI**  
**RETAIL**

## **Section VI**

### **RETAIL**

#### **INTRODUCTION**

Projects of the size proposed for the subject property often require a retail component. The current draft site plan provides for the location of several retail uses within the proposed community. (To view this map, see Exhibit III-1, *East Kapolei Project - Location Map* located on page III-3.)

**Organization of this Section.** This section defines the retail trade area for potential neighborhood retail services located on the subject property. Further, it reviews current and future supply and demand conditions and outlines in general terms the possible retail tenants which could be located in retail facilities should they be developed on the subject property.

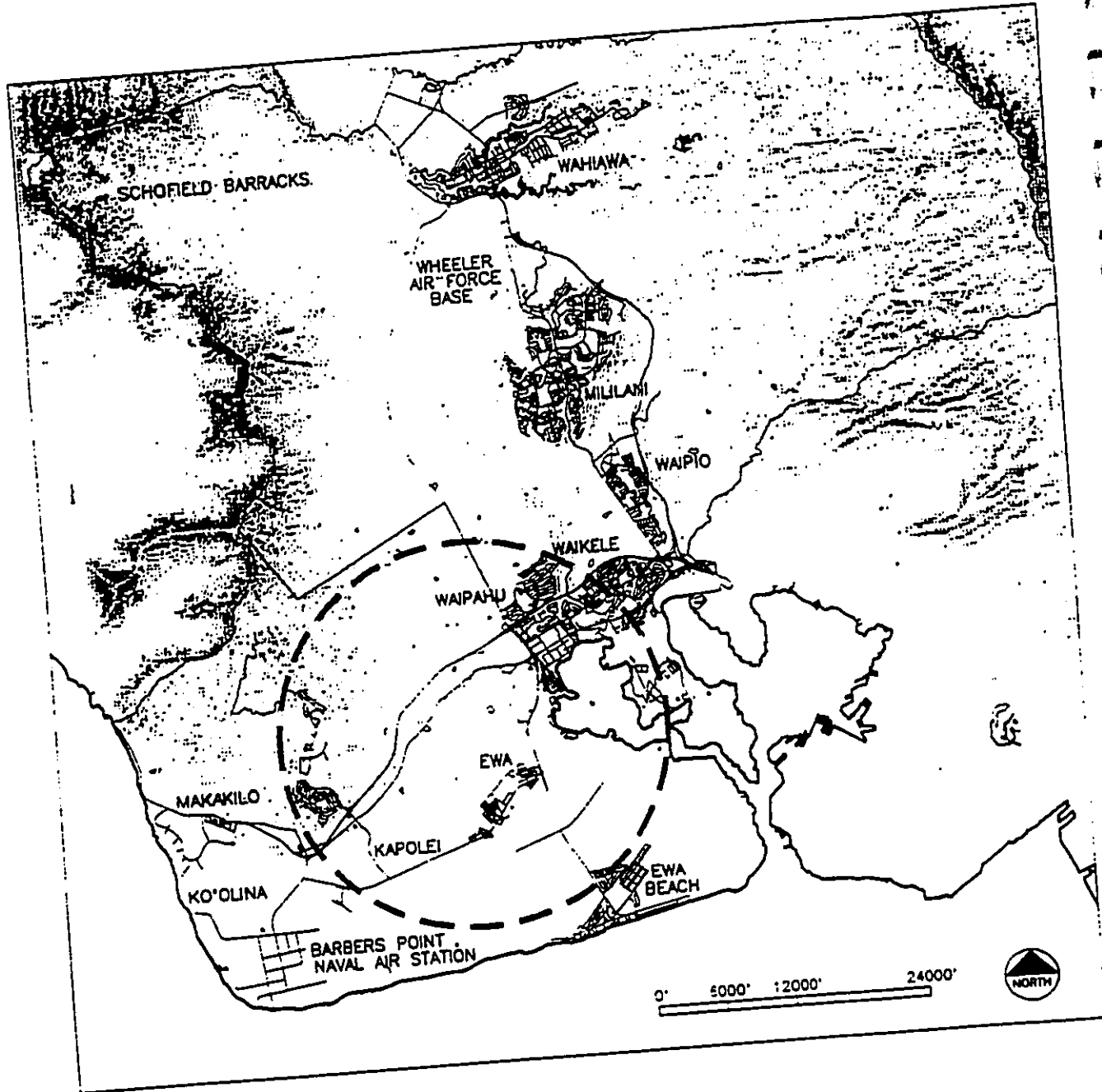
#### **RETAIL TRADE AREA DEFINITION**

The trade area for neighborhood commercial uses proposed for the subject property was defined as a three-mile radius from the center of the parcel. Exhibit VI-1, *East Kapolei Project: Retail Trade Area* illustrates this area. It includes all or a part of the following communities:

- Ewa Villages
- Ewa by Gentry
- Royal Kunia
- Villages of Kapolei
- West Loch Estates
- Naval Air Station, Barbers Point (NASBP) (portion)
- Makakilo (portion)
- City of Kapolei (portion)

Although only portions of West Loch, NASBP, Makakilo and the City of Kapolei are considered within the trade area, all proposed housing units for those areas were included in the analysis.

Exhibit VI-1  
East Kapolei Project: Retail Trade Area



## METHODOLOGY

The calculation of the need for support retail on the subject parcel is based on an analysis of the market forces of supply and demand. The analysis focuses purely on need for additional retail which is created by new housing.

- **Supply.** Estimation of supply is based on the existing and planned neighborhood shopping centers within the retail trade area. Existing supply is described for informational purposes.
- **Demand.** Future demand for neighborhood retail facilities within the subject parcel is based on growth in population within the retail trade area. It assumes that the existing population currently is having its needs met.

## SUPPLY

### Current Retail Supply

The existing supply of retail space within the defined trade area is quite limited, since its three-mile radius is largely undeveloped agricultural land or in residential use. The following retail establishments are currently doing business within the designated retail trade area and are presented for informational purposes:

- *The recently opened Kapolei Shopping Center, Phase I.* This center is located on the southern fringe of the retail trade area. This phase totals 140,000 square feet on 18.5 acres according to staff of The Estate of James Campbell.
- *The Ewa Villages neighborhood.* This older residential area has a few "mom and pop" convenience stores but no significant commercial area.
- *The town of Waipahu.* This area contains a mixture of commercial uses. Retail commercial in Waipahu which is

not associated with shopping center activity was excluded from relevant supply for the purpose of this analysis, as it is dissimilar to other competition. Only the expansion of the Waipahu Town Center was included in the estimate of future supply.

- *Makakilo strip center.* Currently there is limited retail for the convenience of local residents.

### **Additions to Retail Supply**

Exhibit VI-2, *Existing and Future Retail Supply - Trade Area* provides a summary of the additional retail planned within the subject property's trade area. The existing projects are included as an illustration of the limited retail supply currently within the trade area.

**East Kapolei Project  
Market Assessment**

**Exhibit VI-2  
East Kapolei Project**

**Existing and Future Retail Supply - Retail Trade Area**

Shopping Center	Square Feet	Acres
<b>Existing Supply (selected)</b>		
Kapolei Shopping Center Phase I	140,000	18.5 (given)
Waipahu Town Center	160,000	11 (given)
<b>Future Supply</b>		
Kapolei Shopping Center Phase II	100,000	11.0 (given)
Kapolei Power Center Phase I	150,000 <sup>1</sup>	12.5 <sup>1</sup> (given)
Phase II	75,000 <sup>1</sup>	6.9 <sup>1</sup> (derived)
Kapolei Entertainment Center Restaurant Pads	12,000	1.5 acres <sup>2</sup> (estimate)
Villages of Kapolei	Unknown	15 (estimate)
Laulani Retail Center	150,000	20 (given)
Commercial proposed by The Estate of James Campbell	230,000	27 acres <sup>3</sup> (given)
Additional Ewa by Gentry Commercial (tentative)	50,000	4.6 (derived)
Waipahu Town Center Expansion	80,000 <sup>4</sup> (given)	7.3 (derived)
Royal Kunia (Walmart and Times)	165,000 (derived)	15 acres (given)
<b>Total Future Supply in Acres (Retail Trade Area)</b>		<b>121</b>
<p>Sources for "given": The Estate of James Campbell, Waipahu Town Center, Royal Kunia. "Derived" consultant estimates based on a lot coverage ratio of 0.25 and 43,560 square feet per acre; <sup>1</sup>Indicates that actual has been discounted by 50 percent due to lack of direct competitiveness to subject retail; <sup>2</sup>Total parcel is 8 acres. 1.5 acres represent three restaurant pads which are considered competitive with retail on the subject parcel. <sup>3</sup> Total parcel is 27 acres adjacent to subject parcel on Farrington Highway. <sup>4</sup>Waipahu Town Center will not actually expand its acreage, but the 80,000 square feet of retail would capture demand. For this reason, it was converted into an estimate of relative acreage based on the calculation described above.</p>		

## **DEMAND**

Demand for retail facilities located on the subject property will be a function of population growth and household formation which are translated into neighborhood shopping needs. Demand will be created by:

- Housing within the proposed development;
- Construction of the university campus across the North South Road from the project site; and
- Expansion of existing master planned communities within the retail trade area (particularly Ewa by Gentry, Villages of Kapolei, Ewa Villages and West Loch).

An estimation of the additional population expected within the trade area is shown in Exhibit VI-3, *Calculation of Additional Population to be Served*. This analysis indicates that approximately 107,000 additional persons will need to be served within the retail trade area by the year 2010.

Exhibit VI-3  
East Kapolei Project

Calculation of Additional Population to be Served

Housing Units	1995	2,000	2,005	2,010
City of Kapolei - Makai		500	1,000	500
City of Kapolei - Mauka		250	500	
Ewa by Gentry	1,069	4,050		
Ewa Villages	113	1,603		
Ewa Fairways		360	720	220
Kapolei Knolls		380		
Makakilo	102	1,096	499	
	136	199		
	172	230		
NASBP	120			
Royal Kunia - Ph 1	350	1,398		
Royal Kunia - Ph 2		1,400	600	
Villages of Kapolei	993	2,211	949	
West Loch	175	1,200	3,000	3,000
Subject	0	2,650	2,850	3,750
Total	3,230	17,527	10,118	7,470
Cumulative Residential Units	3,230	20,757	30,875	38,345
Population (units x household size of 2.8)	9,044	58,120	86,450	107,366

**Calculation of Future Demand for Neighborhood  
Retail**

The methodology shown in Exhibit VI-4, *Calculation of Future Demand*, was utilized to estimate demand for neighborhood commercial facilities within the retail trade area by the year 2010.



**East Kapolei Project  
Market Assessment**

**Exhibit VI-4  
East Kapolei Project**

**Calculation of Future Demand**

	1995	2000	2005	2010
<b>Step 1: Additions to population of retail trade area</b> Method: multiply additional future units by household size of 2.8 to estimate population for the years 1995, 2000, 2005 and 2010 Source for population: Exhibit VI-3	9,044	58,120	86,450	107,366
<b>Step 2: Total sales for the retail trade area</b> Method: multiply the population in Step 1 by a factor of dollars spent per person (\$11,463.24). Dollar estimate is based on a ratio of total 1992 retail sales by 1992 population of Oahu. Source of sales data: Urban Decision Systems, Inc. (UDS), 1992	100,446,101	645,498,363	960,146,551	1,192,447,595
<b>Step 3: Total neighborhood retail sales in trade area</b> Method: multiply total sales in Step 2 by the proportion of neighborhood-type retail sales to total sales. The percentage of neighborhood-type sales is then increased over time from a rural factor of 15% to a more urban factor of 30% to reflect urbanizing character of the retail trade area over time. Source of neighborhood to total sales: UDS	0.15	0.20	0.25	0.30
	15,066,915	129,099,673	240,036,638	357,734,279
<b>Step 4: Supportable rural shopping center area (square feet)</b> Method: divide the sales in Step 3 by a rule-of-thumb factor of \$200 per square foot of sales.	75,335	645,498	1,200,183	1,788,671
<b>Step 5: Acreage needed for neighborhood commercial in retail trade area</b> Method: Divide the supportable square feet in Step 4 by a lot coverage factor of 0.25 and divide by 43,560 square feet per acre. 164 acres represents total new demand for neighborhood retail within the retail trade area by the year 2010	7	59	110	164

**SUPPLY AND DEMAND SUMMARY**

As shown in Exhibit VI-5, *Supply and Demand Calculation*, the supply/demand calculation resulted in the conclusion that approximately 43 acres of neighborhood commercial could be

**East Kapolei Project  
Market Assessment**

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supported within the retail trade area. This would translate into a need of approximately 468,300 square feet of additional neighborhood commercial space within the retail trade area (based on lot coverage ratio of 0.25).

**Exhibit VI-5  
Supply and Demand Calculation**

Calculation	Acres	Reference
Future Supply	121	Exhibit VI-2
Future Demand	164	Exhibit VI-4
Need/(oversupply)	43	

**MARKET POSITION**

**Design Type: Neighborhood Center.** It is expected that the commercial land uses on the subject property will be limited to neighborhood "support" retail, most likely a neighborhood shopping center. Such shopping centers typically include the following:

- Supermarkets
- Drug stores
- Restaurants and/or bars
- Apparel shops
- Dry cleaners

Additional retail outlets serving the needs of university faculty and students should also be viable. Such uses could include bookstores, photocopiers and coffee shops.

**Deed Restriction.** A deed restriction in the land exchange and purchase agreements entered into by Schuler Homes, Inc. and The Estate of James Campbell places a limit on commercial within the project area of two acres for every 1,000 residential units. This would mean that a total of twenty acres of

commercial acreage could be developed on the subject property.

- At a lot coverage ratio of 0.25, a neighborhood shopping center of approximately 218,000 square feet could be developed by 2010.
- As shown by the analysis above, the estimate of demand for an additional 468,300 square feet within the retail trade area is in well excess of this number.

**Timing.** Absorption of retail space on the subject property is assumed to be through the sale of a parcel to an unrelated developer. This sale would be expected to take place at the end of the project's development period, circa 2010.

## **RETAIL CONCLUSION**

The proposed development appears to be well positioned to serve a variety of community retail needs. Tenants drawn to the subject property will primarily provide goods and services for its residents through neighborhood shopping center facilities to be developed at the end of the project's expected build-out in 2010-2011.

**Appendix A**  
**COMPETITIVE PRODUCT**

## Appendix A

### COMPETITIVE PRODUCT

The following are descriptions of the history and current status of major competitive projects within the market study area and including over 1,000 units. Information is presented in the following order:

Description	Page
1. <i>The City of Kapolei</i>	A-1
2. <i>Ewa by Gentry</i>	A-2
3. <i>Ewa Marina</i>	A-3
4. <i>Ewa Villages</i>	A-4
5. <i>Ko Olina</i>	A-6
6. <i>Makakilo</i>	A-7
7. <i>Makaiwa Hills</i>	A-8
8. <i>Royal Kunia</i>	A-9
9. <i>Villages of Kapolei</i>	A-10
10. <i>Waikele</i>	A-12

#### The City of Kapolei

The City of Kapolei is part of a phased commercial development plan that is planned to include seven million square feet of office, government, commercial and light industrial space. The City is intended to be a self-contained community that will provide a living as well as working environment for its residents.

Phase I: A total of 135 acres has been rezoned to B-2 Community Business District for the development of the City of Kapolei. The 135 acres involved two petitions to re-zone: Ordinance 90-30 (92.7 acres) and Ordinance 91-65 (42.3 acres). The State Boundary Amendment for the 135-acre site was approved in 1988.

**Phase II:** The State Land Use Commission approved urbanization of the remaining 586 acres in the City of Kapolei in June 1993.

Source: City and County of Honolulu, Department of Land Utilization, Director's Report File 85/Z-21, Developer Interview (The Estate of James Campbell)

### **Ewa by Gentry**

Ewa by Gentry is located three and one-half miles south of the H-1 freeway along Fort Weaver Road. This master planned community will encompass 1,005 acres for a total of 8,300 dwelling units. Residential construction began in 1988 with the Soda Creek project. At the time of the 1994 Development Plan Annual Report, an estimated 3,000 units had been completed. An additional 5,000 units is expected by the year 2000.

The master plan for the community of Ewa by Gentry includes an 18-hole golf course, an elementary school, two community parks and a neighborhood commercial center. This community includes both single- and multi-family homes, at affordable and market prices. The basic infrastructure necessary to sustain ongoing and future residential development has been constructed by the developer.

The project has received zone changes incrementally since 1985. Stipulations for affordable housing have varied, depending on the timing of the request for zone change. These requirements are outlined below.

*Ordinance 84-94, 225 acres are rezoned, 2,465 units proposed:*

- 10 percent at or below 80 percent of median income housing.

*Ordinance 91-17, 224 acres rezoned, 2,835 units proposed:*

- 10 percent at or below the 80 percent of median income housing;
- 20 percent at 80 to 120 percent of median income; and
- 30 percent at the 120 to 140 percent of median income range.

*Ordinance 93-54, 11 acres rezoned, 322 units proposed:*

- 10 percent at or below 80 percent of median income housing.

*Ordinance 94-57, 486 acres rezoned, 1,480 units proposed:*

- 10 percent at or below 80 percent of median income housing;  
and
- 20 percent at 80 to 120 percent of median income.

Sources: City and County of Honolulu, 1993 Development Plan Review;  
Department of Land Utilization, Director's Report File 93/Z-10

### **Ewa Marina**

The Ewa Marina project is located in Ewa Beach and is accessible from H-1 via Fort Weaver Road. This 1,100-acre site has been master-planned as a mixed-use marina community. The project will have one mile of ocean frontage in the vicinity of the 30-acre Oneula Beach Park and includes plans for a 1,400-slip marina.

The Ewa Marina master plan calls for 4,850 residential units, 950 visitor units, specialty hotels, a 27-hole golf course, a health and fitness center, and a community-scale commercial project at the marina. Haseko (Ewa), Inc. is the developer.

The entire 1,100-acre site was designated for urban use by the City and County of Honolulu in 1993 and the State Land Use Commission in 1993. Final government approvals for the marina (Special Management Area and Conservation District Use permits) are pending. Upon substantial completion of the marina, residential construction is anticipated to begin. Full build-out is anticipated to require fifteen years.

The 1,100 acre project will be developed in two phases, with an estimated 2,000 units expected for completion by the end of the decade.

**Phase I** of the Ewa Marina project consists of an area containing approximately 707 acres, located between the Ewa Beach community and the Barbers Point Naval Air Station. It is planned to contain a mixture of uses, including residential, low

density apartment, medium density apartment, commercial, public facility (including the marina), park, and preservation (waterway and flood control areas). Stipulations on the residential units sold require that:

- 10 percent of the units sold or rented at 80 percent of the median income; and
- 20 percent of the units sold or rented at 80 to 120 percent of the median income.

**Phase II** is planned to consist of approximately 403 acres which includes a mixture of park/golf course, commercial-industrial mixed use and park uses. The 27-hole golf course with clubhouse and maintenance facilities is located on approximately 272 acres of land between Naval Air Station Barbers Point and Fort Weaver Road. The golf course will be integrated into the Ewa Marina residential community and will serve as a part of the Kalo drainage system. Phase II also includes a mixed use commercial job center and visitor complex on approximately 114 acres of land between the golf course and the marina. This mixed use complex is planned to include 950 visitor accommodation and apartment units to complement the marina. A 17-acre gateway park will also be provided as a part of Ewa Marina Phase II.

Sources: City and County of Honolulu, Department of Land Utilization, Director's Report; Interview with developer (Haseko Hawaii).

### **Ewa Villages**

The Ewa Villages area is an existing cluster of neighborhoods including Ewa, Renton, Fernandes and Tenney Villages. Access to the existing villages is through Fort Weaver Road to the east. Access to H-1 is through the Fort Weaver Road interchange.

The City and County of Honolulu, through its Department of Housing and Community Development (DHCD), has adopted plans for both revitalization and further development of the existing Ewa Villages. An 18-hole municipal golf course is



nearly complete, and will be followed by additional uses, including:

- Revitalization of 273 existing homes;
- 957 additional residential units;
- Expansion of Ewa Elementary School;
- A district park;
- Commercial/retail center;
- Church parcels; and
- A business park.

This master-planned community is primarily a revitalization project, sponsored by the City and County of Honolulu, Department of Housing and Community Development. This effort began in the late 1970s, when Fernandez Village was identified by the City and County for revitalization.

The project will encompass a total of 600 acres at build-out. Of that, 242 acres will be residential and 350 acres will be for other uses. These uses include a 225-acre, 18-hole golf course (drainage), a 25-acre park, a school, etc. Development of this community has been expedited through the 201E application process.

There will be approximately 1,600 dwelling units total, of which 277 are existing and will be rehabilitated. (Some units may not be salvageable and will be destroyed.) Of these 1,600 units, 60% will be "affordable," sold at 120% or below the median income. Construction began in August 1994 for 113 affordable homes. Reservations for 283 market units are being accepted. Market units in the project will sell for approximately \$350,000 to \$450,000. Full build-out is expected to take until the end of the century.

Infrastructure for Tenney Village (the first project) is just starting. The existing infrastructure for this village will be upgraded to current standards. The main access route, Renton Road, will be expanded, and road construction is expected by December of 1995.

Source: Interview, City and County of Honolulu, Department of Housing and Community Development.

## **Ko Olina**

The Ko Olina development is accessible from the H-1 freeway. It is approximately 24 miles to the west of Honolulu. The project extends along 1.9 miles of shoreline in Ewa.

The developer, West Beach Estates, estimates that more than 8,700 condominium and single-family residences eventually will be built at Ko Olina. Final approval for the project was obtained from the City and County of Honolulu in 1986. Site work and infrastructure development began in March of 1987. Fully completed infrastructure includes facilities for sewers, water, drainage and streets.

The original proposals for Ko Olina included plans for two Phases:

**Phase I** of the Ko Olina Resort is master planned to be a 642-acre residential/resort community. The resort area along the shoreline is planned for just under 4,000 visitor units. Development projections also call for 5,200 housing units of which 3,700 units are intended to be medium density apartment units and 1,500 units low density units. Amenities include: four oceanfront sandy beach lagoons; a 170-acre, 18-hole golf course and clubhouse; a 450-slip marina; a Hawaiian cultural center; three public parks, which consist of two large beach parks and a community park; sites for a school, child care center, and fire station; beach and yacht clubs; tennis facilities; two commercial centers, including one theme shopping center; and several restaurants.

**Phase II** of the Ko Olina Resort project encompasses 372.6 acres of land. It is planned to include two additional 18-hole golf courses, commercial development in the eastern portion and a neighborhood park.

Stipulations for the development of the project required that 10% of the units to be sold to 80% or below the median income level.

To date, the project is far behind the original construction schedule. According to the Planning Department, additions to

the resort portion as well as residential construction have been delayed indefinitely. Although five hotel sites have been planned for and sold, only one is in operation -- the 387-room Ihilani luxury hotel and golf course. The planned beach lagoons are completed as well as the marina basin, but no piers have been built. At present reservations are being taken on a total of 280 condominium units. Prices range from \$220,000 to \$350,000.

Sources: City and County of Honolulu, Department of Land Utilization, Director's Report File 85/Z-3; Developer interview (West Beach Estates).

### **Makakilo**

This hillside community overlooks the Kapolei area. It is accessible from the H-1 freeway via Makakilo Drive. One of the Kapolei area's earliest residential developments, development of Makakilo began in the early 1960's. Today, there are more than 3,500 homes and a population of about 13,000. The development is more than 50 percent complete, with approximately 2,500 homes planned. Developer Finance Realty will continue Makakilo's development through the end of this decade, aiming at an eventual inventory of about 6,100 homes. Projects currently on the market include:

**Palehua Point:** There are 47 homesites available at Palehua Point from \$220,500 with home and lot packages starting at \$510,000.

**Makakilo Ridge:** There are 114 homesites and home and lot packages begin at \$197,000 to \$595,000.

**Royal Ridge:** Phase I of Makakilo's newest development, Royal Ridge, features 72 fee-simple, single family homes with prices starting at \$330,000.

**West Hills:** West Hills offers 66 house lots available for purchase.

**Westview at Makakilo Heights:** Schuler Homes, Inc. is building 500 townhomes, about 10 percent of which are in the affordable category (80% or below the median income). The

first phase was completed in late 1993, with 148 units priced between \$185,000 and \$215,000.

Sources: Estate of James Campbell "Fact Sheet"; Planning Department Interview; Developer interview (Finance Realty, Ltd.); Department of Land Utilization Director's Report 82/Z-6.

### **Makaiwa Hills**

On the hillside to the west of Makakilo lies Makaiwa Hills, a project of the Estate of James Campbell. The Development Plan Annual Report, Fiscal Year 1994 indicates a total of 1,066 units by 2010 in Makaiwa Hills. The Planning Department's Land Use Model indicates a projection of 2,130 units by 2010, a figure which was used in this market assessment. Land Use Commission records indicate state-level approval of 1,700 acres for the Makaiwa Hills project. The proposed development received Development Plan approval in 1993, (Ordinance 93-114) and but the zoning has yet to be authorized. Consequently, infrastructure improvements have not begun.

The project master plan includes a variety of residential unit types and price levels. In addition, an off-site affordable rental housing program is proposed. The affordable housing program would be built in advance of the on-site project market units. The units would consist of 250 units for families earning 50 to 80 percent of the median income. Overall, 700 to 900 off-site rental units are planned and offered at rental prices to families whose income range is between 50 to 140 percent of median income.

The Makaiwa Hills development also includes a regional mall, a public district park, and preservation areas in the gulches of the project area.

Sources: Development Plan Annual Amendment Review, 1993; Planning Department interview.

## **Royal Kunia**

This project is expected to be developed on 1,000 acres north of the Village Park community on lands currently planted in sugarcane. The project will be a golf-oriented community accessible from H-1 via Kunia Road.

To date, the City has designated over 1,000 acres for urban use in Royal Kunia Phases I and II -- including approximately 358 acres for residential and apartment use. The first phase of the Royal Kunia project received DP approval for 2,050 residential units in 1988. Construction of Phase I infrastructure is ongoing and the golf course is substantially completed. According to Kunia Residential Partners (developer of Phase I), 1,748 units are scheduled to be delivered in a projected five-year build out. Of the total 1,748 units, approximately 350 units are scheduled to be delivered by the end of 1995.

Several stipulations were imposed on this phase of the development. Provisions were made for 150 units for the under 80 percent of median income bracket; 20 percent of these units are to be reserved for the elderly. Of the project's total units, 50 percent are to be in the affordable range. The 50 percent affordable component consists of:

- 10 percent at 80 percent of median income housing;
- 20 percent at 80 to 120 percent of median income; and
- 20 percent at the 120 to 140 percent of median income range.

During fiscal year 1992 a portion of the second phase of the Royal Kunia received Development Plan approval. This consisted of an additional 1,000 units on approximately 400 acres of land.

In both the 1992 and 1993 Development Plan Annual Amendment Reviews, the applicant requested increased acreage to be redesignated. Each request, however, was denied. In the 1994 Development Plan Annual Amendment Review, the applicant again requested redesignation of

approximately 114 acres. The Planning Department has recommended denial of the proposed amendment.

Source: Development Plan Annual Amendment Review, 1994.

### **Villages of Kapolei**

The Villages of Kapolei is a master planned community located on the eastern edge of the new City of Kapolei; a portion of the proposed University of Hawaii West Oahu campus will be located to the east. The 890-acre site is accessible from H-1 via Fort Barrette Road and Farrington Highway.

This community is a public/private cooperative housing venture involving the state Housing Finance and Development Corporation (HFDC), Honolulu Department of Housing and Community Development, The Estate of James Campbell and numerous private developers. Under agreement with HFDC, 60 percent of the homes must sell at affordable rates, while 40 percent may be sold at market prices set by the developer.

The Villages of Kapolei project is a community consisting of eight 'villages' with a mix of affordable and market housing types. Mixes of housing include single family and multi-family for sale; assisted, elderly, and family rentals; and owner/builder self-help lots. In addition, the villages will provide several recreation centers; a community and neighborhood park; two or three church and day care sites; two elementary schools; one intermediate school; a neighborhood commercial area at the village center; and a golf course with clubhouse. It is currently projected that at build-out, there will be approximately 5,000 residential units on 890 acres. Projects built and/or underway include:

**Village I (Kumu Iki):** This initial 71.3-acre phase of the Villages of Kapolei began in August 1989 and was completed by Castle & Cooke Properties, Inc. as a 519-unit village in 1991.

**Village II (Aelo):** Site preparation by Watt Hawaii for this 571-unit mixed-density village began in 1994. Completion of the entire 70.67-acre project is scheduled for 1995. Affordable

units will begin at \$140,000 and market-priced properties will range from \$264,000 to \$420,000-plus.

**Village III (Malanai):** At build-out Malanai will have 296 homes situated on 51.1 acres adjacent to the Kapolei golf course. Developer Watt Hawaii delivered the first homes in October 1992. Completion of the project is scheduled for 1994. The market-priced homes in this community range from \$280,000 to \$350,000 for properties along Kapolei golf course. Village III also includes the first multi-family project within the Villages of Kapolei. Located on a 5.16 acre-site between Malanai and the entrance to the Kapolei Golf Course, the 88 unit condominium project of Malanai Iki is being developed and priced between \$96,000 and \$126,000 for one, two, and three bedroom units.

**Village IV (Kekuilani):** A joint venture of M.M.C. Development and Stanford Carr Development Corp., the Kekuilani Development Corp. began construction in August 1993 on this 645-unit, mixed-density community. The 60.61 acre site along with Village IV, and Village II, will contain the remaining golf course frontage units of the Villages of Kapolei project. Prices range from affordable at \$99,000 to \$330,000 for golf course single-family homes. Completion of the project is anticipated in early 1996.

**Village V (Kulalani):** West Beach Estates is developing multi-family projects within Villages V and VI for a total of 1,200 units. Village V, Kulalani, is a 128 unit townhome project. Kulalani sits on approximately 7.5 acres and is located next to the Kapolei Elementary School. All of the units (100%) will be affordable units with prices targeted for 80 percent of the median income range. Additional units are planned for Village V, to eventually total 574.

**Village VI (Pae Ko Gardens):** West Beach Estates also is developing 128 affordable multifamily units in Village VI, targeted for 80 percent and below the median income range. The completion of the 7.5-acre project is estimated for year-end 1994.

**Villages VII and VIII:** An additional 1071 units are planned for Villages VII and VIII between 1996 and 2000.

The project's infrastructure is projected to be developed in six phases. The first five phases have been completed, including drainage improvements, mass grading and the golf course. The sixth and final phase will consist of off-site infrastructure construction that will include the widening of Fort Barrette Road and Farrington Highway.

In the 1994 Development Plan Annual Amendment Review, the applicant, (HFDC and various other owners) requested to amend the Ewa Development Plan Land Use Map to reflect existing construction and to recognize the Villages of Kapolei master plan as adopted by the HFDC's Board of Directors. After review, the Planning Department recommended the redesignation of approximately 482 acres from agriculture to low density apartment; and the redesignation of approximately 15 acres as the "Village Center" from agriculture to commercial emphasis mixed use.

Sources: Development Plan Annual Amendment Review, 1994; Housing Finance and Development Corporation publications; Estate of James Campbell Summary Fact Sheet.

## **Waikele**

This master planned community is being developed north of H-1 between the Waikele exit and Kamehameha Highway. Three developers have provided residential units within the Waikele community: Armstrong Builders, Castle & Cooke Homes Hawaii and Schuler Homes, Inc. The Waikele Power Center, a large commercial retail development, is a major additional amenity to the community.

Castle & Cooke Homes Hawaii developed a project of 250 single-family homes. The Armstrong development included 82 single-family dwelling units, all of which have been sold. To date, the Schuler Homes, Inc. development at Waikele includes:

- 686 affordable units built;
- 204 gap-group units built;



**East Kapolei Project  
Market Assessment**

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- 478 market priced single-family units built or under construction;
- One 18-hole golf course; and
- One H-1 freeway ramp for ingress and egress.

Substantial stipulations on the pricing of the products to be offered at Waikele were imposed in the entitlement process, although all prices are allowed to rise with the Consumer Price Index. The stipulations on Waikele development include the following:

- 10 percent of the units are to be priced for 80 percent of median income or below bracket;
- 8 percent of the units are to be priced below \$120,000, and reserved for six months for those earning less than 120 percent of median income level;
- 7 percent of the units are to be priced below \$140,000, reserved similarly for the less than 140 percent bracket;
- 10 percent of the units are to be priced below \$150,000, reserved similarly for the less than 150 percent of median income bracket; and
- 15 percent are to be priced below \$170,000, reserved similarly for the less than 185 percent of median income level.

Waikele received Annual Development Plan Amendment Review approvals in 1985 and zoning approval in 1986. At the time of this analysis, close to 1,700 of the 2,915 planned units had been completed and an additional 1,000 units were anticipated to be completed by the year 2000. This development is expected to be built-out over the remainder of the decade.

The infrastructure for the development for Waikele was ninety percent complete as of August 1994. Off-site improvements

**East Kapolei Project  
Market Assessment**

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consist of an H-1 overpass at Manager's Drive, a water reservoir, roadways and utilities.

Sources: Market Assessment for the Wahiawa Lands (1992); Developer interview (Schuler Homes, Inc.)

**Appendix B**  
**REFERENCES**

## Appendix B

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**Appendix C**  
**LIMITING CONDITIONS**



**Appendix C**

**LIMITING CONDITIONS**

- The words "project," "projection" and "forecast" are not meant to follow the definition of any professional organizations.
- The consultant assumes no responsibility for economic, market or physical factors occurring after the last day of field work in September 1994, which may affect the opinions stated herein.
- No opinion is intended to be expressed for legal matters or that would require specialized investigation or knowledge beyond that ordinarily employed by a market consultant.
- No opinion as to title is rendered.
- No engineering reports or surveys have been prepared by or made available to the consultant.
- Maps and exhibits included herein are for illustration only, as an aid in visualizing matters discussed within the report. They should not be considered as surveys or relied upon for any other purpose.
- The estimates included in this report are utilized to assist in the market assessment of the property based on current market conditions, anticipated short-term supply and demand factors and a continued stable economy. Therefore, estimates are subject to changes in future conditions that cannot be accurately predicted by the consultant.
- The consultant is not qualified to detect the existence of potentially hazardous material which may or may not be present on or near the property. The client is urged to retain an expert in the field before making a business decision regarding the property.
- This report, or any portions thereof, shall not be included in any public offering or financing document without the consultant's review and consent.

**Appendix D**  
**PROFESSIONAL QUALIFICATIONS**

## **GAIL W. ATWATER, AICP**

Ms. Atwater is an experienced land use planning consultant serving both public and private sector clients. She specializes in market feasibility analyses, the application of strategic planning to land use, and facilitation of government and private sector executives in major planning efforts. She has been a land use consultant for the past seven years, both as an independent and as an associate of Deloitte & Touche Management Consulting. She also has six years of corporate managerial experience at GTE Hawaiian Tel.

### **EDUCATION**

Course work completed for Master in Urban and Regional Planning, with specialization in Land Use Planning, University of Hawaii  
Master of Business Administration, Marketing, University of Hawaii  
Master of Education, Counseling and Guidance, Florida Atlantic University  
Bachelor of Arts, Literature, Wheaton College

### **SELECTED CLIENTS**

City and County of Honolulu, Building Department  
City and County of Honolulu, Transportation Services Department  
State of Hawaii, Department of Business, Economic Development and Tourism  
State of Hawaii, Department of Land and Natural Resources  
State of Hawaii, Department of Transportation  
Schuler Homes, Inc.  
Helber, Hastert & Fee  
Hawaii Strategic Development Corporation  
Chamber of Commerce of Hawaii  
GTE Hawaiian Tel  
Hawaiian Electric Company  
Outrigger Hotels Hawaii  
Estate of James Campbell  
Blood Bank of Hawaii

### **HIGHLIGHTS OF RELEVANT EXPERIENCE**

Conducted the market assessment and analysis of employment generating opportunities for an 800-acre master planned community proposed for the Galbraith Trust Wahiawa Lands. This study was included in a Development Plan Amendment Application and Environmental Impact Statement.

For the City and County of Honolulu under Deloitte & Touche, analyzed the need for a Civic Center in Kapolei to provide Oahu's second city with civic services and facilities. Following a demographic study of projected

population and employment trends in Ewa and Central Oahu, analyzed the activities of each City department to determine the type and level of regional services needed and which departments could be relocated.

Co-authored analysis of supply and demand for industrial land on Oahu for the market assessment of Kapolei Business Park.

Assisted in preparing an economic impact study for the developer of Ko Olina Resort in West Oahu, including analysis of market opportunities and evaluation of fiscal impact.

For the State of Hawaii, Department of Land and Natural Resources, (DLNR), designed, facilitated and managed a major public/private effort to overhaul the regulation of the Conservation District.

Also for DLNR, managed completion of a project involving development and application of a strategic land management methodology for over 200,000 acres of state leased agricultural land. Developed strategic land use plans for four major parcels totaling over 30,000 acres.

Facilitated top management in development of strategic plans for diverse private and public sector clients, such as the Chamber of Commerce of Hawaii, Blood Bank of Hawaii and Hawaii Strategic Development Corporation.

For the Governor's Office of Children and Youth, developed strategies for financing an envisioned optimal system for early childhood education in the year 2000, including 56 financing mechanisms and a proposed legislative agenda.

Developed three consecutive five-year strategic plans as consultant to GTE Hawaiian Tel. Analyzed Pacific Basin opportunities for worldwide operations of GTE.

## **BUSINESS EXPERIENCE**

- |                |   |
|----------------|---|
| 1985 - Present | Planning Consultant, both independent and as subcontractor for Deloitte & Touche.   |
| 1980 - 1985    | Service Office Administrator, GTE Hawaiian Tel, responsible for operational planning and project implementation, \$7 million operating budget, and management of operational/financial planning and analysis group. |

1976 - 1980

Managed private Montessori preschools in Hawaii and on the Mainland; developed and managed statewide educational program for the State of Florida, involving 67 school districts.

### PROFESSIONAL AND CIVIC AFFILIATIONS

American Institute of Certified Planners: Member

Urban Land Institute: Associate Member

American Planning Association, Hawaii Chapter: Director at Large, winner of 1994 Distinguished Service Award, formerly Vice President, Public Information Officer and Housing Chair.

Hawaii Society of Corporate Planners: Past President and current Board member

Suzuki Association of Hawaii: Board of Directors member and Grant Writer

Aloha United Way: Allocations Panel, 1990-1991

**LIMITED SCOPE UPDATE**  
of the

**EAST KAPOLEI PROJECT  
MARKET ASSESSMENT**

(Dated October 1994)

December 1995

by  
Gail W. Atwater, MBA, MURP, AICP

The purpose of this Update is to report on revisions to the East Kapolei Project and its market area which have occurred between October 1994 and December 1995. The factors analyzed should affect the demand for and absorption of residential and retail development within the property. Due to the limited scope of this update, it must be reviewed in conjunction with the East Kapolei Project Market Assessment by the same author dated October 1994. The latter document is available as Appendix D of the Final Environmental Impact Statement for the East Kapolei Project (Helber Hastert & Fee Planners, April 1995).

LIMITED SCOPE UPDATE  
of the  
EAST KAPOLEI PROJECT  
MARKET ASSESSMENT (October 1994)

TABLE OF CONTENTS

	Page
I. Executive Summary.....	i
II. Introduction.....	1
III. Revised East Kapolei Project Site.....	1
IV. Revised Project Concept.....	2
V. Area Review and Current Market Conditions.....	3
VI. Future Residential Demand.....	4
VII. Future Residential Supply.....	6
VIII. Residential Demand and Supply Imbalance and Market Position.....	7
IX. Retail.....	9

## EXHIBITS

	Page
Exhibit 1 Location Map.....	10
Exhibit 2 Calculation of Demand.....	11
Exhibit 3 Additions to Residential Supply July 1994 - "After 2005".....	12
Exhibit 4 Calculation of Supply.....	13
Exhibit 5 Supply and Demand Summary.....	14
Exhibit 6 Affordable Pricing Structure.....	15
Exhibit 7 Hypothetical Absorption Schedule.....	16
Exhibit 8 Existing Residential Product, 1995.....	17
Exhibit 9 Capture Rates of Future Demand.....	18
REFERENCES.....	19
PERSONS CONSULTED.....	21
LIMITING CONDITIONS.....	23



## I. EXECUTIVE SUMMARY

**Property Location**

One of the last major agricultural regions remaining unplanned in Oahu's developing "second urban center" in Ewa. Major parcel bordered by Farrington Highway and surrounded by agricultural land, with nearby master planned communities of West Loch, Villages of Kapolei and Ewa Villages.

**Size**

Approximately 794 acres, including 52 acres of off-site infrastructure.

**Physical Attributes**

Gently sloping terrain from north to south on former coral plain which historically has been planted in sugarcane.

Good access via Farrington Highway and its H-1 interchanges at Makakilo Drive to the west and Fort Weaver Road to the east. Future access to planned North South Road and eventually Fort Weaver Road.

Sunny, leeward-type climate

**Market Study Area**

Master Planned Communities within the Ewa Development Plan Area and along the western H-1 corridor including the communities of Waikele and Royal Kunia.

**Economic**

Moderate near- and long- term growth trends in both commercial and residential indicators, with demonstrated pent-up residential and retail demand gradually subsiding during the 16-year build-out.

**Government Policy**

State and County governments have established population allocation policies. Additionally, these agencies have joined private developers in capital investments which support development of a second urban center and affordable housing in Ewa.

**Residential**

Supply/Demand Shortfall, 1994 - 2020, Market Study Area 9,629 - 14,900 units

Supply/Demand Shortfall, 1994 - 2020, Ewa Dev. Plan Area Only 8,100 - 12,500 units

Demand for Additional Units, 1994 - 2020, Market Study Area (includes Ewa DP Area)	38,329 - 43,600 units	
Demand for Additional Units, 1994-2020, Ewa DP Area Portion Only	32,200 - 36,600 units	
Planned Units East Kapolei Project	2,080 1,440 1,920	Single Family - Market Priced Townhomes - Market Priced Multifamily - Low Density Units (DU) - Market
	160 800	Multifamily - Medium DU - Market Multifamily - Medium DU - Affordable (up to 80% of median household income)
	1,600	Multifamily - Medium DU - Affordable (81-120% of median)
	8,000	Total
Year Sales Begin / End	1998 / 2013 (16-year build-out)	
Average Annual Absorption	500 - 550 units	
Capture Rate of Market Study Area Residential Demand to 2020	25 to 30 percent	
Capture Rate of Oahu Residential Demand to 2020	13 to 14 percent	
<b>Retail</b>		
Potential Need New Support Retail	Estimated future demand for 43 additional retail acres in the defined retail trade area exceeds the 16 acres allowed on the subject property by a deed restriction. Neighborhood retail only.	
Target Tenants	Supermarkets, drug stores, restaurants, surf and other small apparel shops, bars, dry cleaners.	
Additional Uses	Central community park and neighborhood parks.	

## II. INTRODUCTION

**Purpose.** The purpose of this Update is to report on revisions to the East Kapolei Project and its market area which have occurred between October 1994 and December 1995. The factors analyzed should affect the demand for and absorption of residential and retail development within the property. Due to the limited scope of this update, it must be reviewed in conjunction with the East Kapolei Project Market Assessment by the same author dated October 1994. The latter document is available as Appendix D of the Final Environmental Impact Statement for the East Kapolei Project (Helber Hastert & Fee Planners, April 1995).

**Scope limitations.** The intent of this assignment was to provide information on changes affecting the subject property and its market area which have occurred since publication of the East Kapolei Project Market Assessment (Atwater 1994). The primary focus of this update was the analysis of residential supply, demand and absorption. Changes were based on currently-utilized population and housing unit forecasts, newly published policy documents and Development Plans, and updated housing supply and market performance information.

Field work on market performance was limited to review and spot verification of published sales data and selected on-site interviews with realtors and developers. Written realtor surveys were not conducted as had been performed for the 1994 Market Assessment. Area Review research was limited to interviews with top local analysts to confirm prior economic conclusions. The retail supply and demand analysis was not revised due to its continued relevance. Finally, the report format was scaled down to focus on incremental changes since publication of the 1994 Market Assessment.

**Revised Report Format.** This 1995 Update covers a variety of subjects, beginning with a brief conclusion for each section followed by supporting discussion. Exhibits are located at the end of the commentary.

## III. REVISED EAST KAPOLEI PROJECT SITE

### Conclusion

The revised 794-acre project site is ideally situated to take advantage of the growth expected to occur in Oahu's second urban center at Kapolei. The project design is consistent with the vision for Ewa, desired direction of residential growth, and regional urban design criteria contained in the draft Ewa Development Plan Report (Planning Department, June 1995). Design changes and available acreage limit housing to 8,000 units, a small commercial area, and expand park space. While the project's physical characteristics have been modified, the only significant market impact of the locational

and physical changes is the questionable proximity and likelihood of development of the planned University of Hawaii at West Oahu.

#### **Supporting Discussion**

*Project size, location, and surrounding uses.* The revised project area consists of 794 acres at Kapolei, Ewa, Hawaii, of which 742 acres are subject to Development Plan land use amendment. The remaining 52 acres are for off-site infrastructure including development of a reservoir site and a 31-acre detention basin. There are two parcels targeted for development, with the largest area south of Farrington Highway and a second residential component north of the highway. See Exhibit 1, *Location Map*. These agricultural-zoned parcels and surrounding areas are in transition from sugar production to diversified agriculture. Nearby master planned communities include West Loch, Ewa by Gentry, Villages of Kapolei and Ewa Villages.

*Access to the project.* The northern boundary of the revised project site is formed by Farrington Highway, which will provide the community's primary access to Oahu's primary urban center. The project is linked to the H-1 Freeway via interchanges at Fort Weaver Road and Makakilo/Kapolei. Additional future access will include a primary connection to the planned North South Road and an eventual link to Fort Weaver Road.

*Market study area.* The market study area has not changed since the 1994 Market Assessment. This area includes the Ewa Development Plan Area, plus directly competitive projects within the Central Development Plan Area. The most notable of these Central projects are Waikele and Royal Kunia. Due to its physical and market characteristics this region is referred to as the H-1 corridor.

*Second city growth.* The project site is ideally situated to take advantage of the growth expected to occur in Oahu's second urban center. It supports General Plan population guidance directing growth toward Kapolei. The planned University of Hawaii at West Oahu, if developed, would likely contribute to activity and demand on the subject property. However, due to its uncertainty, university-generated demand has been excluded from the analysis of need for the project. This factor is discussed further in Section VI, *Future Residential Demand*.

#### **IV. REVISED PROJECT CONCEPT**

##### **Conclusion**

The East Kapolei Project as revised reflects a neotraditional development concept featuring a centrally located retail and community recreation area with residential development emanating out from the core. This development concept is consistent with the regional urban design principles and guidelines in the draft Ewa Development Plan Report (Planning Department 1995).

**Supporting Discussion**

To be more in keeping with the proposed Ewa Development Plan, the project concept has moved from a decentralized suburban-style development to a community concept in the neotraditional style. In neotraditional town planning, a commercial town center and community recreation area are the activity centers and form the physical core of the community. They are surrounded by multifamily residences and, further out from the core, single family residential development. This concept will encourage a sense of inclusiveness and belonging to a town within the development and provide a human-scale, walkable environment for living.

The East Kapolei Project Plan includes 649 acres of residential land uses. These uses encompass 275 acres of single family detached housing and 374 of multifamily housing, including 120 acres of affordable homes. Supporting the residential development are 16 acres of commercial, 32 acres of parks and recreation and 25 acres for public and quasi-public facilities.

**V. AREA REVIEW AND CURRENT MARKET CONDITIONS**

**Conclusion**

This section was updated based on the results of interviews with two notable local economists and one real estate analyst. Based on their comments, the general conclusion of the updated Area Review is that continued long-term support is indicated for this project through moderate but steady economic growth. Furthermore, demand is expected to continue for lower-end residential affordable and affordable product.

**Supporting Discussion**

**Economic outlook.** This assignment limited the Area Review economic update to interviews with two top Hawaii analysts: Paul Brewbaker, Chief Economist at Bank of Hawaii and Leroy Laney, Chief Economist at First Hawaiian Bank. Their conclusions are that:

- The State of Hawaii, especially the island of Oahu, has demonstrated substantial growth in all sectors of the economy over time, with a continuing expansion expected.
- The overall outlook for Hawaii's economy is for steady growth of about 2.5 percent per year, which is close to the projection for the nation as a whole. This growth will result in sustained demand for additional residential development.
- Pent-up demand and documented overcrowding of Oahu families will continue to drive the need for additional affordable and moderately priced housing.

- Inflation and cost of living factors in Hawaii have been declining in recent years, along with relatively sustained low interest rates. These factors will continue to increase the purchasing power of potential homebuyers.
- Home pricing is expected remain relatively stable on Oahu, with no major "spikes" in prices foreseen.
- Hawaii's pattern of real estate "peaks and plateaus" is favorable to "peaks and valleys" experienced in other markets. For example, economists noted that several locations on the Mainland have seen a 20 to 30 percent decline in real estate values in the last few years.

Review of Current Market Conditions. A review of the current market for new homes was conducted with realtors and developers actively selling in the market study area. Further, an interview was also conducted with Dr. Michael Sklarz, Hawaii real estate expert at Prudential Locations, Inc. The following observations were made during the course of this update.

- The new home market is currently experiencing a slow-down that appears to be more related to consumer confidence in the economy than a lack of demand. Since early 1995 when events such as the announcement of the State of Hawaii's budget shortfall occurred, sales of market-priced homes dipped and were sustained at lower levels than in early 1995. It appears that some buyers are holding back on large purchases, exhibiting a "wait and see" attitude.
- According to realtors, all new home buyers have become more discerning, especially with regard to developer incentives and the more widely available affordable product. See Exhibit 8, *Existing Residential Product, 1995* for updated details regarding currently-selling projects in the market study area.
- Dr. Sklarz had previously predicted the next Hawaii real estate cycle peak in 1996-97. According to a September 1995 interview with Dr. Sklarz, the next peak is now expected in a time frame closer to 1998, which is the targeted time frame for early market entry of the East Kapolei Project.

Market conditions conclusion. Real estate professionals and experts indicated the Oahu market is at or near the trough of the current real estate cycle. Long term economic indicators, however, appear to indicate a strong but more subdued residential market than that experienced in the early 1990s.

## **VI. FUTURE RESIDENTIAL DEMAND**

### **Conclusion**

The estimated demand for residential units within the market study area (Ewa Development Plan Area, plus the H-1 corridor developments of Waikele and Royal Kunia) by the year 2020 will be from 57,690 to 62,961 units, including 9,361 already

existing. Of those units, approximately 48,500 to 52,900 are estimated to be in the Ewa Development Plan Area.

**Methodology**

*Population and housing unit forecast.* The 1994 Market Assessment utilized the Land Use Model and General Plan projections to estimate future Oahu population and establish a range of population within the study area in the year 2010, respectively. Use of 2010 projections was appropriate for the 1994 Market Assessment because the project as then conceived was expected to be built-out by 2011. Further, those sources were the most widely used forecasts at the time. However, the reconceived project is expected to extend at least until 2013.

The Planning Department has issued a forecast for the year 2020 which they have called "an interim replacement for the [State of Hawaii] M-K projections" (Issue Paper on General Plan Population Distribution Policies, Planning Department, 1995). This Land Use Model forecast is currently being used for transportation planning by the Oahu Metropolitan Planning organization. As such, it is utilized in this update as the basis for estimating future population and housing units.

*Allocation of future Oahu population to the market study area.* The 2020 forecast provides an estimate of the Oahu population. These estimates must be allocated to the study area based on accepted population distribution policy. Consistent with the 1994 Market Assessment methodology, the General Plan allocation factor for the Ewa Development Plan was expanded to include future population of Waikele and Royal Kunia. The endpoints of the resulting range for the market study area are 14.23 percent of Oahu 2020 demand at the low end, to 15.53 percent at the high end, with a midpoint of 14.88 percent. See Exhibit 2, *Calculation of Demand*.

*Vacancy factor.* Accounting for vacancy is essential to the calculation of an appropriate level of housing stock. An adequate vacancy allowance provides the opportunity for population movement in and out of a community and within a community. This update calculates the same vacancy factor as the 1994 Market Assessment, or 5 percent. This factor is supported by a recent City and County planning document, which states: "a five to six percent vacancy rate is considered optimal, but Oahu has dropped from 4.2 percent vacant in 1980 to 2.5 percent today. This indicates a large pent-up demand for new housing units." (First Biennial Report on the Condition of the City and General Plan and Development Plans, Planning Department, 1995). See Exhibit 2, *Calculation of Demand*.

*Demand generated by the University campus.* The 1994 Market Assessment contained a small (300 unit) upward adjustment to future residential demand which recognized the expected impact of the adjacent University of Hawaii at West Oahu campus. This adjustment has been excluded from the Limited Scope Update demand calculations for several reasons. First, the locations of both the subject parcel and the university have

changed. Secondly, the university's location has not been formally approved. Finally, because the 300-unit adjustment represents less than one percent of estimated additional demand for the market study area, it is not expected to have a material impact on the market viability of the project.

## VII. FUTURE RESIDENTIAL SUPPLY

### Conclusion

An adjusted supply of 48,061 units is expected within the study area in 2020. This reflects existing units, future construction estimates, and consultant adjustments to future supply of 5,543 and 2,710 units, to reflect delays in construction timing and resort occupancy of residential units, respectively. Percentage adjustments were comparable to the 1994 Market Assessment.

### Methodology

*Estimation of future supply* was developed using the Construction Schedule for Housing Projects (Table II-3) in the Planning Department's Development Plan Annual Report, Fiscal Year 1995. According to the developers surveyed, a total of 36,953 units are expected to be built within the market study area between July 1994 and the time period designated "after 2005." This includes 31,546 units in the Ewa Development Plan Area. See Exhibit 3, *Future Additions to Supply, July 1994 to "After 2005"*. This estimate of future additions to supply should be regarded as an unlikely scenario, as it includes the full number of units reported by developers via survey regardless of demonstrated progress.

*Adjustment factors* for supply remain unchanged from the previous analysis. First, fifteen percent of future additions to supply were subtracted for slippage in timing given the progress of several major projects (-5,543 units, Exhibit 4, *Calculation of Supply*). This conservative estimate was based on the progress of several major projects.

City officials have taken notice of this lack of progress among major land use plans in Ewa. The Honolulu City Council is currently considering the implementation of a "use it or lose it" policy through its 1995 Resolutions 95-270 and 271. Under these proposals, as many as 7,300 units within the market study area could have their urban designation downgraded to a less intensive use because they have not shown adequate progress since receiving Development Plan approval (Planning Department 1995). The projects include the City of Kapolei housing areas (2750 proposed units), Ko Olina Phase II (3500) and Makaiwa Hills (1066). These future units are fully represented in the additions to future supply (Exhibit 3).

A second adjustment to supply was a deduction of twenty percent of the 13,550 future residential units estimated by the developers of resort communities at Ko Olina and



Ewa Marina (-2,710 units, Exhibit 4). This adjustment was made to account for the probable use of "residential" units by visitors via long-term rentals and others being left vacant by non-resident owners. As noted in the 1994 Market Assessment, interviews with property managers indicated that up to 80 percent of units being effectively removed from local residential supply due to non-resident occupancy in comparable situations. Thus a 20 percent deduction appears conservative.

### VIII. RESIDENTIAL DEMAND AND SUPPLY IMBALANCE AND MARKET POSITION

#### Conclusion

This analysis indicates that by 2020 there will be a shortfall of approximately 9,629 to 14,900 residential units within the market study area. Based on this range's midpoint of 12,265 units, there appears to be adequate demand for the 8,000-unit East Kapolei Project which would be built out by 2013. Approximately 8,100 to 12,500 of the estimated shortfall in market study area units will be within the Ewa Development Plan Area.

The developer intends to offer a variety of products which will cater to a wide range of buyers. Part of this mix would include 30 percent affordable units which is in keeping with City and County of Honolulu housing policies. The product mix will be similar to the 1994 project concept. This mix focuses on low- to medium-density multifamily residences.

Based on an analysis of historical residential sales and capture rates of market area projects offering similar product, the project should be able to achieve a 25-30 percent capture rate of the market study area. This capture rate reflects sales of 550 units per year during the most active sales period or an average of 500 units per year over the 16-year build-out period.

#### Methodology

*Supply and demand imbalance.* In order to determine the need for the project, the potential imbalance between supply and demand must be assessed. This is accomplished by subtracting total supply from total demand, yielding either a shortfall or oversupply of residential units. The East Kapolei project will fill a shortfall of approximately 9,629 to 14,900 residential units within the market study area. Of these, 8,100 to 12,500 are expected within the Ewa Development Plan Area. Exhibit 5, *Supply and Demand Summary*, details the methodology used to arrive at these estimates, which is comparable to that employed in the 1994 Market Assessment.

*Affordability, target markets, and product mix.* The project's affordability is consistent with the City and County of Honolulu's Rules for Unilateral Agreements Requiring

Affordable Housing (Department of Housing and Community Development, September 1994). The East Kapolei Project will offer 30 percent affordable homes: ten percent will be priced for families with income levels up to 80 percent of Oahu's median, with an additional twenty percent priced to accommodate families in the 81-120 percent of median income brackets. Planned pricing of affordable homes is shown as Exhibit 6, *Affordable Pricing Structure*.

Market-priced homes are expected to be offered at approximately \$185,000 to \$285,000 (*Exhibit 7, Hypothetical Absorption Schedule*). The target market for multifamily market-priced homes is expected to be a combination of first-time and move-up buyers aged 25 to 40. Single family market-priced homes are expected to attract primarily move-up buyers aged 30 to 45 years.

The planned product mix and densities for the revised parcel configuration are comparable to the 1994 Market Assessment. The East Kapolei Project plan includes a range of single family residences, townhomes, and both market-priced and affordable low density multifamily homes (Ewa Special Provisions define "low density" as up to 30 units per acre). It is assumed that at least four different residential product types would be active at any given time (*Exhibit 7*).

*Anticipated capture rates - market study area.* In order to assess the subject development's potential to capture future residential demand, a comparative analysis was conducted using seven-year sales performance of master planned communities within the market study area (raw data source: Prudential Locations, Inc.). Projects included in this analysis were Ewa by Gentry, West Loch, Makakilo, Waikele and Royal Kunia. The results of this investigation showed average project capture rates during active sales periods ranging from approximately 15 to 44 percent of new home sales within the market area.

An East Kapolei Project capture rate of 25 to 30 percent per year has been concluded upon. This capture rate is based on the above comparative analysis, recent sales at competitive projects, and market performance of Oahu projects by Schuler Homes, Inc. (*Exhibit 8, Existing Residential Products, 1995*). When compared to capture rates achieved by comparable developments (15 to 44 percent), the range established for the proposed development appears to be conservative (*Exhibit 9, Capture Rates of Future Demand*).

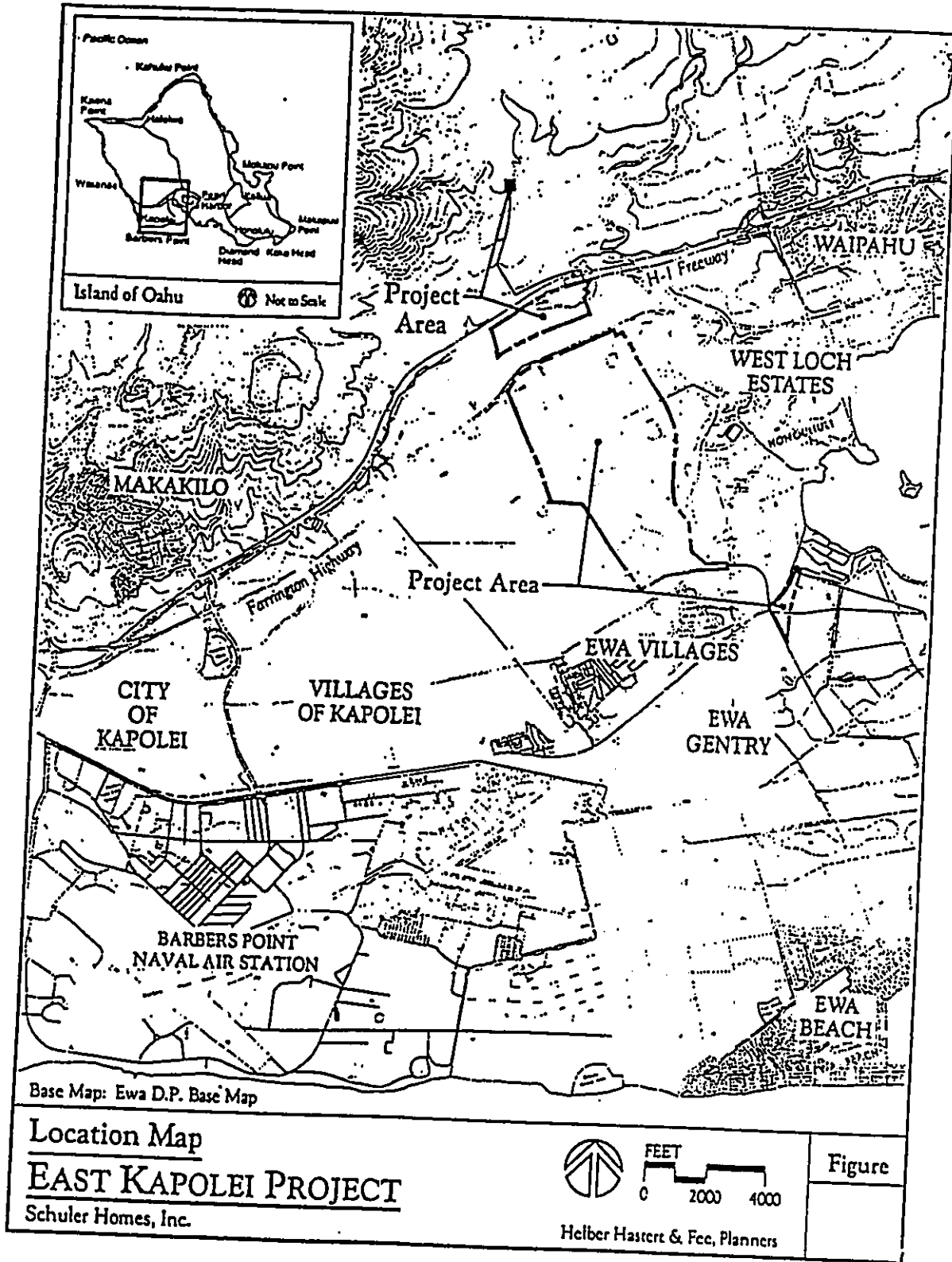
*Average annual absorption.* Exhibit 7, *Hypothetical Absorption Schedule*, reflects a mean annual absorption rate of 500 units per year, with absorption of the 8,000-unit project over 16 years. During the most active sales period, absorption rates of 550 units per year are expected. This estimate appears reasonable as it compares favorably with the recent and past sales experience of the other master planned communities and the developer's assessment of annual sales potential.

## **IX. RETAIL**

### **Conclusion**

The East Kapolei Project will contain a 16-acre neighborhood commercial center whose size is limited by a deed restriction of two commercial acres for every 1,000 residential units. Planned retail is well within the demand for an additional 43 acres within the retail trade area that was estimated in the 1994 Market Assessment. As the factors affecting retail supply and demand have not materially changed, this conclusion still appears to be valid.

Exhibit 1  
Location Map



**Exhibit 2**  
**Calculation of Demand**

Oahu Housing Units - 2020	395,198			Land Use Model
Oahu Occupied Units - 2020	386,108			Net of 2.3 percent vacancy rate
Vacancy provision	19,305			Occupied units plus 5% vacancy provision Refer to Section VI
Total Demand for Oahu - 2020	405,413			Occupied units + vacancy provision
Study Area Allocation Factor (% of Total Oahu)	14.23%	14.88%	15.53%	General Plan and Land Use Model Low End Midpoint High End
Total Study Area Demand by 2020 (includes 19,361 existing units)	48,460	50,673	52,887	Based on General Plan allocation to Ewa DP Area Excludes provision of 300 additional units for university-generated demand
<b>Comparative Data</b>				
Net Additional Study Area Demand - 2020	38,329	40,964	43,600	Total study area demand less existing units
Net Additional Demand - EWA DP Area portion only - 2020	32,197	34,410	36,624	Based on General Plan allocation to Ewa DP Area

**Exhibit 3  
 Additions to Residential Supply  
 July 1994 - "After 2005"**

Project		Area	Total Units in Project <sup>1</sup>	7/1/94 - 6/30/95	1996	1997	1998 - 2000	2001 2005	After 2005
<b>City of Kapolei</b>									
Makai	Ewa		2,000				500	1,000	500
Mauka	Ewa		750				250	500	
Ewa by Gentry	Ewa		5,375	332	625	700	2,700	1,018	
Ewa Marina	Ewa		4,850			300	1,809	2,545	196
Ewa Villages	Ewa		1,480	113	133	327	907		
Ewa Fairways	Ewa		280		280				
Kapolei Knolls	Ewa		418			100	318		
Ko Olina Fairways	Ewa		280		280				
Ko Olina, Phase 1 (rest)	Ewa		4,920			500	675	3,145	600
Ko Olina, Phase 2	Ewa		3,500						3,500
Makaiwa Hills, Phase 1	Ewa		1,066					1,000	66
<b>Makakilo</b>									
Post 1986 phases	Ewa		1,697			40	70	600	987
Makakilo Hts. (Palilali)	Ewa		344		38	62	104	140	
Westview (Schuler)	Ewa		352	172	90	90			
Royal Kunia - Ph 1	Central		1,848	495	200	400	753		
Royal Kunia - Ph 2	Central		2,000				1,000	800	200
Villages of Kapolei	Ewa		4,059	760	844	168	731	1,556	
Waikele	Central		1,559	479	153		927		
West Loch	Ewa		175	175					
<b>Total Additions<sup>1</sup></b>			<b>36,953</b>						

<sup>1</sup>Total units 7/1/94 - "After 2005"  
 Excludes military and Hawaiian Home Lands units  
 Source: Development Plan Annual Report, Fiscal Year 1995, Table II-3

**Exhibit 4  
Calculation of Supply**

Existing Housing Inventory	19,361 estimate	Planning Department
Additions to Future Supply	36,953	Exhibit 3 Future Additions to Supply
Deduction for Timing of Additions to Supply (15%)	-5,543	15% of 36,953
Deduction for Non-Resident Occupancy	-2,710	20% of total future units at Ko Olina and Ewa Marina (13,550)
<b>Adjusted Supply for the Year 2020 Market Study Area</b>	<b>48,061</b>	

**Exhibit 5  
 Supply and Demand Summary**

	Low	Midpoint	High	
<b>Demand Calculation</b>				
1 Total Demand - Market Study Area	57,690	60,326	62,961	Exhibit 2 Includes 19,361 existing units Excludes a provision of 300 additional units for university-generated demand
<b>Supply Calculation</b>				
2 Existing Inventory - Study Area	19,361	19,361	19,361	Planning Department estimate
3 Additions to Future Supply	36,953	36,953	36,953	Exhibit 4
4 Deduction for Timing of Additions to Future Supply (15%)	-5,543	-5,543	-5,543	Consultant Estimate Refer to Section VII
5 Deduction for Non-Resident Occupancy	-2,710	-2,710	-2,710	Consultant Estimate (applies only to Ko Olina and Ewa Marina) Refer to Section VII
6 Adjusted Supply for the Year 2020 - Market Study Area	48,061	48,061	48,061	
<b>Conclusions</b>				
7 Total Market Study Area Demand (1994-2020)	57,690	60,326	62,961	Line 1
8 Total Market Study Area Supply (1994-2020)	48,061	48,061	48,061	Line 6
9 Estimated Shortfall - Market Study Area (1994-2020)	9,629	12,265	14,900	Line 1 less Line 6
10 Estimated Shortfall Ewa Development Plan Area only	8,089	10,302	12,516	Based on General Plan allocation to Ewa DP Area
11 Additional Demand - Market Study Area (1994-2020)	38,329	40,965	43,600	Total demand (Line 1) less existing (Line 2)
12 Additional Demand - Ewa Development Plan Area (1994-2020)	32,197	34,410	36,624	Excludes Royal Kunia, Waikele and existing units



**Exhibit 6**  
**Affordable Pricing Structure**

		4
Family Size		
Percent of Median Annual Income Home Price	80%	\$42,880 \$119,800
Percent of Median Annual Income Home Price	100%	\$53,600 \$170,700
Percent of Median Annual Income Home Price	120%	\$64,320 \$215,100

Source: Schuler Homes, Inc., after State of Hawaii Housing Finance and Development Corp., 1995  
Assumes mortgage rate of 7.5%

**Exhibit 7  
 Hypothetical Absorption Schedule**

Product Type - Target Market	Density (units/ac)	Number of Units	Avg Price (\$000)	Absorp per mo <sup>1</sup>	Absorp per yr	1998 Yr 1	1999 Yr 2	2000 Yr 3	2001 Yr 4	2002 Yr 5	2003 Yr 6	2004 Yr 7	2005 Yr 8	2006 Yr 9	2007 Yr 10	2008 Yr 11	2009 Yr 12	2010 Yr 13	2011 Yr 14	2012 Yr 15	2013 Yr 16	Total	
Single Family - Market	7	2,080	\$285,000	11	132	60	120	140	140	140	140	140	140	140	140	140	140	140	140	140	120	100	2,080
Townhome - Market	11	1,440	\$235,000	8	96	36	60	100	100	100	100	100	100	100	100	100	100	100	100	100	80	64	1,440
Low Density <sup>2</sup> Type 1 - Market	15	1,920	\$208,000	10	120	14	110	135	135	135	135	135	135	135	135	135	135	135	135	135	110	66	1,920
Low Density <sup>2</sup> Type 2 - Market	20	160	\$185,000	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	160
Low Density <sup>2</sup> Type 3 - Affordable Up to 80% of median Up to 120% of median	20	800	\$133,000	4	48	20	40	55	55	55	55	55	55	55	55	55	55	55	55	55	45	35	800
	20	1,600	\$175,000	8	96	40	80	110	110	110	110	110	110	110	110	110	110	110	110	110	90	70	1,600
		8,000				180	420	550	550	550	550	550	550	550	550	550	550	550	550	550	455	345	8,000

<sup>1</sup> average monthly absorption = total per product/16 year build-out  
<sup>2</sup> Ewa Special Provisions allow up to 30 units per acre under the designation "low density"

East Kapolei Project  
 Limited Scope Update of the Market Assessment dated October 1994

**Exhibit 8**  
**Existing Residential Product, 1995**

Master Planned Community	Developer	Area	Type	Number	Monthly Absorp.*	Living Area (sq ft)			\$(1,000s)		
						Min	Max	Avg	Min	Max	Avg
<b>Ewa by Gentry</b>											
Fiesta (affordable)**	Gentry	Ewa	SFD	171	Lottery	865	1260	1063	209	240	225
Summerhill (market)	Gentry	Ewa	SFD	305	11	1055	1648	1352	255	295	275
Coronado (affordable)	Gentry	Ewa	SFA	120	Lottery	407	710	559	105	150	128
<b>Currently offered - total project</b>											
<b>Villages of Kapolei</b>											
Iwalani (market)	HFDC/Stanford Carr	Ewa	SFD	224	5	1141	1871	1506	285	332	309
Iwalani (affordable)	HFDC/Stanford Carr	Ewa	SFD	49	Lottery	1141	1530	1336	190	230	210
Aeoloa (market)	HFDC/Watt Hawaii	Ewa	SFD	229	6	1118	1264	1191	275	398	337
Aeoloa (affordable)	HFDC/Watt Hawaii	Ewa	SFD	103	Lottery	1117	1264	1191	190	230	210
Aeoloa Terrace (affordable)	HFDC/Watt Hawaii	Ewa	SFA	96	Lottery	565	1039	802	120	168	144
<b>Currently offered - total project</b>											
<b>Makakilo</b>											
West Hills	Fin. Realty	Ewa	SFD	96	5	1394	1787	1591	328	393	360
Royal Ridge	Fin. Realty	Ewa	SFD	48	1	1370	1818	1594	376	404	390
Westview	Schuler Homes, Inc.	Ewa	SFA	148	9	750	980	865	183	212	198
<b>Currently offered - total project</b>											
<b>Ko Olina</b>											
Fairways (market)	West Beach Estates	Ewa	SFD	280	6	847	1264	1056	195	350	273
<b>Royal Kunia</b>											
Phase I - SFD	Kunia Res'l Partners	Central	SFD	366	23	800	2051	1426	250	400	325
Phase I - (affordable)	Kunia Res'l Partners	Central	SFA/SFD	248	Lottery	770	1000	885	183	205	194
<b>Currently offered - total project</b>											
<b>Waikale</b>											
Village on the Green (market)	Schuler Homes, Inc.	Central	SFA	174	10	790	1445	1118	204	329	267
Tropics (market)	Schuler Homes, Inc.	Central	SFD***	191	9	886	1376	1131	268	324	297
Royal Pines (market)	Schuler Homes, Inc.	Central	SFD	126	10	1183	1664	1424	309	325	317
Signature (market)	Schuler Homes, Inc.	Central	SFD	67	14	1329	1663	1496	356	437	397
Champions (market)	Schuler Homes, Inc.	Central	SFD	117	14	1336	1664	1500	355	445	400
Highland View Estates (market)	Schuler Homes, Inc.	Central	SFD	35	10						
<b>Currently offered - total project</b>											
<b>Ewa Villages</b>											
Green View Villas	Armstrong Ewa	Ewa	SFD	157	2	1286	2000	1648	300	450	375
Tenney and Renton Villages	City and County of Honolulu	Ewa	SFD	200 (new)	Not avail. yet	900	1250	1075	120	270	195
				(also 200 rehab)							

SFA= single family attached; SFD= single family detached; Fin. Realty= Finance Realty; HFDC=Housing Finance and Development Corporation; \* based on realtor interviews \*\*formally Sun Terra (market) \*\*\*Cluster  
 REFLECTS ONLY PROJECTS WITH MORE THAN 25 UNITS ACTIVELY SELLING

**Exhibit 9**  
**Capture Rates of Future Demand**

Study Area Future Demand (market study area demand less existing supply)*	40,965
Study area capture rate @ 20%	8,193
Study area capture rate @ 25%	10,241
Study area capture rate @ 30%	12,289

\* 40,965 represents the midpoint of Study Area Future Demand (Exhibit 5, Line 11)

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\* In addition to persons consulted for the East Kapolei Project Market Assessment (Atwater 1994)

East Kapolei Project  
*Limited Scope Update of the Market Assessment dated October 1994*

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## Limiting Conditions

- This document is a market assessment and not an assessment of financial feasibility.
- The words "project," "projection" and "forecast" are not meant to follow the definition of any professional organizations.
- The consultant assumes no responsibility for economic, market or physical factors occurring after the last day of field work in December 1995, which may affect the opinions stated herein.
- No opinion is intended to be expressed for legal matters or that would require specialized investigation or knowledge beyond that ordinarily employed by a market consultant.
- No opinion as to title is rendered.
- No engineering reports or surveys have been prepared by or made available to the consultant.
- Maps and exhibits included herein are for illustration only, as an aid in visualizing matters discussed within the report. They should not be considered as surveys or relied upon for any other purpose.
- The estimates included in this report are utilized to assist in the market assessment of the property based on current market conditions, anticipated short-term supply and demand factors and a continued stable economy. Therefore, estimates are subject to changes in future conditions that cannot be accurately predicted by the consultant.
- The consultant is not qualified to detect the existence of potentially hazardous material which may or may not be present on or near the property. The client is urged to retain an expert in the field before making a business decision regarding the property.
- This report, or any portions thereof, shall not be included in any public offering or financing document without the consultant's review and consent.

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SOCIO-ECONOMIC IMPACT ASSESSMENT OF EAST KAPOLEI  
RESIDENTIAL PROJECT, NOVEMBER 1994.

COMMUNITY RESOURCES, INC.

SOCIO-ECONOMIC IMPACT ASSESSMENT OF EAST KAPOLEI  
RESIDENTIAL PROJECT, UPDATE MEMORANDUM, DECEMBER 1995.

COMMUNITY RESOURCES,  
A DIVISION OF SMS RESEARCH & MARKETING SERVICES, INC.

**SOCIO-ECONOMIC IMPACT  
ASSESSMENT OF EAST KAPOLEI  
RESIDENTIAL PROJECT**

November 1994

Prepared for:  
**Schuler Homes, Inc.**

Prepared by:  
**Community Resources, Inc.**

## EXECUTIVE SUMMARY

The proposed East Kapolei project covers about 1,044 acres of land recently used for sugar cane cultivation. Schuler Homes, Inc. proposes a residential development for the site, to be built out in two phases over a period of 15 or more years.

The project site lies between the planned North-South road, to the west, Farrington Highway (to the north), the `Ewa Villages project (south or makai of the project) and the West Loch project. The first homes would be developed in the makai half of the project site, on land transferred to the Galbraith Estate by the State (Phase 1). Over time, the project would come to include, in both phases, some 10,000 housing units, land for two elementary schools and adjacent parks, and 20 acres of commercial space. (Land use permits are also being requested for another 27 acres of commercial area to be retained by the Estate of James Campbell.)

A market assessment for the project has indicated that project buildout could occur by 2011. At first, residents would reach their homes through a road running through the site to Farrington Highway. The North-South road would become the major roadway to the project, leading to Farrington Highway and to H-1.

The `Ewa Development Plan Area is slated for rapid urbanization. Major new residential areas have been planned, along with a city center in Kapolei. The area could potentially have a strong employment base, but employment center — above all, Barbers Point NAS and Ko `Olina may not generate as many jobs as expected, as fast as anticipated. Residents are concerned with the region's already limited infrastructure and traffic congestion. New public facilities and roadways are being planned to meet the needs of regional growth.

Knowledgeable community informants interviewed by Community Resources, Inc. in September 1994 tended to evaluate the proposed project in terms of the likelihood that it will add to or alleviate `Ewa's current traffic problems and lack of community facilities.

Project impacts include:

- **Employment.** Construction would support more than 13,000 person-years of direct employment over the entire construction period. The average number of direct jobs would be about 825 annually in 1996-2000, then rise to a high of 950 annually in 2006-2010. Construction spending would also support a total of 28,000 person-years of employment in indirect and induced jobs during the construction period.

Operations jobs would be created largely in the project commercial areas. Total on-site operations employment would amount to about 275 jobs by 2000, and reach a total of nearly 900 jobs at buildout. At buildout, an additional 525 indirect and induced jobs would be supported by project operations.

- **Population and Housing.** The project population is estimated as 6,100 in 2000, increasing to 24,500 in 2010. At buildout, the total population would be about 28,000. The population supported by operations-related jobs (including indirect and induced jobs statewide) could live in some 975 households — a small fraction of the 10,000 units in both phases of the project.

Population growth in the `Ewa Development Plan Area (DPA) is likely to be much less rapid than City and County General Plan policy indicates. Project development would help to allocate expected population growth to `Ewa by 2010 in line with current policy, reducing somewhat the pressure for urban growth in other areas.

- **Government Revenues and Costs.** Project construction is estimated as yielding about \$105 million (1994 dollars) in State taxes. City and County property taxes from the project would reach about \$6.5 million annually at buildout (1994 dollars, at current tax rates), and continue at that level. The project would further contribute to lower government costs, in that the developer would participate in the development of infrastructure and facilities along with government agencies.

The developer's participation in infrastructure planning can help infrastructure development occur more quickly and efficiently.

- **Social impacts include:**
  - Provision of additional housing for O`ahu residents, responding to the recognized islandwide need for additional housing.
  - Improved quality of life for residents newly able to own their homes, and for others to the extent that crowded conditions are alleviated.
  - Intensification of demand for regional infrastructure, facilities and services in `Ewa. This will likely involve competition for scarce resources and increased problems of traffic congestion in the short term, but is likely to lead to community pressure for timely construction of planned facilities and delivery of services. The greater the regional population, the more justification will exist for

expensive projects such as the North-South road or for locating social service providers in the proposed Kapolei Civic Center.

The project is likely to have little impact on police, fire, and medical services. Recreation impacts are contingent on the timing of developer's provision of park space.

Impacts on public education will be met in part by the provision of land for two elementary schools on the project site. However, students living in the project will also attend nearby intermediate and high schools in considerable numbers.

- Short-term irritants and potential health impacts due to construction dust and noise.
- Impact on the community character of nearby areas, to the extent that project design and scale is incongruous with them.

Possible mitigations for project impacts include:

- Coordinated planning for regional growth;
- Providing incentives for government agencies to develop community facilities in a timely manner;
- Support for community and/or neighborhood facilities in the East Kapolei project; and
- Community involvement and response, both to work for regional facilities and to respond to problems created by construction.

## CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	<b>i</b>
<b>1. INTRODUCTION</b> .....	<b>1-1</b>
1.1 Project Description .....	1-1
1.2 Purpose and Scope of this Report .....	1-4
<b>2. EXISTING AND EMERGING CONDITIONS IN THE SURROUNDING COMMUNITY</b> .....	<b>2-1</b>
2.1 Definition of Study Area .....	2-1
2.2 Primary Study Area .....	2-1
2.2.1 Overview of `Ewa .....	2-1
2.2.2 Geography .....	2-4
2.2.3 History and Current Conditions .....	2-4
2.2.4 Community Issues and Concerns .....	2-10
2.3 Secondary Study Areas.....	2-12
2.3.1 Central O`ahu Development Plan Area .....	2-12
2.3.2 Wai`anae Development Plan Area .....	2-13
2.4 Emerging Conditions .....	2-14
2.4.1 `Ewa in the Late 1990s .....	2-14
2.4.2 `Ewa Around 2010 .....	2-16
2.4.3 Community Facilities/Organization .....	2-18
2.4.4 Neighboring Regions .....	2-19
<b>3. ECONOMIC AND DEMOGRAPHIC IMPACTS</b> .....	<b>3-1</b>
3.1 The Concept of "Impact" and the East Kapolei Project .....	3-1
3.2 Employment .....	3-3
3.3 Income .....	3-5
3.4 Population and Housing .....	3-6

## CONTENTS (continued)

3.5 Impacts on Government Revenues and Costs .....	3-9
3.5.1 Revenues.....	3-9
3.5.2 Costs.....	3-12
<b>4. PUBLIC FACILITIES .....</b>	<b>4-1</b>
4.1 Public Safety .....	4-1
4.1.1 Police .....	4-1
4.1.2 Fire .....	4-2
4.2 Medical Facilities and Services .....	4-3
4.3 Recreation .....	4-4
4.4 Education and Library Services .....	4-5
4.4.1 Primary and Secondary Schools .....	4-5
4.4.2 Post-Secondary Education .....	4-7
4.4.3 Library Services .....	4-8
<b>5. FIT OF PROJECT WITH SURROUNDING COMMUNITIES .....</b>	<b>5-1</b>
5.1 Approach.....	5-1
5.1.1 "Fit" or Compatibility.....	5-1
5.1.2 Sources .....	5-1
5.2 Compatibility .....	5-2
5.2.1 Views of Community Character .....	5-2
5.2.2 Factors Shaping Community's Views of Project Compatibility .....	5-4
5.3 Development of "Fit" .....	5-6



**CONTENTS (continued)**

**6. SOCIAL IMPACTS ..... 6-1**

    6.1 Overview ..... 6-1

    6.2 Regional Impacts ..... 6-4

    6.3 Impacts on Nearby Areas and Land Uses ..... 6-5

        6.3.1 Project Site ..... 6-5

        6.3.2 Communities along Fort Weaver Road ..... 6-6

        6.3.3 Makakilo and Kapolei ..... 6-8

    6.4 Impacts to Planned Land Uses ..... 6-8

        6.4.1 University of Hawaii, West O`ahu ..... 6-8

        6.4.2 Kapolei High School ..... 6-8

        6.4.3 Site Transferred to DHHL ..... 6-9

    6.5 Impacts on Secondary Study Area ..... 6-9

        6.5.1 Wai`anae DPA ..... 6-9

        6.5.2 Central O`ahu DPA ..... 6-9

**7. MITIGATION MEASURES AND COMMUNITY BENEFITS ..... 7-1**

    7.1 Mitigation Measures ..... 7-1

    7.2 Community Outreach and Benefits ..... 7-4

**APPENDICES**

- A. Detailed Exhibits on Existing Conditions
- B. Key Informants
- C. Community Interview Guide and Handout
- D. Residents' Issues and Concerns Related to the Project
- E. References

## LIST OF EXHIBITS

Exhibit 1-A: Location Map .....	1-2
Exhibit 1-B: Preliminary Concept Plan .....	1-3
 Exhibit 2-A: `Ewa Development Plan Area .....	 2-2
Exhibit 3-A: Project Construction, Sales, and Occupancy .....	3-2
Exhibit 3-B: Construction Employment .....	3-3
Exhibit 3-C: Operations Employment .....	3-4
Exhibit 3-D: Personal Income Associated with Project-Related Jobs .....	3-5
Exhibit 3-E: Population and Housing Associated with Project-Related Jobs .....	3-6
Exhibit 3-F: Target Populations for Development Plan Areas .....	3-8
Exhibit 3-G: Real Property Values and Taxes, Schuler East Kapolei .....	3-10
Exhibit 3-H: State Revenues Associated with Project Construction.....	3-12
 Exhibit 4-A: Estimate of Project's DOE .....	 4-6
 Exhibit 5-A: Factors in Community's Assessment of Project "Fit" .....	 5-3
 Exhibit 6-A: Potential Social Impacts of Project .....	 6-2
 Exhibit 7-A: Possible Mitigation Measures .....	 7-2
 Exhibit A-1: Demographic Characteristics, Selected DP Areas, 1990 .....	 A-1
Exhibit A-2: Geographic Mobility, Selected DP Areas, 1990 .....	A-2
Exhibit A-3: Housing Characteristics, Selected DP Areas, 1990 .....	A-3
Exhibit A-4: Income Characteristics, Selected DP Areas, 1990 .....	A-4
Exhibit A-1: Demographic Characteristics, Selected DP Areas, 1990 .....	A-1
Exhibit A-6: `Ewa and Central DP Areas in Census Terms .....	A-6
Exhibit A-7: Existing and Planned Residential Developments in `Ewa .....	A-7
Exhibit A-8: Demographic Characteristics, Selected `Ewa Areas, 1990 ....	A-9
Exhibit A-9: Geographic Mobility, Selected `Ewa Areas, 1990 .....	A-10
Exhibit A-10: Housing Characteristics, Selected `Ewa Areas, 1990 .....	A-11
Exhibit A-11: Income Characteristics, Selected `Ewa Areas, 1990 .....	A-12
Exhibit A-12: Labor Force Characteristics, Selected `Ewa Areas, 1990 .....	A-13

## **Section 1 INTRODUCTION**

### **1.1 PROJECT DESCRIPTION**

The East Kapolei project is planned for approximately 1,044 acres of land in `Ewa District, O`ahu. The site lies makai and south of Farrington Highway, west of the West Loch developments on Fort Weaver Road, and north of the `Ewa Villages area along Renton Road. Its western boundary is the proposed North-South road, a major road linking central `Ewa to the H-1 Freeway. On the western side of the proposed road is State land, where construction of the future University of Hawaii, West O`ahu and Kapolei High School is planned. (Exhibit 1-A shows the site in relation to the Development Plan Areas of the City and County of Honolulu. Exhibit 1-B indicates the land uses around the site.)

The project has two parts or Phases, as shown in Exhibit 1-B:

- The Phase 1 land is currently owned by the State of Hawaii. The State has agreed with the Galbraith Trust (represented by Hawaiian Trust Company, Ltd.) to a land exchange. The State will gain some 2,200 acres of agricultural land in Central O`ahu in exchange for 500 acres of urbanized land in `Ewa. The Office of State Planning has petitioned the State Land Use Commission to designate the Phase 1 parcel as Urban. When that designation is made, the exchange can proceed.

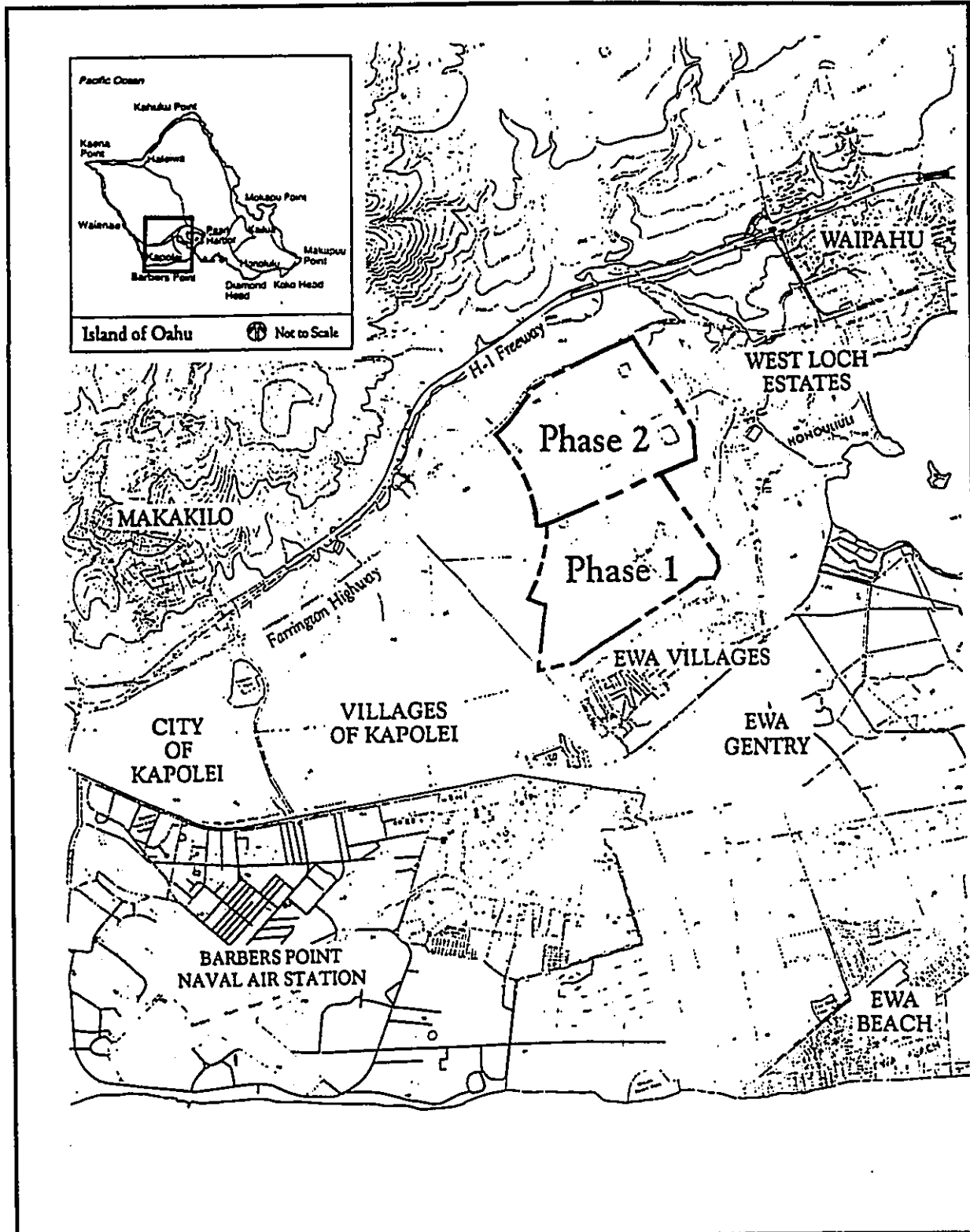
The Galbraith Estate and Schuler Homes, Inc. have entered into an agreement to develop the Phase 1 land as a housing development.

- Phase 2 land is being bought by Schuler Homes, Inc. from the Estate of James Campbell. (While Exhibit 1-B shows the Phase 2 land as 544 acres in area, the exact size of the parcel is still being negotiated.)

The proposed development would consist of housing with supporting infrastructure and public facilities. Each phase would probably include:

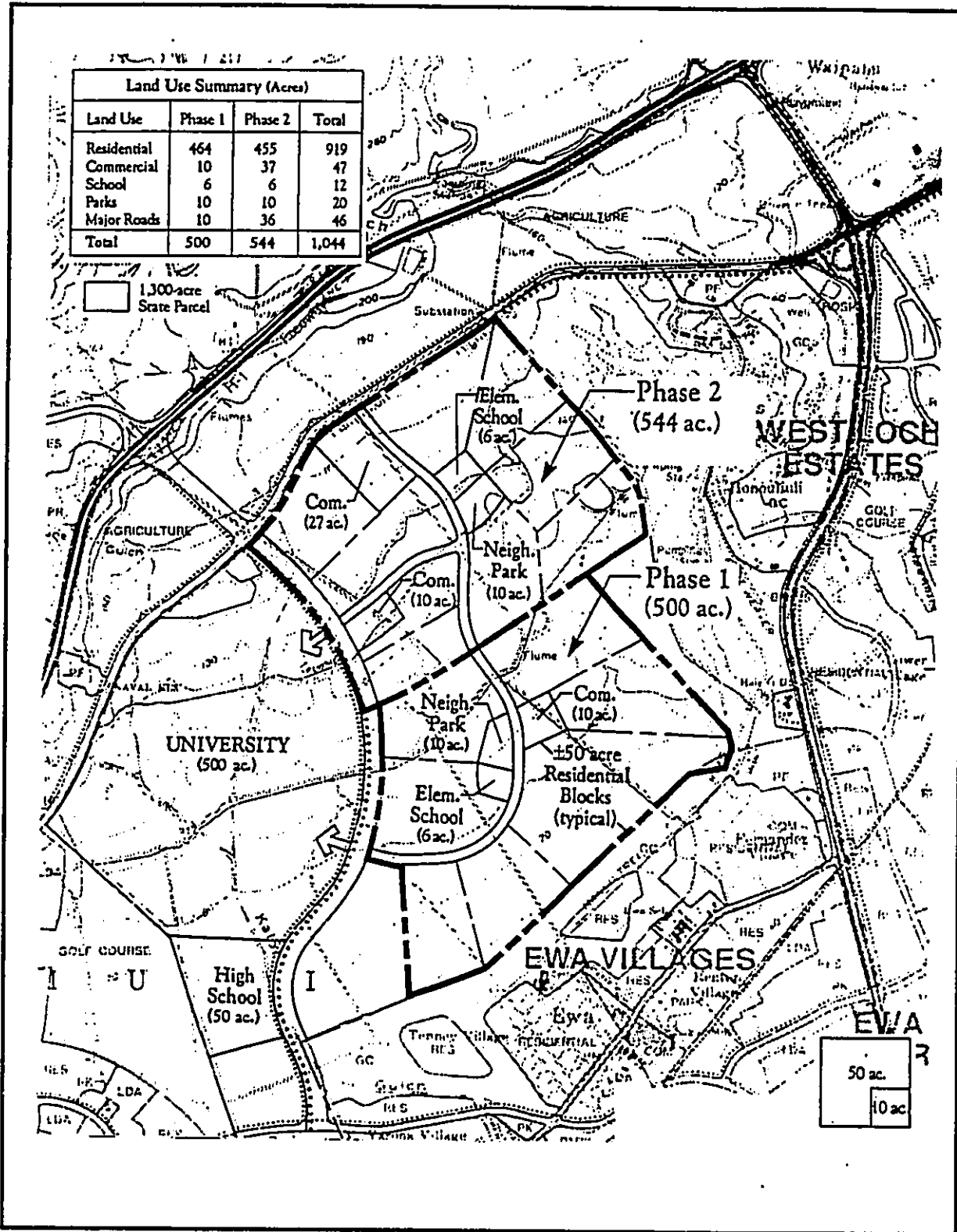
- About 5,000 units of housing, including multi-family and single-family units. These would be built for the resident market. In conformity with City and County policy, about 30% of units would be offered at "affordable" prices to buyers with household incomes ranging from 80% to 120% of the median. Other units would be sold at market prices, but would still be priced at levels comparable to those of nearby `Ewa and Central O`ahu projects.

**Exhibit 1-A  
LOCATION MAP**



SOURCE: Adapted from Helber Hastert & Fee, 1994.

**Exhibit 1-B  
PRELIMINARY CONCEPT PLAN**



SOURCE: Adapted from Heiber Hastert & Fee, 1994.

- Land for an elementary school.
- Land dedicated to park use, adjacent to the school site.
- About 10 acres of land for neighborhood commercial development. That land is shown in Exhibit 1-B as a single parcel in each Phase. However, the acreage could be divided into separate lots, to serve smaller neighborhoods in each Phase.

In addition, a 27-acre parcel included in Phase 2 would be retained by the Estate of James Campbell for eventual development. It is slated for neighborhood commercial use. Because this parcel would not be developed by Schuler Homes, Inc. and no timetable for development has been set, it will not be discussed further in this socio-economic impact assessment.

At first, a road from Farrington Highway through Phase 1 will provide access to the property. When the North/South road is built, both Phase 1 and Phase 2 will have road links to this major road.

If infrastructure development begins in 1996, the first homes might be offered for sale in 1997. Schuler Homes expects to build housing at the site, at Phase 1 then at Phase 2, continuously thereafter. A market assessment for the project indicates that buildout of both phases — 10,000 units — could come as early as 2011. However, the construction period could take longer.

## **1.2 PURPOSE AND SCOPE OF THIS REPORT**

This report assesses the socio-economic impacts of the proposed project. It takes into account both existing conditions and likely future trends in the area surrounding the project.

The report is intended to serve as an appendix to an Environmental Impact Statement being prepared by Helber, Hastert & Fee, Planners. Sections of a draft version of the report were provided for inclusion in an Environmental Assessment of the project.

The report is written to identify and disclose information that may be of use to decision makers and members of the general public as they evaluate the implications of the project. Discussions of the likely points of compatibility of the project with surrounding land uses, of potential impacts, and of steps which might mitigate unwanted impacts are intended to help in the EIS process and to contribute to community planning over the long term.

The sections of this report deal with:

- Introductory issues;
- Existing conditions and emerging trends in the area surrounding the project;
- Economic and demographic impacts of the project;
- Impacts on public facilities and services;
- Other social impacts; and
- Potential mitigation measures and processes that would appropriately respond to adverse impacts of project development.

## Section 2 EXISTING AND EMERGING CONDITIONS IN THE SURROUNDING COMMUNITY

### 2.1 DEFINITION OF STUDY AREA

The project is located on the `Ewa Plain. Its location and the area affected by it could be defined in several different ways.

The site is within the State's `Ewa District and the City and County of Honolulu's `Ewa Development Plan Area (DPA). As a major housing project built in response to existing and anticipated demand, the project is intended to serve consumers from all areas of the island of O`ahu. It will compete for buyers with other projects in `Ewa and Central O`ahu. Finally, it will add to traffic on the H-1 Freeway, affecting residents of Wai`anae, who also depend on the western sections of this roadway, along with other `Ewa residents.

For this report, the `Ewa DPA is the Primary Study Area. It includes the land divisions of Hono`uli`uli and Pu`uloa. This region has been identified as a high-growth area of O`ahu, in which planned residential, commercial, industrial, and public developments are being proposed to form a Second City. (The State's `Ewa Judicial District is much larger, with boundaries running from Halawa in the east to Barbers Point in the west, as shown in Exhibit 2-A. That region is not usefully considered as a unit for the purposes of this report.)

Because the project will have impacts on residents and housing projects in the DPAs adjoining `Ewa, the Wai`anae and Central O`ahu DPAs are considered Secondary Study Areas in this report.

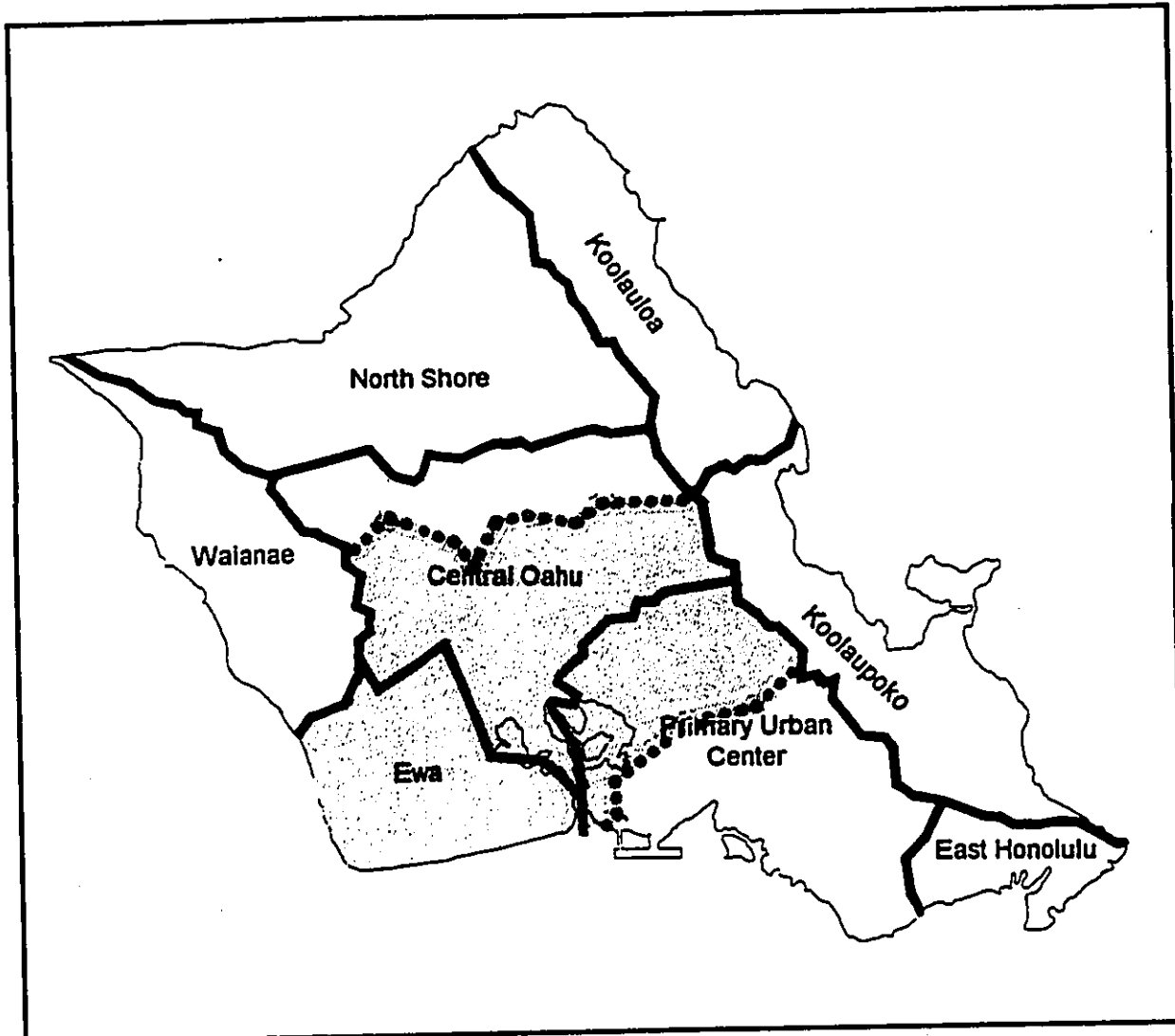
### 2.2 PRIMARY STUDY AREA

#### 2.2.1 Overview of `Ewa

`Ewa lies in the leeward district of O`ahu, to the west of Pearl Harbor. `Ewa means "crooked" or "ill-fitting." It is said that the gods Kane and Kanaloa once walked around O`ahu and threw stones to determine district boundaries. Wherever the stone landed would become the boundary. However, when they came to present day `Ewa, they could not find the stone they threw and called that district "Ewa." The story concludes that the strayed stone was later found at Pili o Kahe, a place at the present-day boundary of Wai`anae and `Ewa in Nanakuli.



**Exhibit 2-A  
'EWA DEVELOPMENT PLAN AREA**



NOTE: Shaded area depicts boundary of 'Ewa Judicial District.

SOURCE: Adapted from City & County of Honolulu Planning Department, 1992.

Kamehameha III awarded the 'ahupua'a of Hono'uli'uli to Chief Miriam Ke'ahikuni Kekau'onohi in 1848. She in turn leased it to ranchers. James Campbell bought Hono'uli'uli from a rancher in 1878. Campbell had the first artesian well drilled on his ranch in 1879, and subsequently developed well systems which allowed the cultivation of sugar cane in Hono'uli'uli. Campbell leased about 2,000 acres of land to Castle and Cooke in 1890 to raise cane under the incorporation of Ewa Plantation Company. A plantation settlement was established around the mill site on Renton Road and 'Ewa became a plantation community.

Castle and Cooke dissolved the Ewa Sugar Company in 1970 and sold its operations to AMFAC, thus merging Ewa Plantation with O'ahu Sugar Company (OSCo). Cane cultivation continued but processing was done at OSCo's Waipahu mill. OSCo's lease with Campbell Estate will end in 1995.

`Ewa is made up of many different and distinct communities. Old and new settlements stand in contrast. Although `Ewa Villages and `Ewa Beach, two older and major communities, are predominantly Filipino, Caucasians made up the major ethnicity (followed by Filipinos) in the `Ewa Development Plan area, in the 1990 Census (See Appendix A-1). The `Ewa Development Plan area (DPA) had a large proportion of young adults, aged 18 to 34 years old.

Some 21% of home owners in the `Ewa DPA paid 35% or more of their income for housing expenses, while the island-wide average was only 15%.

Due to the presence of the Barbers Point Naval Air Station (BPNAS) and the Iroquois Point housing area, the number of persons employed in the military was double that of Honolulu County. The number of men and women working in the civilian labor force was slightly higher than the island-wide population. (See Appendix A-5).

Although sugar has been the primary activity in `Ewa, BPNAS and James Campbell Industrial Park (JCIP) have provided an alternative industrial base. New office and commercial projects in Kapolei provide a basis for further diversification of the economy.

Regional population trends indicate that `Ewa's population will more than double by 2010 (Planning Department, City & County of Honolulu, April 1994). The average annual growth rate from 1980 to 1990 was 1.87%, and is forecast as about 4%, between 1990 and 2010. In 1990, `Ewa accounted for about 5% of O'ahu's population; in 2010, it is expected to account for about 9% of the total island population.

The anticipated population growth follows from the development of major new subdivisions. In the 20-year period from 1990 to 2010, `Ewa's housing stock is expected to increase by nearly 17,000 units, more than double the 1990 stock. (This estimate falls below earlier ones, that treated all permitted developments as built out by 2010. One count of permitted and proposed units in `Ewa included 13,975 existing units and 39,089 future units [Estate of James Campbell, 1993c.]

With urbanization, `Ewa's regional jobcount is estimated as reaching 48,552 jobs in 2010, nearly four times the 1990 figure. However, the speed of job-creation at Ko` Olina and at BPNAS (after the base closes in 1997) is uncertain. Kapolei will soon become the major employment center of the region. Campbell

Industrial Park and Barbers Point Deep Draft Harbor will function as industrial and maritime employment centers.

### **2.2.2 Geography**

The project site is in the `ahupua`a of Hono`uli`uli.

The two major land forms in the `Ewa region are the `Ewa Plain and Makakilo upland. H-1 Freeway and Farrington Highway are the general boundaries of the two land areas. The cinder cones, *pu`u*, along the Wai`anae Mountain Range form the peaks of that region: Manawahua, Kapuai, Makakilo, Palailai, Kapolei.

`Ewa Plain is an elevated coral reef covered by alluvium. Elevations vary from about 50 feet above mean sea level (MSL) near the southern boundary at NAS Barbers Point, to 2,300 feet MSL at Pu`u Manawahua, the highest peak in the `Ewa region.

The climate is relatively dry in `Ewa. However, the land was arable in earlier times. There were once large terrace areas near West Loch, referred to as `Ewa taro lands. Hawaiians used the holes and pits in the coral for planting.

### **2.2.3 History and Current Conditions**

James Campbell purchased 41,000 acres of land in Hono`uli`uli for \$95,000 in 1877. He bought the dry ranch land from owner John Coney. Looking for a water source to cultivate sugar cane, Campbell hired John Ashley to drill for water. On September 22, 1879, Ashley tapped the first artesian well, named Wai`ani`ani, which continued to flow for 60 years.

Soon after the discovery of the artesian well, Benjamin Dillingham leased land from Campbell to cultivate sugar on a large scale. He sought out W.R. Castle's expertise in sugar cane cultivation, and shortly thereafter, the Ewa Plantation Company was chartered and incorporated. Dillingham also obtained permission from the Government of Hawai`i to construct O`ahu's first railroad — Oahu Railway and Land Company (OR&L). With water and transportation available, `Ewa was transformed into a plantation community in the 1890s.

`Ewa's sugar and plantation communities flourished for decades. After World War II, no new investment was made in the plantation villages. Sugar cultivation remained, but urban development began to encroach on sugar land on the `Ewa Plain in the 1980s. Now the area is largely planned for urbanization.

(See Appendix A-7 for an inventory of residential projects existing and/or planned in `Ewa.)

**Project Site.** The project site has been planted in sugar cane for most of this century. With the closing of Oahu Sugar Company (OSCo) slated for 1995, this The landowners have negotiated with truck farmers to continue agricultural use of the land in the next few years.

**Major Communities.** CRI compiled 1990 Census data for five `Ewa residential areas (`Ewa Villages, `Ewa Beach, `Ewa by Gentry, Barbers Point NAS, and Makakilo). Kapolei and West Loch are also notable developments as of 1994. These are discussed here in order of age:

- **`Ewa Villages.** Sugar mill construction commenced in 1891, and plantation villages sprouted up around the mill site over the next sixty years. The number of residential units amounted to over 1,200 during that era. The Ewa Sugar Company built most of the villages. At one time there were eight villages, housing immigrant plantation workers from Portugal, Spain, Korea, Japan, and the Philippines. Four of the newer villages — Renton, Tenney, Varona, and Fernandez — are still standing, while "C," Mill, Middle, and Lower Villages were razed

Renton Village is the historic core of the Villages. It was built between 1913 and 1938. Much of the community's infrastructure and facilities were constructed during George F. Renton's tenure as plantation manager. Improvements to the area included: construction of most of the mill structures, a system of roads, installation of street lighting, water mains, service lines and plumbing, fire equipment, theaters, clubhouses, playgrounds, tennis courts, a swimming pool, administration building, and hospital.

Although the villages were rather self-contained entities, a number of amenities served as the focal point and a gathering place for the entire area. These included the post office, general stores, churches, butcher shop, and a bank. Several churches and social halls are also still standing in the Villages.

There has been no construction of new villages since the 1950s. Fernandez Village was redeveloped in the late '70s to early '80s, and the City is currently engaged in revitalizing the Villages in order to preserve the plantation character and heritage of the mill area.

The `Ewa Villages population was 3,780 in 1990 (See Appendix A-8, Demographic Characteristics), and residents were primarily Filipino (67%). The median age was 32.4 years. Most of the Villages residents

were born in Hawai'i, while one-third were born in another country (Appendix A-9). About half of the residents were living in houses that were more than twenty years old (as shown in Appendix A-10), while about 40% had lived in their homes from two to 10 years. (Most of these households probably reside in Fernandez Village, which was redeveloped.) Two-thirds of the households were owner-occupants, while one-third were renters. The average household size — 4.19 persons per household in 1990 — was very high for O'ahu.

In 1990, almost half of the Village households received Social Security income, and one-third received retirement income (See Appendix A-11). Few Village residents (1%) lived in poverty, and the median household income was just above the island median.

The City Department of Housing and Community Development (DHCD) plan for revitalizing the 'Ewa Villages calls for a number of improvements, including:

- developing some 957 affordable and market, single- and multi-family residential units, while also revitalizing 273 existing homes;
- expanding 'Ewa Elementary School;
- creating a district park and an 18-hole municipal golf course;
- developing a commercial/retail center and a business park; and
- providing for existing churches (through land acquisition or relocation).

The plan calls for not only architectural renovation to preserve the historic character of the villages, but also rental and home ownership programs for Renton, Tenney, and Varona village residents.

The project is now scheduled for completion between 1997 and 1998, with homes rehabilitated by 1997. The golf course is presently under construction.

- **'Ewa Beach.** 'Ewa Beach began as a weekend recreational area in the 1940s and eventually became a permanent residential community. There were 3,426 housing units reported in the 1990 Census.

There were 14,315 people residing in 'Ewa Beach in 1990 and residents were predominantly Filipino. The median age was 28.6 years (Appendix A-8). Households are very large, with an average size of

4.26 persons. People in `Ewa Beach were much more likely to be receiving public assistance for income than the other major communities in `Ewa (Appendix A-11).

- **Barbers Point Naval Air Station (BPNAS).** Originally known as Kalaeloa, this area in the south-central portion of Hono`uli`uli, was renamed Barbers Point after Captain Henry Barber wrecked his ship on a coral shoal in 1795. BPNAS was established during World War II as a major U.S. Navy aviation facility. The station comprises 3,700 acres and operates on a 24-hour basis. There are three 7,000-foot runways which allow operation of fixed-winged and rotary-winged aircraft.

According to the 1990 Census, the air station had 2,218 residents. (In addition, the Iroquois Point military housing area, on the eastern side of `Ewa, houses about 5,000 persons.)

Military personnel stationed on-base at BPNAS numbered 4,146 in 1990, while 1,619 civilians were employed there (from special Census runs for transportation analysis, for Traffic Advisory Zone 251). BPNAS is scheduled to shut down in 1997 as part of the national Base Realignment and Closure initiative. Plans for re-use are currently under way. Navy housing and recreation areas will be retained after the Naval aviation facility closes.

In comparison to other `Ewa communities, Barbers Point residents were young with a median age of 24.7. Due to the low military wage structure, there was less difference between rich and poor at Barbers Point than in `Ewa Beach or Honolulu County as a whole (as shown by the interquartile income range, in Appendix A-11).

- **Makakilo.** Makakilo opened for occupancy in 1962, with single- and multi-family, mid-priced homes. Finance Realty is the major developer at Makakilo, which encompasses 1,202 acres. Development is more than halfway through and there will be 6,174 homes at full build-out.

Makakilo had 9,828 residents in 1990. (See Appendix A-8.) Nearly half were Caucasian. Although people have lived in Makakilo since 1962, over two-thirds of the population were recent arrivals in 1990 — 64% had moved into their homes within the five years preceding the Census (Appendix A-9).

Makakilo had higher household income levels than the other communities shown in Appendix A-11. However, costs were also high in Makakilo. Some 24% of homeowners spent 35% or more of their

incomes on housing costs, while 46% of renters spent similarly large shares of their income on housing.

- **Ewa by Gentry.** The first residents began moving into Soda Creek, the development's first subdivision, in 1988. The population of Ewa by Gentry was nearly 2,000 in 1990 (Appendix A-7). One-third of the residents were Caucasian, and about another third were Filipino. The median age was 28.4 years. Similar to Makakilo, almost 90% of Ewa Gentry residents had earned a high school diploma; 40% had a college degree.

In 1990, there were 752 houses in Ewa by Gentry. Eighty percent of the homes were owner-occupied. Owners and renters alike in this development paid the most for housing costs, compared to the other `Ewa communities studied. Almost 40% of homeowners, and 78% of renters, paid more than 35% of their income for housing costs (Appendix A-11).

Gentry Development Company plans to build about 8,300 homes over 1,000 acres of land in Hono`uli`uli. To date, about 3,500 units have been completed. The remainder of units are scheduled to be built through 1999. Planned community facilities are: an 18-hole golf course, elementary school, two community parks, and a neighborhood community center.

- **West Loch.** This DHCD project is situated on 491 acres in Hono`uli`uli on the western edge of Pearl Harbor's West Loch. The development consists of single- and multi-family homes; 60% are affordable and 40% are in the market range. Phase I was completed in 1990, with 593 homes. A total of 1,600 residential units will be built by the end of the project. Other planned features of the community include: a commercial center, church, child care facilities, Asing Community Park within the civic center, an 18-hole municipal golf course, and a 40-acre shoreline park.
- **Kapolei.** Kapolei, which was not even counted as a Census Defined Place in 1990, is to be the regional center for `Ewa and nearby areas.

Campbell Estate has been involved in master planning its extensive property in the `Ewa region since 1955 when Harland Bartholomew and Associates prepared the first `Ewa master plan. The plan was revised in the early 1960s, and updated in 1974, during which the concept of a self-contained city evolved. In 1986, Campbell Estate proposed a detailed implementation plan for a city center, bordered by Makakilo, Campbell Industrial Park, and NAS Barbers Point, and renamed it

Kapolei. The city center concept accorded with General Plan policies to develop a secondary urban center in west O'ahu.

The Kapolei Area Long Range Master Plan defines the second city as consisting of: Kapolei Villages, Kapolei Town Center, Kapolei Regional Park, Kapolei Shopping Center, Ko 'Olina resort, James Campbell Industrial Park, Barbers Point Harbor, and Makakilo. Finance Realty plans to develop Kapolei Knolls mauka of Kapolei Villages. To the east, the State has identified sites for the University of Hawaii, West O'ahu and for Kapolei High School. The East Kapolei project further extends the unofficial limits of the Second City, to cover nearly half of 'Ewa.

The State Housing, Finance, and Development Corporation (HFDC) is developing Kapolei Villages in conjunction with DHCD. The first homes were completed in 1990. There will be about 5,000 residential units at build-out.

Kapolei also includes:

- Offices at Campbell Square;
- A shopping center with some 25 vendors, ranging from grocery markets, service outlets, specialty shops, and fast food eateries;
- A new elementary school; and
- Many additional components under construction (i.e., the Bank of Hawaii building, with space for some 1,200 employees; a 16-screen movie theater; part of the regional park; and a child care center.) Seagull Schools expects the center to be completed in April 1995. It will accommodate 280 children, from six weeks to five years old.

**Non-Residential Developments.** Major employment centers, in addition to BPNAS, are James Campbell Industrial Park, Barbers Point Harbor, and the Ko 'Olina Resort:

- **James Campbell Industrial Park (JCIP).** Campbell Estate developed this park as a heavy industrial complex in 1959. The entire complex stretches across 1,367 acres. Major tenants include two oil refineries, a concrete manufacturing plant, cattle feed lot operation, large building material supply yards, numerous light industrial businesses, and the City's H-POWER plant. About 75% of the park is owned in fee by its tenants.



- **Barbers Point Harbor (BPH).** The new State-owned harbor is located at the northwestern edge of the Industrial Park. Campbell Estate dedicated 89 acres to the State for the harbor. Both BPH and Campbell Industrial Park are extensions of Foreign Trade Zone No. 9. The first increment of the development was completed in 1990, and ships now make regular calls at BPH. Facilities include 1,600 feet of pier and 30 acres of paved back-up area and related infrastructure. In addition, a bulk cargo ship unloader went into use in 1992.

When harbor development is completed in the next 15 or 20 years, there will be a total of 237 acres of developed area surrounding the basin. BPH is being planned to accommodate O`ahu's shipping needs for the next 50 years.

- **Ko `Olina.** Ko `Olina is a planned resort community at the southwest end of the `Ewa region. Developer West Beach Estates has planned and created beaches and lagoons for a 1,000-acre resort. To date, one hotel and a golf course have been developed. Eventually, a maximum of 8,700 housing units could be built, and about 9,000 people employed (Personal communication: Ken Williams, West Beach Estates, August 1994). Medium-rise apartment-condominiums, low-density apartments near the golf course, and hotels are planned. The 350-400 slip marina has already been dug out and in-water facilities are to be built.

#### **2.2.4 Community Issues and Concerns**

Community Resources, Inc. reviewed Ewa Neighborhood Board Minutes from January 1992 to mid-1994, to identify recurring concerns of the `Ewa community. Major concerns expressed by Board members and the community included:

- **Development of the `Ewa Area.** This has involved discussion on the impacts of growth on the quality of life for existing communities, and promises made to those communities by developers, City, and State officials.
- **Public Infrastructure and Facilities.**
  - **Schools:** The community wants to ensure that DOE will live up to its promises to provide adequate facilities and services within a reasonable time period.
  - **Wastewater Management:** The Ewa Neighborhood Board does not have confidence in the City's prediction that the Hono`uli`uli

Sewage Treatment Plant can adequately support the planned developments in `Ewa.

- **GTE Hawaiian Telephone System:** The system does not currently have the ability to provide expanded services in the `Ewa area. GTE has promised these services by the end of 1995.
- **Traffic:** Traffic flow in and out of Leeward is hampered by the inadequate access roads (Fort Weaver Road, and the current H-1 freeway exits), and by the need for more traffic lights coming into and out of the development areas.
- **Crime.** Crime in `Ewa could be managed by the police substation in Kapolei and increased police services, according to Neighborhood Board members. Concerns included the increasing number of gangs, graffiti, and drug houses, that the Board feels could be handled by expanding youth recreational facilities and services.
- **Fire Protection.** This in `Ewa is considered adequate, but the community would prefer that the fire station planned for Kapolei be positioned close to large development tracts, such as Ewa by Gentry. Until the new fire station is built, Kapolei is served by both the Makakilo and the Waipahu Fire Stations.
- **Parks.** A central district park is sought by members of the community. HFDC has developed a master plan for the Kapolei District Park, that Kapolei residents feel is inadequate unless both night time lighting and landscaping features are included in the plan. HFDC believes that these features should be purchased and added by Campbell Estates.
- **Naval Air Station Barbers Point.** Future use of the station is an area of concern. Many residents oppose the conversion of this area into an airport, and would like the beach area to be converted into park land.

Community Resources, Inc. conducted interviews of community leaders and other representatives in September 1994, to understand what issues and concerns were most pressing to them. For the most part, the interviewees' concerns tended to reflect discussions before the `Ewa Neighborhood Board. Three concerns were mentioned most often:

- **Traffic Congestion.** Congestion is especially during peak commute hours. Interviewees looked forward to the North-South Road as a reliever for Fort Weaver Road.

- **Timing and Coordination of Infrastructure, Public Facilities, and Commercial Development with Residential Development.** Two major issues raised under this concern were:
  - Park facilities — the need for more park space and facilities, and for properly maintained parks;
  - Schools — the need for another high school and other educational facilities to meet existing and future demands in a timely manner.
- **Uncertainty about Jobs.** Several wondered whether Kapolei will become another major financial district like downtown Honolulu as envisioned, and whether the re-use of Barbers Point will generate many jobs.

Other concerns that residents mentioned were:

- Uncertainty over how the neighborhood character would change with the influx of new residents;
- The desire for a sense of community, but with little time to create it;
- The perception of a lack of political equity between 'Ewa and other regions of the island, as well as power differentials between 'Ewa communities;
- The need for more organized youth activities and services; and
- The capacity of the Hono'uli'uli Sewage Treatment Plant to handle current and future processing.

## 2.3 SECONDARY STUDY AREAS

### 2.3.1 Central O'ahu Development Plan Area

Central O'ahu contains both established communities that have long served as plantation towns — Waipahu and Wahiawa — and new developments. Of the new developments, Mililani Town is a planned community, with homes, a light-industrial or technological park, and a major shopping center; and Waikele includes both extensive residential areas and a major shopping center. It is located between Waipahu and other subdivisions, not as a separate community.

While Central O'ahu is much more populous than 'Ewa DPA, the two areas' populations are very similar. Differences largely follow from the existence of

plantation towns in Central O`ahu. (There is no military base in Central O`ahu, but 16% of the 1990 population age 16 and over was in the armed forces [compared to 17% for `Ewa]). Central O`ahu lies between the major military bases of O`ahu, at Pearl Harbor, or Schofield Barracks, and it houses military personnel assigned to either.)

Central Oahu had more than 130,000 residents in 1990 (as shown in Appendix A-1). The age structure was very similar to that of `Ewa. As in `Ewa, about a quarter of the population was of Filipino ancestry. Caucasians formed the largest single ethnic group, but amounted to only 30% of the population (vs. 40% in `Ewa). Household incomes were slightly higher than for `Ewa households (as shown in Appendix A-4). The average household size — 3.49 persons per household — was slightly less than the `Ewa average, but still much higher than the islandwide average of 3.02 persons (Appendix A-3).

### **2.3.2 Wai`anae Development Plan Area**

Wai`anae is relatively isolated, with one major roadway linking the region with the rest of O`ahu. Major land uses include military uses (at Lualualei and Makua valley), Hawaiian Homelands areas (in Nanakuli) and a resort in Makaha.

The region is known for a distinctive "country" lifestyle based in the Native Hawaiian culture of many residents. It stands out as more settled, with larger households than in nearby regions.

In 1990, Native Hawaiians made up 41% of the DPA population. About three-quarters of the population was born in Hawaii. The community was young, with a median age of 26.3 years. (For demographic characteristics, see Appendix A-1.)

Incomes tended to be low in the Wai`anae DPA. About a fifth of the population had incomes below the poverty line (Appendix A-4). Many renters (44%) paid a very large part of their incomes for housing costs. However, only 14% of homeowners paid over 35% of their incomes for housing, in contrast with the other DPAs under study. Unemployment was about twice as high as the islandwide average, and workers typically commuted 36 minutes to work (as shown in Appendix A-5).

## 2.4 EMERGING CONDITIONS

### 2.4.1 ʻEwa in the Late 1990s

ʻEwa's sugar lands are being replaced by urban development. Recent years have seen residential growth and modest retail development. However, plans call for a complete city, not a set of suburbs separated by grass lands.

The Kapolei Area Long Range Master Plan contains designs for a city similar in layout to Honolulu: a commercial and government center, surrounded by homes, with a resort area six miles from the urban center, and a commercial harbor in close vicinity.

Though projections indicate that ʻEwa is the fastest growing region of all the Development Plan Areas (DPA) on Oʻahu, there are several uncertainties that appear on the horizon of near-term (to 2000) and long-term (to 2010 and beyond) developments. The fundamental question is whether Kapolei will manifest as the second city.

**Population and Housing.** In 1990, 42,983 people, or 5% of the island's population, lived in ʻEwa. As growth is directed away from the Primary Urban Center towards the Second City in leeward, forecasters predict that ʻEwa's population will more than double over the next 15 years.

ʻEwa is experiencing a boom in housing development. Residential construction projects began in the mid-1980s with the first phases of these projects: Ewa by Gentry, Villages of Kapolei, and West Loch. In 1990, there were 11,734 housing units. Residential construction increased in the early 1990s and will continue well into the early years of the next century. Major developments planned for the late 1990s to 2000 are:

PROJECT	UNITS
Ewa by Gentry	4,050
Ewa Marina	2,109
Ewa Villages	1,603
Kapolei	2,220
Makakilo	1,500

In ʻEwa, there are about 32,000 housing units either proposed or committed by various developers through 2010. In line with predictions for the growing population, housing should increase four times faster than for all of Oʻahu. Refer to Appendix A-7, for a summary of housing developments.

**Employment.** City planners hope for a high rate of growth in jobs for ʻEwa in the next 15 years, as the Second City comes into being. The region's military facilities, tourism plant, and industrial area could provide a strong basis for jobs.

However, uncertainties loom over several projects in the area, which may affect `Ewa's employment growth projections:

- **Kapolei Civic Center.** The first Kapolei State office building is now scheduled for occupancy in early 1998 (personal communication: Joseph Earing, Department of Accounting and General Services, August 1994). Location of government offices will be phased in over the next decade or so, with substantial relocation expected by 2010. It is anticipated that civil service positions will comprise much of the 9,800 jobs projected for the Kapolei urban core (The Estate of James Campbell, October 1993).
- **The Naval Air Station at Barbers Point** is scheduled to close in 1997. Although the Navy plans to retain housing on the site, the installation's closing will result in the loss of most civilian jobs in support of existing military operations. In 1990, Barbers Point provided 56% of the jobs in the `Ewa DP area. In its new role, it is forecast to provide only about 18% of the jobs for `Ewa.

The Barbers Point Naval Air Station Reuse Committee, a group comprised of government, business, and community leaders, was formed to consider possible uses of the site after the base closes, and to forward their recommendations to the Secretary of Navy. Once the Navy decides on the new federal uses, the remaining property will be declared surplus, and become available for other uses. Recently, the Reuse Committee voted in favor of a proposal to keep the Coast Guard air rescue operation there, rather than relocating it to the Marine Corps Base in Kane`ohe. Possible future uses of the base are as yet undetermined, so the number of jobs that will be generated cannot be estimated

In any event, it is likely that there will be some dislocation of jobs for several years. Some jobs may be generated during the transition. These jobs are likely to be highly specialized in environmental protection and hazardous waste disposal.

- **Ko `Olina** is planned as a world-class resort community. City projections to 2010 indicate that Ko `Olina would provide 15% of the jobs in the `Ewa DP Area (Planning Department, April 1994). At build-out, the resort is supposed to employ 9,000 people.

Development has lagged behind initial plans, and no firm dates are available for construction of additional hotels or most of the proposed residential stock. Consequently, Ko `Olina is unlikely to be a major employer in the region in the near term.

- **Ewa Marina** is a master-planned resort community on 1,100 acres with one mile of ocean frontage near `One`ula Beach Park. It is to include a 1,400-slip marina and comprise a mix of: residential units, visitor units, specialty hotels, a 27-hole golf course, health and fitness center, and community-scale commercial center. Developer HASEKO (Ewa), Inc. received designation of the property for urban use by the City and County and State Land Use Commission in 1993. Final government approvals for the marina are pending. Construction is expected to start up in 1995, with a projected fifteen years till full build-out. Construction will occur in two phases. Approximately 2,000 residential units are scheduled for sometime between 1996 to 2000 and about 2,700 more units between 2001 to 2010. At build-out, there will be more than 4,800 residential units and almost 1,000 visitor units.

This timetable suggests that `Ewa Marina will generate many construction jobs in the rest of the 1990s, but few on-site operational jobs.

Until the Kapolei Civic Center, Ko `Olina, and `Ewa Marina are substantially built out and occupied, the ratio of jobs to housing in `Ewa will be low.

#### 2.4.2 `Ewa around 2010

**Population and Housing.** The City and County's population projection for `Ewa in 2010 is 93,112 persons, 9.3% of the island's population.

Several of the housing developments will reach the middle or final increments by 2001. Hence, housing starts could be fewer from 2000 to 2010 than in the 1990s. Planned projects that will contribute significant increments of housing during the first decade of the 21st century are:

PROJECT	UNITS
City of Kapolei — Makai	1,000
Ewa Marina	2,335
Makaiwa Hills	1,000
Villages of Kapolei	949

**Employment.** For 2010, the City and County Planning Department expects that there would be some 31,312 jobs in `Ewa. The total number of jobs is small compared to Central O`ahu (projected as having 63,361 jobs in 2010), `Ewa is expected to have the highest employment growth rate of all the O`ahu DPAs (5.11% annually, as compared to 1.71% and .6% for Central O`ahu and the Primary Urban Center). This projection anticipates successful relocation of government offices to Kapolei Civic Center, formation of a strong employment

base by light and heavy industrial uses, full operation of maritime activity at Barbers Point Deep Draft Harbor, and replacement of the Barbers Point military base with a new job centers.

**Other Regional Forces for Change.** Two additional factors may affect the character of the region after 2000:

- **University of Hawai'i — West O'ahu (UHWO).** The University of Hawai'i (UH) Board of Regents approved the siting of the second University campus in the State's "land banked area," just west of the project area. The site encompasses 500 acres of land that is now in cane.

Though the University of Hawai'i is just beginning the master planning process, a tentative timeline for development has been outlined (Atwater, September 1994; and personal communication: Clyde Akita, UH Facilities Planning and Management, September 1994):

1996 - 1997:	Begin site preparation and infrastructure
2000 - 2001:	Complete planning, design, and site work
2000 - 2005:	Campus provides a four-year undergraduate in liberal arts with limited masters-level programs. It is expected that students will be net additions to the University of Hawai'i system.
2001 - 2045:	Campus will provide full bachelors and masters programs.
2006:	UHWO must have at least 2,650 students enrolled, or land will revert to Campbell Estate.
2010:	Enrollment of 4,000 students projected
2020:	Enrollment of 6,020 students, as projected by a City Planning Department study (Atwater, 1994).
2050 +:	The campus may have doctoral programs (Atwater, 1994).

UHWO will bring demand for on-campus student housing and off-campus housing for students and faculty. It will stimulate retail and other commercial activities, as well as create a number of jobs for the region.

- **Department of Hawaiian Home Lands (DHHL).** DHHL is working with Office of State Planning (OSP) and Department of Land and Natural Resources (DLNR) to identify public lands for transfer to their department, in order to make more developable lands available for homestead development. In `Ewa, two parcels are being considered for transfer (Office of State Planning, August 1994):

1. A 67-acre parcel owned by Campbell Estate near the intersection of Malakole Street and Kalaeloa Boulevard (TMK 9-1-15:15); and



2. Some 200 landbanked acres presently under lease to OSCo in Kapolei (TMK 9-1-16:25). This area includes the 85 acres adjoining Phase 1 along the North-South road (in Exhibit 1-B) as well as land makai of the proposed Kapolei High School, west of the North-South road. This area could be developed while, or soon after, Phase 1 of the project is developed.

### **2.4.3 Community Facilities/Organization**

Kapolei will become the focal point of the region, with its town center, shopping center, and regional park. Campbell Industrial Park will continue as one of O'ahu's major industrial parks, and will be complemented by the development of the Kapolei Light Industrial Park. The deep draft harbor at Barbers Point should be completed in the next 15 to 20 years and will be the second seaport along O'ahu's lee coast, becoming the focal point of maritime activity for 'Ewa and west leeward communities.

As Kapolei becomes the regional hub, the surrounding 'Ewa communities will become suburbs of Kapolei, not Honolulu, to an important extent. Each of the residential developments has a distinct character; and each community has its own issues, concerns, and needs.

In 'Ewa, every residential area has a community association. Community associations of planned subdivisions are usually formed by the developer and turned over to the residents. The board of directors control and enforce the Declaration of Covenants, Conditions and Restrictions (CC&Rs), which specify standards for home maintenance and appearance in a development.

Community associations also try to spark communal life and encourage resident participation. Associations have formed Neighborhood Security Watches, graffiti removal task forces, craft fairs, pot lucks, *ho'olaule'a*, and youth activities and programs.

The 'Ewa Neighborhood Board is the primary forum through which representatives of the different community associations interact to discuss local and regional issues. In recognition of the growing population of Makakilo and Kapolei, the Neighborhood Board Commission approved a resolution to reduce the jurisdiction of the 'Ewa Neighborhood Board and establish Board 34, covering Makakilo, Kapolei, Barbers Point, and Honokai Hale communities (West Oahu Current, September 1994). The 'Ewa Neighborhood Board will continue to represent 'Ewa Beach, 'Ewa Villages, Ewa by Gentry, and the West Loch projects.

Aside from Neighborhood Board participation, the communities now come together for an annual Christmas parade, which is sponsored by the `Ewa Beach Professional Business Association and the `Ewa Beach Community Association.

A proposed regional park at Barbers Point that is being considered as a possible re-use of the naval base could be an asset and major attraction of the region. The subcommittee on parks of the Barbers Point Re-use Committee has recommended that 1,200 acres of the naval air station be dedicated for a regional park. The Re-use Committee's planner has indicated that at least 800 acres could be dedicated to park use, whatever else is planned for Barbers Point (public communication: Mark Hastert, September 29, 1994). The park could permit diverse activities at ball fields, spaces for flying model airplanes and sailing model boats, and ocean recreation areas

A sense of regional identity will likely manifest as Kapolei emerges. Still, it is also likely that the various residential communities, both existing and upcoming, will retain separate and distinctive identities. The division of the Neighborhood Board into two boards and the limited cooperation achieved to date among local community associations suggest that `Ewa-wide community organization will be difficult.

Regional identity may also go beyond the limits of the `Ewa DPA. UHWO could be a focus for regional allegiance, especially if the University establishes an athletics program there. There is no reason, however, why Wai`anae and Waipahu residents would feel less a part of the UHWO community than `Ewa residents.

#### **2.4.4 Neighboring Regions**

**Central O`ahu.** The Central O`ahu DPA follows `Ewa as one of the leading growth areas on the island. The year 2010 population is forecast as above 169,000, or about 17% of the island's population.

Major growth areas are located near Mililani and on the mauka side of Waipahu. Near Mililani, Mililani Mauka is planned to include 6,600 units of which about 2,000 have been built. In Launani Valley, some 300 units have been built, of a planned total of 1,000. Nearby, the Mililani Technology Park is still being developed.

Near Waipahu, Waikele has permits to build 3,000 homes (of which 1,600 are now standing). The Royal Kunia project is planned to include eventually some 3,700 units, if permits are gained for both phases. At Waiawa Ridge, the Gentry Corporation proposes building some 2,675 units between 1996 and 2000.

AMFAC/JMB is proposing development of a light industrial park near the O'ahu Sugar Mill in Waipahu. This would likely bring more jobs to the area than OSCo now provides.

**Wai'anae.** Wai'anae's growth is forecast by the City as modest in comparison to 'Ewa and Central O'ahu. By 2010, Wai'anae is expected to have about 5% of the island's population, with over 45,000 people. While this is a "country" area, new housing projects will house much of the regional population growth:

- **Ma'ili Kai.** Schuler Homes has zoning approvals to build some 1,300 homes in Ma'ili (of which about 160 have been built).
- **Village Poka'i Bay.** A total of about 510 single-family homes are planned for this Wai'anae 'ahupua'a project. More than 150 of these units have already been built.

The City's forecasts for Wai'anae do not fully allow for historic patterns of natural increase and large households seen there in recent decades. Two other issues add to uncertainty in forecasting:

- **Department of Hawaiian Homelands (DHHL).** In Wai'anae, DHHL has over 1,600 acres, with about 3,400 house lots in varying stages of planning. About 2,200 of those house lots sit at the back of Nanakuli (Nanakuli Valley Estates), with the remainder in Wai'anae and Ma'ili. Some 420 lots are in projects for which infrastructure and home construction are under way. No timeframe is now available for development of the other lots (personal communication, Darryl Ing, Land Agent, Master-Planned Community Branch, DHHL, November 1994). Plans are conceptual at this stage, since the Department lacks funding. However, the Department could acquire new funds in the coming years.

In addition, DHHL has identified almost 870 acres of grazing land in Wai'anae Valley and 15 acres in Nanakuli, that may be transferred over from the Department of Land and Natural Resources (Office of State Planning, August 1994).

- **Ko 'Olina.** As noted earlier, it is uncertain when the bulk of this project, at the entry to the Wai'anae Coast, will be developed. The 9,000 jobs anticipated there are a significant resource for Wai'anae DPA residents as well as 'Ewa. If resort development does not proceed, no major new job center will be closer to Wai'anae than to the housing areas of 'Ewa.

### Section 3 ECONOMIC AND DEMOGRAPHIC IMPACTS

After an introduction to the impact analysis, this section addresses questions concerning employment, income, population, housing, and fiscal impacts of the proposed project. More general socio-economic impacts (including impacts of locating the proposed population on site) are assessed in section 5.

Current plans call for construction of Phase I from 1996 through 2004 and production of Phase II homes between 2005 and 2011. Products proposed for the two phases are identical, so the cumulative employment, income, population, and fiscal impacts of each phase is half the total impact of the project. (As noted in Section 1, the 27 acres of commercial land in Phase 2, to be controlled by the Estate of James Campbell, are excluded from the analysis.)

Nearly all homes would be sold and occupied by 2012, as shown in Exhibit 3-A. By 2015, occupancy and resident population would peak.

The project would generate construction jobs and would provide a site for operations jobs, above all in the commercial areas. The project's impact on government revenues would be positive. The State would gain significant revenues from construction, while City and County revenues would continue after the project builds out. The developer expects to bear significant costs for off-site infrastructure. By shouldering its share of those costs, Schuler Homes, Inc. will help government agencies to develop nearby parcels dependent on the same or related infrastructure. Even if the developer's costs are calculated strictly in terms of the share of infrastructure to be used by project residents, the project's participation in infrastructure planning and development will lower government costs for development of the North-South road, UHWO, and Kapolei High School.

#### 3.1 THE CONCEPT OF "IMPACT" AND THE EAST KAPOLEI PROJECT

In socio-economic impact analysis, an impact is the difference between two possible futures, with and without the proposed project, rather than the difference between present conditions and future ones with the project. Yet, for members of the surrounding community, the difference between the current situation and the future can profoundly affect perceptions of any project. Again, perceptions are often shaped by experience with recent projects, which may have little to do with the proposed action.

Impacts must be assessed in relation to context. A change brought by a project may be highly significant at a local level, yet small or a regional or county scale.

**Exhibit 3-A  
PROJECT CONSTRUCTION, SALES, & OCCUPANCY**

	1997	2000	2005	2010	2015
<b>UNITS BUILT</b>					
During Year	400	750	500	750	0
Cumulative	400	2,650	5,500	9,250	10,000
Phase 1	400	2,650	5,000	5,000	5,000
Phase 2	0	0	500	4,250	5,000
<b>UNITS SOLD (1)</b>					
During Year	200	736	381	749	0
Cumulative	200	2,155	5,206	8,750	10,000
Phase 1	200	2,155	4,956	5,000	5,000
Phase 2	0	0	250	3,750	5,000
<b>UNITS OCCUPIED (2)</b>					
Cumulative	0	1,348	4,584	7,601	9,500
<b>RESIDENT POPULATION (3)</b>					
Phase 1	573	6,137	14,696	24,501	28,000
Phase 2	573	6,137	13,990	14,000	14,000
Phase 2	0	0	706	10,501	14,000

- NOTES: (1) Estimated on assumption that 50% of units delivered in each year are sold in that year, and 75% of unsold inventory is sold in the year.  
(2) Estimated on assumption that 95% of units sold through the end of the previous year will be occupied.  
(3) Estimated from Planning Department analysis of 1990 and expected 2010 average household size for comparable developments — West Loch and Ewa by Gentry (2.90 in 1990, and 2.80 in 2010). This approach allocates population to all units, including vacant ones. After 2010, household size is held constant.

SOURCE: Honolulu Planning Department, 1993b.

It is useful to distinguish locational impacts from absolute ones. An absolute impact is a change that will occur with a project, but would not occur otherwise; a locational impact will occur, but would not occur at the site of a project, or would perhaps be dispersed over a large area, without the project.

The East Kapolei residential project responds to a recognized need on O'ahu for housing. From an economic perspective stressing the local economy, industries such as tourism bring new inputs into the economy which might otherwise go outside Hawaii; these are primary causes of change. With an economy supported by such primary industries, people may be housed in various ways, in different places — but they must be housed. The impact of a major residential project has to do with where people are housed, not whether there will be economic and population growth.

### 3.2 EMPLOYMENT

The project involves short-term jobs related to construction and long-term jobs associated with continuing operations. Employment impacts for both construction and operations are of three types:

- Direct jobs are immediately involved with construction of a project or with its operations. Direct jobs are not necessarily on-site: construction supports construction company personnel in offices and base yards, as well as on site.
- Indirect jobs are created as businesses directly involved with a project purchase goods and services in the local economy.
- Induced jobs are created as workers spend their income for goods and services.

Indirect and induced employment in Hawaii can be estimated using multipliers from a model of input-output relations in Hawaii's economy developed by State researchers.

#### Exhibit 3-B CONSTRUCTION EMPLOYMENT

	Annual Averages:				Cumulative, 1996-2011
	1996-2000	2001-2005	2006-2010	2011	
Construction Spending (Millions \$) (1)	\$96.52	\$88.79	\$111.01	\$57.61	\$1,539.20
Direct Jobs (2)	824	758	947	492	13,134
Indirect & Induced Jobs (3)	1,783	1,640	2,051	1,064	28,431
<b>TOTAL CONSTRUCTION-RELATED JOB</b>	<b>2,606</b>	<b>2,398</b>	<b>2,998</b>	<b>1,556</b>	<b>41,565</b>

NOTES: (1) Estimate does not include land, planning, marketing, sales, and other costs.

(2) Estimated from relation between construction spending and workforce (on average, from 1993 construction put in place and construction workforce data) — 8.53 jobs per million dollars spent on construction.

(3) Estimated on basis of unpublished DBEDT Input-Output Model. Employment multiplier of 2.16 is a weighted average of multipliers for single-family (2.29), multi-family (2.17), heavy (1.97) and commercial (1.76) construction

SOURCES: Bank of Hawaii 1994; Unpublished tables, Department of Business, Economic Development and Tourism.

**Construction.** The East Kapolei project will support a large number of construction jobs from 1996 through 2011. (See Exhibit 3-B above.) The cumulative total for the entire 16-year period is about 13,100 direct full-time person-years of employment and some 28,400 person-years of indirect and

induced jobs. Direct construction jobs are estimated as averaging 750 or more full-time jobs annually through 2010.

(The number of construction jobs varies from day to day for any project, and from year to year as different phases of a project are built out. Construction jobs are estimated in terms of an average number of jobs supported over a period of time, and measured in person-years, since these jobs come to an end when the project is built. Indirect and induced jobs related to construction are similarly limited in duration, since project construction will no longer support these jobs after buildout.)

Since about 80% of construction jobs are, as a rule, located at the job site, the project would provide at least 600 full-time construction jobs on-site for nearly the entire construction period.

**Exhibit 3-C  
OPERATIONS EMPLOYMENT**

	1997	2000	2005	2010	2015
<b>DIRECT JOBS</b>					
Real Estate Sales (1)	20	50	29	50	0
Property Management, Maintenance (2)	8	53	110	185	200
Commercial (3)	87	174	436	610	697
<b>SUBTOTAL A</b>	<b>115</b>	<b>277</b>	<b>575</b>	<b>845</b>	<b>897</b>
<b>DIRECT JOBS, BY INDUSTRY (4)</b>					
Finance	24	76	84	142	100
Agriculture (Landscaping)	4	27	55	93	100
Retail Trade	70	139	348	488	558
Automobile, Miscellaneous Services	17	35	87	122	139
<b>INDIRECT &amp; INDUCED JOBS ASSOCIATED WITH DIRECT JOBS IN:</b>					
Finance	24	76	84	142	100
Agriculture (Landscaping)	2	12	25	42	45
Retail Trade	40	79	199	278	318
Automobile, Miscellaneous Services	8	17	42	59	67
<b>SUBTOTAL B</b>	<b>74</b>	<b>184</b>	<b>350</b>	<b>521</b>	<b>530</b>
<b>TOTAL OPERATIONS-RELATED JOBS (A + B)</b>	<b>189</b>	<b>461</b>	<b>925</b>	<b>1,368</b>	<b>1,427</b>

- NOTES: (1) Based on an estimated ten jobs per 100 unsold units in inventory.  
 (2) Based on an average of 2 jobs per 100 units built.  
 (3) Based on average of 4 jobs per 1,000 square feet of commercial space, assuming a net buildable area of 20% of the commercial acreage.  
 (4) Allocation of jobs to industry categories by Community Resources, Inc. Indirect and induced jobs supported by operations jobs from unpublished State Input-Output model Type II employment multipliers for these industries.

**Operations.** (See Exhibit 3-C above for details.) Most direct on-site operations jobs would be located in the commercial areas in the project. As

stores are built, the workforce would grow to about 900 workers. An additional 500 indirect and induced workers would be supported by spending by direct operations enterprises and workers.

The project will provide housing for Oahu residents, who will patronize local stores and shops wherever they live. Most of the operations jobs associated with project residents' spending would exist somewhere on Oahu in any event. They are not created by the project. Hence these operations jobs do not strictly speaking count as an "impact" on employment islandwide. However, the location of some of these jobs in 'Ewa — jobs at the neighborhood commercial areas at the project (counted in Exhibit 3-C), and in other commercial areas, such as the Kapolei Shopping Center — is an impact of the project.)

### 3.3 INCOME

Personal incomes of the workforce associated with the project are estimated in Exhibit 3-D. Direct construction workforce incomes will average about \$35 million annually from 1996 through 2010. Annual incomes from direct, indirect, and induced jobs associated with construction will average \$75 million or more during this period. Direct operations incomes will grow to total over \$10 million annually by 2010. These will be divided equally between operations in Phase I and Phase II.

**Exhibit 3-D  
PERSONAL INCOME ASSOCIATED WITH PROJECT-RELATED JOBS**

	Annual Average Income (Millions \$s):			
	1996-2000	2001-2005	2006-2010	2011-2015
<b>DIRECT JOBS</b>				
Construction (1)	\$35.4	\$32.5	\$40.7	\$5.3
Operations	\$2.7	\$6.8	\$10.7	\$12.4
<b>INDIRECT AND INDUCED JOBS</b>				
Construction (1)	\$48.0	\$44.1	\$55.2	\$7.2
Operations	\$2.9	\$7.8	\$12.4	\$14.6
<b>TOTAL PERSONAL INCOME</b>	<b>\$88.9</b>	<b>\$91.2</b>	<b>\$118.9</b>	<b>\$36.9</b>

NOTES: Income estimates from reports of statewide average income by industry, with jobs allocated by industry as shown in Exhibit 3-C. Average wages for 1992 increased in proportion to changes in CPI-U between 1992 and 1994, to estimate 1994 average wages. Indirect and induced employment wages estimated from statewide average annual wage, all covered employment

(1) With construction ending in 2011, the average construction income for the five-year period is lowered by four years without such income.

SOURCES: Hawaii Department of Labor and Industrial Relations, 1993; Bank of Hawaii, 1994b.



### 3.4 POPULATION AND HOUSING

**Residential Population.** The project will provide a mix of multifamily and single-family housing comparable to that found in other major new projects in Ewa and Central Oahu. Future population of the project can be estimated on the basis of the buildout schedule and estimates of average future household size. By 2000, the project is expected to house more than 6,000 persons in Phase I.

By 2010, the on-site residential population would climb to 24,500 — 14,000 in Phase I and 10,500 in Phase 2. At buildout, the total population would be about 28,000 in both Phases. (As noted in Exhibit 3-A, average household size is expected to be about 2.8 persons per household by 2010. No further reduction in household sizes after 2010 has been assumed.)

**De Facto Population.** The project does not include facilities to attract persons from other areas. Hence it would have few or no visitors, and the peak population on-site would be the resident population.

**Exhibit 3-E  
POPULATION & HOUSING ASSOCIATED WITH PROJECT-RELATED JOBS**

	1997	2000	2005	2010	2015
<b>OPERATIONS JOBS (1)</b>					
Total Direct Jobs	115	277	575	845	897
Total Indirect & Induced Jobs	74	184	350	521	530
<b>LEEWARD OAHU SHARE OF JOBS (2)</b>					
Direct Jobs	112	269	571	837	897
Indirect & Induced Jobs	15	40	87	147	171
<b>WORKFORCE-SUPPORTED POPULATION (3)</b>					
Statewide	391	954	1,914	2,827	2,953
Leeward Oahu	263	640	1,360	2,038	2,211
<b>WORKFORCE HOUSEHOLDS (4)</b>					
Statewide	130	316	634	936	978
Leeward Oahu	87	212	450	675	732
<b>EVENTUAL NEW HOUSING DEMAND (5)</b>					
Low Range, Statewide	19	47	95	140	147
Low Range, Leeward Oahu	13	32	68	101	110
High Range, Statewide	39	95	190	281	293
High Range, Leeward Oahu	26	64	135	202	220

- NOTES: (1) From Exhibit 3-C.  
 (2) Estimated on assumption that 85% of real estate sales jobs are on site, and all other direct operations jobs are on site. Regional share of indirect and induced jobs is estimated as 20% at first, but as increasing to 32.4% in 2015. This increase in regional share (at a rate of 2.7% annually) derives from a weighted average of the Planning Department's projection of growth in support jobs in the region by 2010  
 (3) Assumes 2.07 persons per operations job, based on 1990 County average of 1.46 workers per household.  
 (4) Based on 1990 County average of 3.02 persons per household.  
 (5) Assuming that 15% of low range & 30% of high range worker households will eventually require new housing.

**Population Supported by Project-Related Jobs.** Project-related jobs would support nearly 3,000 persons statewide at buildout, most of whom would likely live in Leeward Oahu. By the buildout of both phases of the project, some 730 workforce households in Leeward Oahu — nearly 1,000 statewide — would be associated with direct, indirect, and induced project-related jobs. Housing for these workers, and “new” units for workers who are establishing new households, will amount to a small fraction of the housing to be supplied by the project.

(See Exhibit 3-E on preceding page for details. Demand for “new housing” is really for additional housing units, as workers form new households. The extent of new housing demand depends on housing prices and availability. Hence it is estimated here as a range between low and high points.)

**Population and Housing in Relation to City and County of Honolulu Policy.** Both the City and County of Honolulu and the State of Hawaii support the development of a Second City in `Ewa. Exhibit 3-F shows the population guidelines established by the City for the various DPAs. It reflects a policy of fast-paced growth for `Ewa, and slow growth or decline in population for most other regions.

The `Ewa DP Area is one of two in which substantial new housing is proposed in the coming years. Land has been designated for extensive new housing developments. However, development of several major projects has been much slower than proposed. City planners recognize that the population of the area is likely to fall well below the guidelines established in the General Plan for 2010:

**Year 2010 Population in `Ewa: Policy vs. Projection**

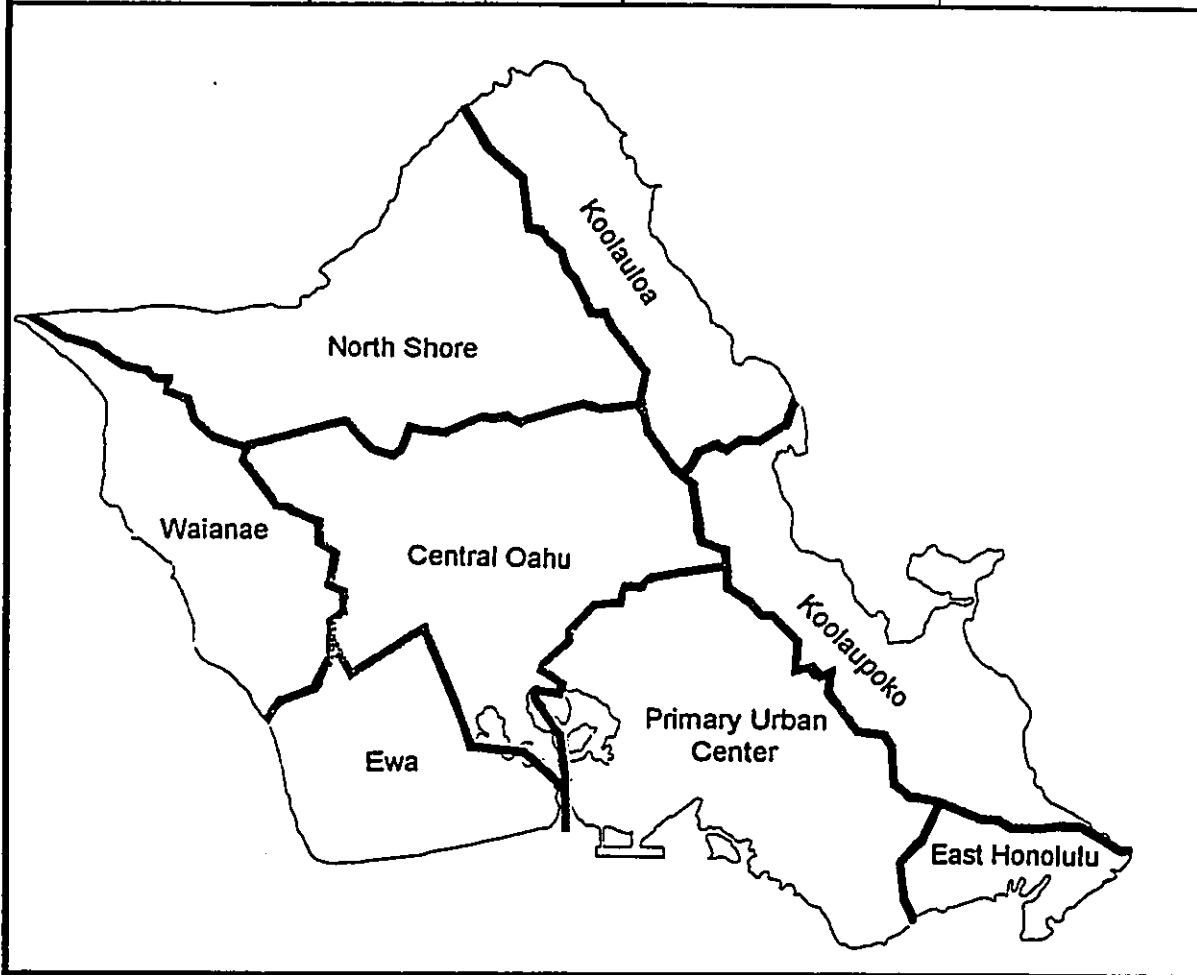
	Share of Island Population	Yr. 2010 Population
General Plan Policy	12.0% to 13.3%	119,900 to 132,900
Planning Department Forecast	9.3%	93,112
Difference		26,788 to 43,788

SOURCE: Honolulu Planning Department, 1994.

The additional population anticipated with the project — 24,500 as of 2010 — would raise the `Ewa DP area population to a point near the General Plan guidelines. Hence the project would help to keep population growth in other areas, where population projections are higher than the General Plan guidelines, closer to the guideline levels.

**Exhibit 3-F  
TARGET POPULATIONS FOR DEVELOPMENT PLAN AREAS**

	1990 Actual		2010 Targets	
	Resident Population	Actual % of Total	Projected Range of Population (1)	Target % of Total
<b>OAHU TOTAL</b>	836,231	100.0%	949,500 to 1,049,500	95.0% to 105.0%
Primary Urban Center	432,023	51.6%	450,800 to 497,800	45.1% to 49.8%
Ewa (2)	42,983	5.1%	119,900 to 132,900	12.0% to 13.3%
Central Oahu	130,474	15.6%	148,900 to 164,900	14.9% to 16.5%
East Honolulu	45,654	5.5%	53,000 to 58,000	5.3% to 5.8%
Koolaupoko	117,694	14.1%	109,900 to 121,900	11.0% to 12.2%
Koolauloa	14,263	1.7%	13,000 to 14,000	1.3% to 1.4%
North Shore	15,729	1.9%	16,000 to 18,000	1.6% to 1.8%
Waianae	37,411	4.5%	38,000 to 42,000	3.8% to 4.2%



NOTES: (1) Population ranges based on target percentages specified in the General Plan and the Hawaii State DBED Series M-K population projection of 999,500 for the year 2010.  
(2) Includes study area.

SOURCES: U.S. Bureau of the Census, 1991; Honolulu City & County, 1989.

**Response to Pent-Up and Continuing Housing Demand.** A separate market study (Atwater, 1994) has established that demand for the housing proposed in the project will be strong enough to build the entire project by the end of 2011. The project responds largely to islandwide demand, but also is situated to meet local demand for housing from University of Hawaii faculty and students.

### **3.5 IMPACTS ON GOVERNMENT REVENUES AND COSTS**

The project is planned to provide housing for Hawaii residents. Hence it generates no new capital flows from out of state, and will not attract new residents to Hawaii. It is an indirect effect of the overall growth of the island and State economies, not a new stimulus. This means that the project's impact on government revenues and costs is limited to the effects of building the specific components of the project, and building them on its site.

Project-related additions to government revenues can be estimated in detail. The City and County will gain new property tax revenues amounting to over \$6.3 million annually as of buildout, and the State will gain about \$105 million in taxes from construction-related spending over the construction period. Government costs are much more difficult to estimate. Still, this project will so clearly help the State by lowering initial development costs of nearby State projects that the net cost of the project for government is likely to be minimal or nil. Hence the overall impact of the project will be to increase government revenues, as described below.

#### **3.5.1 Revenues**

**City and County of Honolulu.** City and County revenues from the project would mainly derive from real property taxes on developed land and buildings. Exhibit 3-G on the following pages provides an estimate of the tax revenues from the project. By 2000, annual revenues would reach \$1.8 million (1994 dollars). The annual tax revenues would climb to \$6.0 million in 2010, and to \$6.5 million at buildout. In contrast, only \$171,000 could be raised in taxes annually from the property under its current use. At buildout, then, property taxes on the project would amount to a \$6.3 million increase over current taxes.

(Exhibit 3-G derives from the construction and occupancy schedule in Exhibit 3-A. It calculates the land area developed, and then the value of developed and undeveloped land in the project. Development values are estimated from construction values and estimated sales value of this and similar projects. The estimated land value is adjusted to allow for owner-occupant exemptions, after which taxes are calculated on the basis of 1994-1995 tax rates.)

**Exhibit 3-G  
REAL PROPERTY VALUES & TAXES, SCHULER EAST KAPOLEI**

	1994 (1)	1997	2000	2005	2010	2015
<b>A. AREAS (Acres)</b>						
ACREAGE TO BE DEVELOPED (2)	875	837	642	394	68	0
Unimproved Residential (Phase 1)	437	399	204	0	0	0
Agricultural (Phase 2)	438	438	438	394	68	0
<b>NEWLY DEVELOPED ACREAGE (ANNUAL)</b>						
Improved Residential		17	28	16	28	29
Apartment		19	36	25	36	36
Commercial		3	0	3	0	3
<b>CUMULATIVE DEVELOPED</b>						
Improved Residential		17	101	201	341	370
Apartment		19	127	267	449	485
Commercial		3	5	13	18	20
<b>TOTAL AREA DEVELOPED</b>		38	233	481	807	875
<b>B. VALUES (\$1,000s)</b>						
ACREAGE TO BE DEVELOPED (2)						
Unimproved Residential (Phase 1)		\$33,920	\$17,355	\$0	\$0	\$38
Agricultural (Phase 2)		\$1,094	\$1,094	\$984	\$170	\$0
<b>ANNUAL NEW DEVELOPED LAND VALUE</b>						
Improved Residential		\$7,877	\$12,799	\$7,548	\$12,799	\$13,456
Apartment		\$15,282	\$30,215	\$20,956	\$30,215	\$29,693
Commercial		\$861	\$0	\$861	\$0	\$861
<b>CUMULATIVE DEVELOPED LAND VALUE</b>						
Improved Residential		\$7,877	\$46,274	\$92,549	\$156,546	\$170,001
Apartment		\$15,282	\$105,928	\$222,681	\$373,756	\$403,449
Commercial		\$861	\$1,722	\$4,306	\$6,028	\$6,889
<b>ANNUAL NEW IMPROVED VALUE</b>						
Improved Residential		\$26,323	\$42,776	\$25,227	\$42,776	\$44,969
Apartment (New Units)		\$39,723	\$77,860	\$54,119	\$77,860	\$76,532
Apartment (Buybacks) (3)		\$0	\$0	\$0	\$270	\$270
Commercial		\$1,851	\$0	\$1,851	\$0	\$1,851
<b>CUMULATIVE IMPROVED VALUE</b>						
Improved Residential		\$26,323	\$154,651	\$309,301	\$523,179	\$568,149
Apartment		\$39,723	\$273,302	\$574,069	\$964,308	\$1,041,110
Commercial		\$1,851	\$3,703	\$9,257	\$12,959	\$14,811
<b>TOTAL VALUE (LAND + IMPROVED)</b>		\$125,838	\$602,935	\$1,212,163	\$2,036,776	\$2,204,447

**Exhibit 3-G (continued)**

	1994 (1)	1997	2000	2005	2010	2015
<b>C. EXEMPTIONS (\$1,000s) (4)</b>						
VALUE		\$4,800	\$28,200	\$56,400	\$95,400	\$103,600
Improved Residential		\$11,200	\$77,800	\$163,600	\$274,600	\$296,400
Apartment						
CUMULATIVE TAXABLE LAND VALUE		\$3,077	\$18,074	\$36,149	\$61,146	\$66,401
Improved Residential		\$4,082	\$28,128	\$59,081	\$99,156	\$107,049
Apartment						
<b>D. TAXES (\$1,000s)</b>						
ACREAGE TO BE DEVELOPED (2)		\$133	\$68	\$0	\$0	\$0
Unimproved Residential (Phase 1)		\$10	\$10	\$9	\$2	\$0
Agricultural (Phase 2)						
DEVELOPED LAND VALUE		\$10	\$56	\$113	\$191	\$207
Improved Residential		\$14	\$99	\$208	\$349	\$377
Apartment		\$7	\$0	\$0	\$0	\$0
Commercial						
IMPROVED VALUE		\$103	\$606	\$1,212	\$2,051	\$2,227
Improved Residential		\$140	\$962	\$2,021	\$3,394	\$3,665
Apartment		\$0	\$0	\$0	\$0	\$0
Commercial, Industrial						
TOTAL TAXES		\$417	\$1,802	\$3,563	\$5,987	\$6,476
<b>E. INCREASE IN TAX REVENUES (\$1,000s)</b>						
TAX REVENUES BEFORE PROJECT (5)	\$171					
DIFFERENCE IN TAX REVENUES		\$246	\$1,631	\$3,392	\$5,816	\$6,305
Total Annual Taxes		\$246	\$3,755	\$17,896	\$42,126	\$73,652
Total Cumulative Taxes						

- NOTES: All figures in thousands of dollars, except Areas (in acres).
- (1) Acreage "to be developed" is taxable area, excluding schools, parks, roads. Analysis based on increase in value from time of acquisition by Galbraith Estate and Schuler Homes. Hence Phase 1 is treated as Unimproved Residential in 1994, rather than Agricultural, because Urban classification of that land is a precondition to the proposed State land exchange.
  - (2) Agricultural value for Phase 2 land estimated on assumption of use for diversified agriculture up to the time of development.
  - (3) Taxable value of low-income and gap-group units assumed to be constrained by buybacks for ten years, after which it would rise to market value.
  - (4) Standard homeowner's exemption (\$40,000) assumed for all units.
  - (5) This calculation assumes that all project land is taxed, based on classification. This is an estimate of maximal tax revenues, since it assumes that taxes would be paid for Phase 1 as Urban, even though the State rather than a private taxpayer owns the land in 1994.

SOURCES: Honolulu City and County 1994-1995 real property tax rates; City and County tax records.

**State of Hawaii.** The State will gain revenues deriving from project construction. These revenues will average well over \$6 million annually during the construction period, and add up to some \$105 million (1994 dollars) as of buildout:

**Exhibit 3-H  
STATE REVENUES ASSOCIATED WITH PROJECT CONSTRUCTION**

	Annual Average Revenues (Thousands \$s):			
	1996-2000	2001-2005	2006-2010	2011
<b>EXCISE TAXES</b>				
Construction Spending (1)	\$3,861	\$3,552	\$4,440	\$2,304
Construction-Related Workforce Spending (2)	\$1,077	\$991	\$1,239	\$643
<b>CORPORATE INCOME TAX (3)</b>				
Construction (3)	\$241	\$222	\$278	\$144
<b>PERSONAL INCOME TAX (4)</b>				
Construction-Related Workforce Incomes	\$1,429	\$1,314	\$1,643	\$853
<b>TOTAL TAXES</b>	<b>\$6,608</b>	<b>\$6,079</b>	<b>\$7,600</b>	<b>\$3,944</b>

NOTES: Cumulative total revenues, 1996-2011: \$105.4 million

- (1) Calculated at 4% of direct construction spending.
- (2) Calculated at 4% of workforce income spent on taxable items. Disposable income estimated from 1988-1989 U.S. Bureau of Labor Statistics Survey.
- (3) Calculated at 0.25% of construction spending, from 1989-1990 data on business receipts and corporate income taxes collected.
- (4) Calculated at 4.04% of wages.

SOURCES: Hawaii Department of Business, Economic Development and Tourism, 1992; Hawaii Department of Taxation, 1992; Tax Foundation of Hawaii, 1992, 1991.

**3.5.2 Costs**

Because the project will not attract new residents, it will not add to the population served by the City and County. Hence it will have little or no impact on City and County operating costs.

Often, government personnel have expressed concern that new development can add to government costs due to: (a) demand for capital improvements; and (b) added costs in delivering services to out-of-the-way locations. The East Kapolei project will add few costs due to this sort of locational impact. Instead, its locational impact on government costs will be positive:

- As part of the planned development of `Ewa, the project will contribute to the funding of already-planned capital improvements, rather than force public funding of improvements which would otherwise be unneeded.
- By helping to bring the planned population to `Ewa, the project will help to make delivery of government services — many of which will be based in `Ewa, with or without the project — more cost-effective.

As a participant in planning and development of infrastructure for central `Ewa, the project will likely lower government costs. That is because the State is committed to major infrastructure improvements, notably the North-South road. The road must be built in the next few years if UHWO is to enroll 2,650 students on site by 2006 and thereby retain its land.

If the East Kapolei project were not proposed, and the project site remained undeveloped, the State would have to cover any costs of infrastructure development ascribable to the project site, and hope eventually to charge a future developer for those costs. The State would, at the very least, need to carry interest charges which would likely not be fully paid by a future developer.

Similarly, drainage problems affect State land, the project site, and DHCD's `Ewa Villages project. The project developer will have to address them now, making a coordinated approach to a regional problem possible.

The development costs at issue are significant. For example, the North-South road and its H-1 interchange have been estimated as costing \$52.8 million (1991 dollars) (Pacific Planning and Engineering, 1992). The final cost will likely be greater than that figure. Hence the impact on State finances of the project developer's participation in regional development will be substantial.



## Section 4 PUBLIC FACILITIES

This section describes existing and expected public services and facilities in the `Ewa vicinity. It then provides an analysis of the impact of the proposed development on:

- Public safety (police and fire services);
- Medical facilities and services;
- Recreation;
- Education; and,
- Libraries.

### 4.1 PUBLIC SAFETY

#### 4.1.1 Police

**Existing Services and Facilities.** Currently, the Pearl City Police Station covers the area from Red Hill to Kahe Point in Honolulu Police Department's District 3. There are five beats in the `Ewa area with one officer per beat, 24 hours a day, seven days a week. One sergeant is included for each beat. The police officers assigned to the `Ewa area work with the community through two channels: the volunteer Neighborhood Security Watch and the Community Policing Team (CPT). The latter is a modern police effort to directly involve the community with police crime prevention efforts, such as painting over gang-related graffiti or referring families with potential abuse problems to appropriate services.

**Planned Services and Facilities.** The Captain of the Pearl City Station is confident that existing police services to the `Ewa area are sufficient at this time, given the current level of demand for services (personal communication, Captain Chastain, City and County Police Department, Pearl City Station, Administrative Captain and Executive Director, August 1994). However, because of the anticipated growth in the area, an additional substation will be added in the Kapolei area. In 1995-1996, the number of beats will be increased to nine, and the officers on duty will increase to 22.

Current crime problems include the following:

- Property crimes — burglary and theft; and
- Graffiti, which the Community Policing Team (CPT) is addressing with residents.

Crime in the `Ewa area includes gang-related incidents and some drug house problems. These crimes tend to be located in the older `Ewa Beach community.

**Impact of Project.** Captain Chastain does not expect the project to affect police services to this area, if police planning for increases in number of police beats to this area and an expanded Leeward Police Station is met. The Captain anticipates that another police district will be created by the time the proposed project reaches build-out. The new Kapolei Police Substation should meet any increased demand for police services in the project area. When the new police district is created, the current Wai`anae Station will serve `Ewa (Makakilo, Honokai Hale, `Ewa Beach, and Kapolei) and the Wai`anae Coast area. The Pearl City Station will then serve Halawa Heights to Waipahu.

#### **4.1.2 Fire**

**Existing Facilities.** `Ewa is served by three fire stations:

- Makakilo Station serves Makakilo, upper Kapolei, and Ko Olina Estates (Honokai Hale and Nanakai Gardens may call on either Nanakuli Fire Station or Makakilo);
- The Waipahu Station serves lower Kapolei, `Ewa by Gentry, and `Ewa area to Renton Road; and
- The `Ewa Beach Fire Station serves all of lower `Ewa Beach up to Renton Road.

The Waipahu Station has 23 fire fighters on a 24-hour rotating shift, with all equipment and trucks necessary for emergency calls. The Station Captains find they have sufficient resources to respond quickly to emergency calls. (Personal communication, Captain Souza, `Ewa Beach Fire Station and Captain Monayre, Waipahu Fire Station, August 1994.) The Waipahu Station assists the `Ewa Beach Station when needed.

Typical calls are for brush fires, property damage, and medical emergencies.

**Planned Services.** A new firehouse will be added to Kapolei in December 1994 to serve the `Ewa Plain. The fire station will be fully equipped and manned.

**Impact of Project.** According to the two captains interviewed, the increased need for fire services resulting from the proposed development will be easily managed by the planned Kapolei Fire station. Fire Department plans for increased service have taken into account proposed residential development in the `Ewa area.

#### 4.2 MEDICAL FACILITIES AND SERVICES

**Existing Facilities and Services.** St. Francis-West is the full-service hospital closest to the proposed development. It is approximately five to 15 minutes from the project site, depending on traffic conditions. Ambulance service is coordinated with the City and County, and the hospital has a helipad. St. Francis-West offers a full range of hospital services, including emergency care, outpatient treatment, laboratory and X-ray facilities, and medical offices.

The hospital has 79 licensed beds available. The hospital anticipates expanding bed capacity to 84 beds. (Personal communication, Phil Baltch, St. Francis Medical Center-West, Chief Operating Officer, January 1994.) The hospital is operating at about 80% capacity. In a 20- to 30-minute drive, emergency services are also offered by Wai`anae Coast Comprehensive Health Center (which also has a helipad), Pali Momi Medical Center (a division of Kapiolani Women and Children's Hospital) at Pearl Ridge, and Wahiawa General Hospital.

Non-emergency services are provided by local general physicians and specialists in the area, as well as by three medical clinics: Kaiser Permanente at Punawai in Waipahu, West-Side Women's Health Care Clinic and `Ewa Beach Medical Clinic both located on Fort Weaver Road in `Ewa.

**Impact of Project.** According to St. Francis West, the demand for hospital services by residents of the Schuler development can readily be absorbed by the hospital, because of two factors: (1) the facility can be expanded — it currently uses only a small portion of its total 23 acres; (2) the length of hospital stay by traditional users (such as women giving birth) has been declining over recent years, and is projected to decline even further in the future. (Personal Communication, Phil Baltch, St. Francis Medical Center-West, Chief Operating Officer, August 1994).

### 4.3 RECREATION

**Existing Facilities.** Several parks and other recreational facilities are located in the general vicinity of the proposed development: `Ewa Mahiko Neighborhood Park, Pu`uloa Neighborhood Park, Makakilo Community Park, Geiger Park Gentry, West Loch 18-hole Municipal Golf Course, Asing Park (part of West Loch Estates), and the newly created Kapolei Park. Most of the beaches in `Ewa are not staffed by City and County lifeguards. These include Iroquois Beach, One`ula Beach, `Ewa Beach Park, West Loch Shoreline Park, and `Ewa Plantation Beach. Barbers Point Beach Park and Nimitz Beach are restricted to military use. `Ewa currently lacks a recreation director and after-school services on park grounds.

According to Parks Management, the provision of public parks lags behind the development of housing projects, infrastructure, and other public facilities. (Personal communication, Don Akiyama, City & County Department of Parks and Recreation, `Ewa Beach Complex Supervisor, August 1994).

**Planned Facilities and Services.** The City and County is planning to establish a district park either by expanding `Ewa Mahiko Park or creating one at Oahu Sugar Company's warehouse area in `Ewa Villages. (Personal communication, Ronald Wong, City and County Parks and Recreation District Manager, August 1994.) The proposal is part of the `Ewa Villages revitalization project. The Master Plan for `Ewa Villages also includes a municipal golf course (currently under construction).

Dedicated parks to be developed at some future time are: Asing Community Park, Iroquois Point Neighborhood Park, Geiger Community Park, Kapolei Community Park, and Makakilo Heights Neighborhood Park (personal communication, Jason Yuen, City and County Parks and Recreation Facilities Development Division, Parks Planner, October 1994). Geiger and Kapolei Community Parks have priority for development.

Barbers Point NAS includes extensive recreation areas, most of which the Navy plans to retain after the base closes. An agreement was recently reached between the Navy and the Department of Parks and Recreation outlining possible joint use of the shoreline at Barbers Point to accommodate both Navy and civilian needs. Under the agreement, the City would acquire and develop 38 acres of shoreline for beach park facilities and 15 acres to the east for shoreline fishing. The Navy would retain a total of 42 acres of beachfront at Nimiiz beach and White Plains Beach.

The City and County Parks Department and members of the community have been interested in creating a regional park at Barbers Point NAS. Preliminary planning indicates that land will be available for such a use. However, no definite

land allocation will be made until after a Master Plan and Environmental Impact Statement for the base closure are completed. The final allocation will be made by the Secretary of the Navy, after considering recommendations from the island-based Reuse Committee.

**Impact of Project.** According to the `Ewa Parks and Recreations Manager, the impact of the project on the existing parks and recreational facilities will be contingent on the coordination of new parks and home construction. If the construction of parks lags behind housing development, then the increased demand for park space will severely impact existing facilities.

#### **4.4 EDUCATION AND LIBRARY SERVICES**

##### **4.4.1 Primary and Secondary Schools**

**Existing Conditions.** According to the DOE, the rapid development in the `Ewa area has created a pressing need for additional schools and classroom space. Currently, Campbell High School is the only high school serving the area. (Personal communication, Ed Hasegawa, DOE Leeward District Business Office, Administrator, and Lester Chuck, DOE CIP Planner, August 1994.) The DOE has stated that Campbell High School is sufficient for the existing population until the turn of the century. However, many in the `Ewa community disagree with this timeframe, and have requested that the DOE plan for Kapolei High School to open sooner. The one intermediate school serving the area is `Ilima Intermediate, located in `Ewa Beach.

Kapolei Elementary opened recently and is now serving the Kapolei Villages, Makakilo, and Makaiwa Hills area. For the 1994 year, the elementary school had an enrollment of 350 students. However, once the school is completed by Fall of 1995, the DOE is projecting that between 800 and 850 students will be enrolled. (Personal Communication, Ed Hasegawa and Kapolei Elementary School, August 1994.)

`Ewa has a total of five elementary schools, each of which has a maximum capacity of 1,000 students: `Ewa, Mauka Lani, `Ewa Beach, Makakilo, and (as of 1995) Kapolei Elementary Schools. `Ewa Elementary is nearest to the project site.

**Planned Facilities.** Kapolei High School will serve 1,500 to 1,800 students from the Kapolei Villages, Makakilo, Makaiwa Hills, and Ko Olina Estates development areas by the 1998-1999 school year. Current plans call for it to be located next to the UHWO site, across the North-South road from Phase 1 of the project.

The DOE also plans to build elementary schools at `Ewa by Gentry and Ko Olina. An intermediate school is to be built in 1998-1999, to serve approximately 900 students. Also in the Leeward District, new elementary schools are planned for Waikele and Royal Kunia. Waikele and Royal Kunia Elementary students will feed into Waipahu Intermediate and Waipahu High School.

**Impact of Project.** As the East Kapolei project builds out, many children will need school facilities nearby. The project includes elementary school sites in each phase to accommodate some of that need.

The DOE has estimated that, at buildout, the project would house the following students (letter, Dr. Herman M. Aizawa, Superintendent, November 4, 1994):

**DOE PROJECTION OF ENROLLMENT — 10,000 HOUSING UNITS IN PROJECT**

	Total	Ratio per 100 Units
Elementary (Grades K to 6)	1,772	17.72
Intermediate (Grades 7 to 8)	500	5.00
High (Grades 9 to 12)	710	7.10

When the ratios shown above are used with the project construction schedule, estimated enrollments for the project can be derived (as shown in Exhibit 4-A). It indicates that project enrollments could well justify construction of an elementary school before the year 2000, and a second school in 2005 or soon afterwards. Project residents would significantly contribute to intermediate and high school populations.

**Exhibit 4-A  
ESTIMATE OF PROJECT'S DOE ENROLLMENTS**

	1997	2000	2005	2010	Buildout
UNITS BUILT (1)	400	2,650	5,500	9,250	10,000
DOE STUDENTS (2)					
Elementary (K to 6)	71	470	975	1,639	1,772
Intermediate (7 to 8)	20	133	275	463	500
High (9 to 12)	28	188	391	657	710
TOTAL	119	790	1,640	2,758	2,982

NOTES: (1) From Exhibit 3-A.

(2) Based on the following number of students per 100 households, from the DOE, 1994:

Elementary	17.72
Intermediate	5.00
High	7.10
TOTAL	29.82

Exhibit 4-A follows DOE calculations. It is not an independent calculation of school impacts, in that it estimates enrollments, not impacts. To the extent that students living in the project are already in the DOE, and perhaps in the DOE schools serving project residents, impacts are minimized. This factor is important for intermediate and high schools, rather than elementary schools, since elementary students in the project are likely to attend new schools within the bounds of the project.

If no new school construction occurred, enrollments at schools near the project would soar far above capacity. The preliminary concept plan already shows two elementary school sites.

The DOE is requesting that the developer contribute two elementary school sites next to County parks and an intermediate school site within the East Kapolei project. In addition, the DOE indicates that it will request a contribution toward the construction of high school facilities.

The developer has entered into discussions with the DOE concerning possible contributions to offset the impact on the DOE of project development.

#### **4.4.2 Post-Secondary Education**

**Existing.** The nearest post-secondary school is University of Hawaii West Oahu, located in temporary quarters on the campus of Leeward Community College in Pearl City. UHWO also offers limited courses at their Wai`anae Coast campus. Various universities and colleges offer courses towards degree-granting programs at the Schofield Barracks complex in Wahiawa. The University of Hawaii at Manoa campus is a 45-minute to one-hour drive from the project, depending upon traffic.

**Planned.** The University of Hawaii Board of Regents selected a site near Kapolei for the proposed 500-acre University of Hawaii, West Oahu (UHWO). The Legislature has yet to approve construction funding for the campus.

**Impact of Project.** The project will contribute to development and operation of UHWO, notably by:

- **Participation in Regional Infrastructure Development.** This will help to speed infrastructure development and lower the cost to be borne by other landowners, including the State; and
- **Providing Convenient Housing.** The project will likely house many students, faculty, and staff of UHWO.

#### **4.4.3 Library Services**

**Existing.** Currently, `Ewa Beach School and Public Library serves `Ewa (`Ewa Beach, Village Park, West Loch, and Barbers Point), Makakilo, and Kapolei populations, as well as Campbell High School students. The total population served is close to 40,000. The combination school and public library is a full-service library, situated on Campbell High School grounds, with separate entrances for high school students and public patrons. There are two sets of staff to provide high school and public library services, although services often overlap. The public library staff consists of two full-time librarians, two library technicians, two circulation clerks, student volunteers, and a janitor. The current 1994 State hiring freeze has prevented hiring for two vacant positions. The Campbell High School library staff is under DOE jurisdiction and is comprised of two librarians, two library technicians, and one assistant. The library has a collection of 86,883 books, heavily concentrated in the children/youth and reference collections.

**Planned for the Near Future.** Plans include expansion of existing libraries and a major new library:

- **Expansion in the Secondary Study Area.** Plans to expand the Waipahu Library are in the design approval stage. Expansion is to be completed by fiscal year 1995-1996. The expanded library will occupy 15,500 square feet of land in Waipahu, and feature modern library services, including a drive-through book drop-off service. On the Wai`anae Coast, the Nanakuli Library is in its final stages for approval, and will enter design stage this year.
- **Kapolei.** The State plans to use part of 40 acres donated by Campbell Estate for the Kapolei Library. This will satisfy future regional demand. The Kapolei Library is projected to occupy at least 100,000 square feet. The facility will house a collection of approximately 400,000 to 500,000 books and other media, serving as the "second anchor" to Honolulu's Downtown library (Personal communication, Clyde Okinaga, Administrative Services Officer for the Hawaii State Library System, August 1994).

**Planned for the Long Term.** Library System staff feel that the `Ewa community's need for services can be met by the existing library, the proposed Kapolei Library, and those in neighboring districts. The long-term plan for the `Ewa Beach School and Public Library is to separate it into two facilities. The Library System intends to eventually separate all of the school-public libraries in the state.



**Impact of Project.** The plans to expand Waipahu Library, to build Kapolei Library, and to separate the 'Ewa School and Public Library into two facilities are expected to absorb any additional demand from the proposed residential development.

## **Section 5**

### **FIT OF PROJECT WITH SURROUNDING COMMUNITIES**

This section discusses the "fit" between the proposed Schuler project with its neighbors. It draws extensively on the views of key informants knowledgeable about the concerns of people in `Ewa. In Section 6, we go on to provide an independent consultant's assessment of impacts on social life.

Community members offered several suggestions for improving the project or benefiting the community. We mention some of these in this section and discuss mitigations of project impacts in Section 7.

#### **5.1 APPROACH**

##### **5.1.1 "Fit" or Compatibility**

How well the project fits into or is compatible with existing communities nearby is not fully predictable or guaranteed. Objective and subjective factors combine to make a project fit with its surroundings. Judgments about whether the project is in harmony with community character are based on people's personal viewpoints, their definition of community character, and own concept of what makes a project compatible. Also, residents' concerns change over time and new ones will likely emerge.

The context for this discussion is of a region in flux, where development and population changes are happening at a quick pace. Presently, `Ewa sits in a backwash of development; its residents, old and new, are adjusting to the fast-paced growth of residential communities that has continued since the mid-1980s, when the first phases of West Loch Estates and `Ewa by Gentry were built. Many `Ewa residents sought to advise Schuler Homes to learn well from the mistakes of other residential developments. The impact of growth on the quality of life has been a major issue of discussion for the `Ewa Neighborhood Board.

##### **5.1.2 Sources**

Community interviews provided the major source for learning about community character in the study area. During September 1994, Community Resources, Inc. (CRI) staff conducted interviews of community leaders, organizational representatives, and private citizens who were likely to know about issues and concerns of importance to various groups in `Ewa. The interview process focused on residents of the `Ewa Plain area, but also included the

perspectives of some members of neighboring communities, namely Makakilo and Kapolei. (See Appendix B for a list of interviewees.)

Interviewees were given a handout with project description and map (Appendix C). The interviews provided an occasion for people to discuss their concerns, opinions about regional growth, perceptions of potential impacts associated with the project, and possible mitigations. Appendix C-1 displays a list of major concerns and issues that surfaced during the interviews.

## **5.2 COMPATIBILITY**

During the community interviews, several factors emerged which have bearing on residents' assessments of the project's compatibility with surrounding areas and activities.

Informants tended to evaluate the project first in terms of the likelihood that it will add to or alleviate `Ewa's current traffic problem and lack of community facilities. Many viewed the project both in relation to other communities and as part of a regional community.

In interviews, `Ewa residents often had ideas about specific ways Schuler Homes could, in their view, improve the project and contribute to `Ewa. (In CRI's experience, `Ewa residents are more apt than residents of other areas in Hawai'i to suggest physical improvements and contributions. This tendency probably reflects their recent experience with a variety of developments.)

Exhibit 5-A on the next page lists the factors used by interviewees to judge how the East Kapolei project would fit in with its surroundings. It indicates both judgments of the anticipated effect of the project and the (somewhat different) ways that people thought the developer could contribute to `Ewa, tending to make the project an integral part of the evolving region.

### **5.2.1 Views of Community Character**

Residents recognize that `Ewa is in transformation. Some look forward to the urbanization, while others rue its coming. Many long-time residents wistfully anticipate the dissolution of the small town intimacy and rural lifestyle that once characterized `Ewa. On the other hand, there are residents who herald the coming of the Second City and eagerly look forward to enjoying the amenities that metropolitan life brings.

**Exhibit 5-A**  
**FACTORS IN COMMUNITY'S ASSESSMENT OF PROJECT "FIT"**

FACTOR	IMPORTANCE FOR "FIT"	
	Saliency in People's Expectations of Project	Likely Eventual Importance
Traffic and Roadways	1	2
Regional Need for Community Facilities	2	3
Development of a Mixed-Income, Mixed-Aged `Ewa Community	3	1
Impact on Character of Older Communities	4	4
Desire for Open Space and/or Parks	5	5
Support of University Development	6	6
Regional (Im)balance of Jobs and Housing	7	7

NOTES: In judging "saliency," CRI combines informants' ideas of (a) what is important and (b) what matters to many in the community with (c) whether factors were mentioned in many interviews or only a few. Lower numbers are used for the more important factors; higher numbers indicate that an issue was less important and/or less widely mentioned.

There is some disagreement, as to how the transformation into a second city will actually take shape — as to what is the character of the emerging `Ewa. Some residents characterize `Ewa as a patchwork of suburbs, with growing contrasts between older and newer communities. They see the Plain as being blanketed by large, self-contained communities. Yet others look toward the promise of urban life, and the development of industry and commerce, with educational and recreational activities in that region.

Several interviewees noted perceptions of division between existing communities. For example, some interviewees mentioned that Makakilo was distinctive from other `Ewa communities and went on to distinguish between "lower" and "upper" Makakilo neighborhoods. In the `Ewa Plain, the `Ewa Beach community tends to see itself as different from the other Plain communities. Part of this perception may be attributed to the ongoing debate within the Beach community over HASEKO'S `Ewa Marina development. Some `Ewa Beach people also regard `Ewa by Gentry with resentment.

In contrast, a number of interviewees from `Ewa expressed their consternation over the tendency for people from outside communities to confuse `Ewa with `Ewa Beach. They also felt that `Ewa has often been overlooked in terms of resource inputs, while power brokers have concentrated their investments in Kapolei and Makakilo.

### **5.2.2 Factors Shaping Community Views of Project Compatibility**

**Traffic and Roadways.** Residents expressed grave concern about any addition to the region's traffic congestion, and applauded the project for helping to develop the North-South Road. Some wanted assurance that the North-South Road would have its own connection to H-1, and would not add to traffic on Farrington Highway.

*Comment.* At first, the project will be reached through a road from Farrington Highway. The North-South Road will in time be the major point of entry to the project. That road will have a H-1 interchange and a connection to Farrington Highway. Hence it will tend to lower the traffic volume on Farrington Highway and Fort Weaver Road by providing a new road into and out of the region, not by barring project traffic from Farrington Highway.

**Regional Need for Community Facilities.** Community informants emphasized recreation and religious facilities:

- **Park Space and Recreational Facilities.** With development comes the reduction in green space and open vistas. Residents feel particularly affected by the lack of park space and recreational facilities. This is a major issue for all 'Ewa residents. Developers of new communities have been criticized for not providing parks with adequate facilities in a timely manner, and the City Parks Department has been criticized for not maintaining the parks satisfactorily.

Although the East Kapolei proposal allocates space for two neighborhood parks, some of the interviewees wondered whether that would be enough park land. Based on recent experience with other residential communities, others expressed cynicism over the developer's ability to furnish park facilities. A few interviewees thought that the most appropriate use for the subject property is to remain as agricultural land for green space. Yet another few thought that the site is a prime location for a regional park.

*Comment.* A regional park is a priority consideration for the Barbers Point Re-use Master Plan. Also, a district park is planned as part of the 'Ewa Villages revitalization project. Kapolei Regional Park was developed on 28 acres of land that was once Fort Barrette. Campbell Estate donated an additional 44 acres for the park, which is soon to open.

- **Space for Churches.** Several interviewees remarked that the planned developments in 'Ewa do not provide space on which religious

organizations can establish their churches, or too little space such as a community multi-purpose room that must be shared with other church groups. Interviewees pointed out the importance of having places to worship in the local community, and that quite often, churches serve as a safety net for the needy.

*Comment:* The Kapolei Long Range Area Master Plan provides for about six acres on which churches may locate. In addition, there are churches of different religions and denominations in the `Ewa Plain and Makakilo communities.

**Development of a Mixed-Income, Mixed-Age `Ewa Community.** Some interviewees thought that the East Kapolei project should assure a mix of housing types for people of different socio-economic levels. In their view, the development would be most compatible if it avoided being on either side of the continuum of housing: neither exclusively or primarily for the affluent large-lot "estate" homes nor for low-income people (low-income rentals). People warned against promoting a sense of exclusiveness, as in a gated community.

*Comment:* Of its total housing stock, Schuler Homes plans to build 30% as "affordable," multi-family units. The entire project will be designed for a middle-income homeowner market. No gated areas are planned.

**Impact on Character of Older Communities.** Some interviewees feel that `Ewa has become a disjointed array of walled-off residential communities, and lacks a focal point for pulling the communities together. The interviewees expressed hope that Schuler Homes will give thoughtful consideration to the design and configuration of the housing units. They thought that the homes should be appropriately designed for the leeward climate, as well as reflect a country feeling, perhaps basing the design on plantation style architecture. West Loch Estates was often cited as being well-designed, while `Ewa by Gentry was often criticized for its design and construction.

In addition, interviewees would like for Schuler to try to tie its development in with neighboring communities, by providing accessways like bike paths or common green space as buffer areas.

Interviewees felt that an influx of "outsiders" coming to settle in the East Kapolei project would likely change the character and lifestyle of the existing communities, particularly the older ones like `Ewa Villages and `Ewa Beach. A few wondered if the development would contribute to widening gaps between the old and new communities, and between "haves" and "have nots." On the other hand, one interviewee was happy to have more people coming to `Ewa, reasoning that the more residents there are, the more opportunities for friendship, participation in community organizations, and regional activities.

*Comment:* The project is expected to be highly competitive with `Ewa by Gentry and the Villages of Kapolei (Atwater, 1994). Buyers will likely resemble a cross-section of the residents of these projects.

**Support of University Development.** Several interviewees thought that the East Kapolei project would be compatible with the future University of Hawai'i West O'ahu (UHWO) proposed for an adjacent site, and be mutually advantageous as well.

*Comment:* Schuler Homes hopes to plan for the infrastructure needs of the region in cooperation with State and university representatives.

**Regional (Im)balance of Jobs and Housing.** Some interviewees thought that the location of the proposed project will help add to Kapolei's customer base, and be generally beneficial to local businesses in `Ewa. However, a number of other interviewees cautioned that Schuler could end up as another bedroom community if Kapolei falls short of becoming a major employment center for the region. Residents felt that the timing of the development of the homes with the University and Kapolei is a significant factor to be considered.

*Comment:* The East Kapolei project will support operational jobs in its neighborhood commercial area. Residents will likely shop at Kapolei commercial areas as well.

### 5.3 DEVELOPMENT OF "FIT"

Any large new project stands out simply by being new. Over time, it becomes a recognized, if not necessarily loved, part of its region. The Schuler project will affect the region in different ways over time. The importance of different compatibility issues will also change. CRI finds the following sequence likely:

- **Planning Phase.** The project stands out as a major addition to the `Ewa residential stock. With the new project, opportunities arise for sub-regional planning to deal with traffic and infrastructure.
- **Early Construction Period.** Cane land in Phase 1 will be cleared and site improvements begun. The project will start out small and be buffered from other areas by Phase 2 land, which will still be in agriculture, and by the golf course next to the `Ewa Villages. However, traffic on Farrington Highway will be heavier because of construction work on the project and at the adjacent UH West O'ahu site.

- **Midpoint of Development (Completion of Phase 1 of Project).** With 5,000 units in Phase 1, the project is larger and will feed into the North-South Road. Some Phase 2 land will be cleared, and construction of Phase 2 will begin. Traffic may increase at intersections along the North-South Road and Farrington Highway, and at the North-South Road and H-1 Freeway interchange.

Students will go to schools on site for the elementary and intermediate grades, and then to regional intermediate and high schools. By this time, UH West O`ahu should have opened, and the project will serve its faculty and students. Westbound traffic to Kapolei should increase as the Civic Center, shopping, and recreational areas are nearly completed.

- **Buildout.** All 10,000 units are completed. The region will be fully urbanized. The project may attract young families and people involved in education, with new schools on or near the project site and UHWO nearby. The North-South Road will be a major roadway carrying much of `Ewa's local traffic flow. Schuler project residents will tend to be relatively isolated from the other `Ewa Plain communities, and more likely orient their activities and business towards Kapolei than makai communities.



## Section 6 SOCIAL IMPACTS

### 6.1 OVERVIEW

This section describes potential impacts on lifestyle, family life, and community organization. It is an independent consultant's assessment, based on research conducted for this study, interviews with 'Ewa residents and business leaders, and CRI's experience of communities and projects throughout Hawaii.

Social impacts are rarely automatic results of development. They are shaped by planning and design decisions, by interactions with the surrounding community, and by outside forces and events. The assessment of social impacts hence deals with tendencies, dangers, and opportunities, not inevitable consequences. Potential unwanted impacts and problems of compatibility can often be reduced or avoided. Section 7 discusses measures for mitigating potential adverse impacts.

**Social Impacts.** Major social impacts of the project are summarized as:

- Provision of needed housing for O'ahu;
- Increase in traffic and, until new roadways are built, congestion;
- Enhancement of Kapolei's customer base;
- Construction noise or dust;
- Competition for community resources and facilities, namely parks and schools; and
- Perpetuation of a growing sense of isolation between large-scale residential developments and older communities, and the transformation of 'Ewa into a bedroom community.

Exhibit 6-A on the following pages provides a summary of potential impacts, which are discussed in more detail later in this section.

**Exhibit 6-A  
POTENTIAL SOCIAL IMPACTS OF PROJECT**

Area Potentially Affected	Planning 1995	Early Construction 1996 - 2000	Mid-Development Mid-2000s	Build-Out 2015
'EWA REGION			Loss of historical identity in 'Ewa _____  Intensified need for regional park development _____  Intensified need for community facilities _____  Intensified need for early childhood education and care _____	
PRIMARY STUDY AREA PROJECT SITE		Provision of Needed Housing for O'ahu _____  Irritants/health hazards from noise and dust _____  Incomplete infrastructure affecting residents' quality of life _____  Lack of community amenities affecting residents' community life _____  Increased traffic on site from construction and new residents _____	If North-South Road is not completed, then aggravated traffic from housing, UH-WO, Kapolei High School. _____  Orderly regional development _____	
NEARBY Ewa Villages	Opportunity to plan for regional infrastructure needs	Irritants/health hazards from noise and dust _____  Increased traffic along Fort Weaver Road _____  Schools over capacity ('Ilima, 'Ewa -- if construction of school at project lags) _____	Lack of architectural compatibility with historic preservation area _____  Regional project build-up lessens sense of historic place and identity in 'Ewa _____  Increased competition for public facilities _____	

Exhibit 6-A (continued)

Area Potentially Affected	Planning 1995	Early Construction 1996 - 2000	Mid-Development Mid-2000s	Build-Out 2015
Other Communities Along Fort Weaver Road	Reinforced perceptions of separation and "us vs. them"	Schools over capacity would affect West Loch	Increased competition for public facilities	
Makakilo and Kapolei		Increased local traffic on Fort Weaver Road and Farrington Highway	Traffic conditions to improve with North-South alternative road.	
PLANNED University of Hawai'i - West O'ahu (UHWO)	Opportunity to coordinate infrastructure development, enhancing efficiency in development and preventing potential conflicts	Enhance Kapolei customer base		
		Increased traffic along Farrington Highway and H-1, eastbound	Increased traffic on H-1, Farrington Hwy. to Kapolei Civic Center	
Kapolei High School	Increase demand for high school construction	Increased traffic along Farrington Highway and North-South Road		
SECONDARY STUDY AREA Wa'anae		Increased traffic along H-1 eastbound, Farrington Highway, North-South Road	Convenient for university staff and faculty	
Central O'ahu		Increased traffic on H-1 and Farrington Highway		
		Less competition for Central O'ahu housing market		

**Community Issues and Concerns.** Most of the potential social impacts cited by 'Ewa residents during community interviews were inextricably tied to regional concerns over the adequacy of infrastructure and public facilities. People's experience of regional change has repercussions for the East Kapolei Project. Residents seemed to have lumped together perceptions of the East Kapolei project with the other residential developments. Consequently, impacts of the project were invariably voiced in terms of potential cumulative impacts on the region.

Based on the types of issues and concerns raised by the interviewees, some broad themes emerge around which the potential impacts can be grouped:

- **Quality of Life** — primarily infrastructure and other engineering issues which affect the quality of people's lives in a community.
- **Community Character** — elements of design, configuration, timing and coordination of the development, and community consultation processes which affect the project's compatibility with surrounding communities and land uses, and resident perceptions of whether that project is an asset to the region.
- **Community Involvement** — an expressed need for informational and cooperative problem-solving interactions between developer and community representatives, that seek pro-active mitigations of anticipated project impacts.
- **Health and Safety** — mainly issues related to protracted construction, cumulative effects of construction in the region, but also concerns that the developer give thoughtful consideration to providing safe accessways for pedestrians.

Distinctive concerns of particular communities are identified later in this section.

## 6.2 REGIONAL IMPACTS

The proposed development is the largest residential community in the region. Consequently, it may result in substantial impacts to the region. The impacts are discussed in relation to the phases of project development. (See Exhibit 6-A.)

- **Planning** — Opportunities exist to plan for regional infrastructure needs. The outcome could be faster and more orderly regional development, especially since Schuler and the UH will have overlapping construction schedules.
- **Mid-development and afterwards** — Housing construction should be well on its way by the mid-2000s. At this point, Phase 1 should be completed and Phase 2 started. Potential impacts related to this phase of development include:
  - The increased residential population will intensify the need for regional parks and community amenities.

- Loss of historical identity in `Ewa — Much of the former cane land in the landbanked area will have been transformed into housing. Much of the Plain area will have become urbanized, and existing pockets of plantation life may be dwarfed by the new developments.
- Increased population will intensify the need for early childhood education and care in the region. (Situated in Kapolei, Seagull Schools will be the major child care and education facility in the region.)

Potential increased demand for infrastructure, facilities, and services can mean greater competition for limited resources in the short term. In the long term, the greater the regional population, the more justification will exist for expensive projects such as the North-South road or for locating social service providers in the proposed Kapolei Civic Center.

### 6.3 IMPACTS ON NEARBY AREAS AND LAND USES

#### 6.3.1 Project Site

The project will take 15 or more years to build. Residents will move in as housing construction continues until buildout.

*Impacts:*

- **Quality of Life.** The project will provide new housing for thousands of O`ahu residents. For many, this will be a first chance of home ownership. After years of interviews with Hawaii social service professionals, CRI finds that the provision of housing (and hence less crowding in existing neighborhoods) is strongly associated with lower stress and family problems. However, new homeowners typically pay a large share of their income to cover housing costs: homeownership does not relieve people of economic and social challenges so much as increase the benefits of meeting these challenges.

Facilities that support social interaction and activities — social halls, churches, and parks — contribute to the vitality of neighborhood and community life. Limited availability of such spaces can minimize residents' involvement in community life.

- **Health and Safety.** Construction noise and dust are potential irritants or health hazards to project residents. Sites nearby completed homes

will be under construction and barriers such as shrubbery or landscaping may either be freshly or incompletely planted. In extreme cases, chronic exposure to construction conditions can have cumulative impacts to their health.

### **6.3.2 Communities along Fort Weaver Road**

Fort Weaver Road links several communities: West Loch Estates, West Loch Fairways, Ewa Villages, 'Ewa by Gentry, and 'Ewa Beach.

**'Ewa Villages.** The 'Ewa Villages lies southeast of the East Kapolei project site, and is the nearest neighbor to the project.

*Residents' Issues and Concerns.* Infrastructure issues — drainage and traffic above all — were mentioned by all informants. Some interviewees felt that the project would attract residents of a different socio-economic status, which would affect relations between new residents and long-time residents. Social tensions might be played out in common areas such as neighborhood parks.

Others felt that the development would widen the gap between rich and poor, thereby raising 'Ewa's crime rate. It was thought that new residential developments present convenient targets for burglary.

One village resident was concerned that her property taxes would rise as a result of being near a new residential development.

#### *Impacts:*

- **Health and Safety.** Impacts from construction dust will likely be few and short-term. The 'Ewa Villages golf course and, after a few years, much of Phase 1 of the project will separate the Villages from new construction sites.

Potential project impacts on drainage — and hence on the flooding that occurs in 'Ewa Villages apart from the project — are being addressed by project engineers, as reported elsewhere in the EIS for the East Kapolei project.

- **Community Character.** The large scale of the proposed East Kapolei Project could overwhelm the historic atmosphere of the rehabilitated 'Ewa Villages. The addition of these units to the region may lessen residents' sense of historic place and identity in 'Ewa. This incongruity may become magnified because 'Ewa Villages will be situated between

two large-scale housing developments, East Kapolei and `Ewa by Gentry.

- **Quality of Life.** Construction of school facilities can take a number of years, depending on various factors, including the availability of State funds. `Ewa Elementary School would likely be over capacity if the elementary school for the Phase I development is not completed when residents move in. The school currently serves children living in the `Ewa Villages and the West Loch projects. The elementary school district will be re-districted in 1996 when Gentry Elementary comes on-line (DOE, 1994). `Ilima Intermediate could similarly face problems of capacity.
- **Economic Impact on Residents.** The East Kapolei project will have no impact on `Ewa Villages residential tax assessments. Tax assessors routinely treat new projects as separate "neighborhoods," and only treat adjoining areas as comparable if home sales indicate that people are willing to spend much the same amount for older and new homes.

#### **The Other Communities along Fort Weaver Road.**

*Residents' Issues and Concerns.* Residents from the West Loch, Gentry, and `Ewa Beach communities were concerned that the East Kapolei project might exacerbate existing regional conditions. They were most apprehensive about the development adding to what they feel are already intolerable traffic conditions along Fort Weaver.

Businesses along the road felt generally optimistic that the East Kapolei development would bring more customers.

#### *Impacts:*

- **Quality of Life.** West Loch students would also be affected, if `Ewa Elementary exceeds capacity because the elementary school in the Phase 1 development is not completed when residents move in. Again, `Ilima Intermediate could face problems of capacity, as well.

During the early construction phase, local traffic will likely increase along Fort Weaver Road and Farrington Highway, until the reliever North-South Road is completed.

### **6.3.3 Makakilo and Kapolei**

*Residents' Issues and Concerns.* Residents of Makakilo and Kapolei felt that their communities would be most impacted by increased freeway traffic from the project.

*Impacts:* The project will add to the customer base for Kapolei commercial areas. Project residents will add to regional highway traffic.

## **6.4 IMPACTS TO PLANNED LAND USES**

### **6.4.1 University of Hawai'i - West O'ahu (UHWO)**

A number of opportunities that could yield mutual benefits exist for Schuler Homes and the University of Hawai'i.

*Residents' Issues and Concerns.* Community interviewees recognized that the project could help to speed development of the North-South road, UHWO, and Kapolei High School.

*Impacts:*

- **Quality of Life.** Coordinated planning will speed development and can lower overall costs for UHWO construction. When UHWO is open, the project will provide housing and neighborhood commercial areas serving students, faculty, and staff.
- **Health and Safety.** By the time UHWO opens, project construction along the east side of the North-South road will likely be finished. Hence the project and the road will buffer UHWO from construction impacts.

### **6.4.2 Kapolei High School**

The high school is supposed to be built before the year 2000. It will serve 1,500 to 1,800 students from Kapolei, Makakilo, Makaiwa Hills, and Ko 'Olina Estates.

*Residents' Issues and Concerns:* Many residents have long-awaited a second high school for 'Ewa.



*Impacts:*

- **Quality of Life.** The project will increase demand for high school construction.
- **Health and Safety.** The high school site is south and west of the project, and separated from it by both the North-South road and the new DHHL land. Hence few or no construction impacts are likely.

Students living in the project could be at risk along the North-South road unless footpaths and pedestrian overpasses are provided between the project site and the high school. (This impact is cumulative, and more a consequence of road design than of the project.)

#### **6.4.3 Site Transferred to DHHL**

The 85-acre site recently transferred to DHHL is not yet a planned land use. However, it presumably will be used for housing. It will be far more easily developed with the project than without it. The savings on infrastructure planning noted earlier will likely benefit DHHL as well as others. Furthermore, DHHL can consider using the project's road to Farrington Highway as well as the North-South road for traffic to and from their site, if speedy development of the acreage is desired.

### **6.5 IMPACTS ON SECONDARY STUDY AREA**

#### **6.5.1 Wai`anae DPA**

Most Wai`anae residents commute to Honolulu or to other areas of the island for work. Farrington Highway and H-1 Freeway are the only thoroughfares out of the region. The project will affect residents by adding traffic to the freeway.

#### **6.5.2 Central O`ahu DPA**

The project will compete with Central O`ahu housing developments as well as with `Ewa subdivisions for the resident housing market. As a result, it will tend to slow the buildout of those developments, and hence tend to slow the pace of growth in Central O`ahu.

## Section 7 MITIGATION MEASURES AND COMMUNITY BENEFITS

In a region where several developers have been active, community representatives may expect community benefits as their due. Here a distinction is made between mitigation measures, which alleviate actual impacts of a project, and community benefits, which do not respond to specific project impacts but may have an indirect effect of improving relations with the surrounding community.

In this section, CRI identifies ways to mitigate adverse project impacts. This is an independent consultant's assessment, implying no commitment on the part of Schuler Homes, Inc. to undertake any of the steps mentioned. We further note possible community benefits, without implying in any way that provision of these benefits is necessary or obligatory.

To the extent that impacts affect people's sense of their lifestyles and community, mitigation of those impacts depends on their view of proposed solutions as appropriate. Community involvement in decision-making can be crucial to implementing mitigation measures that effectively respond to residents' needs and concerns. Accordingly, consultant recommendations are suggestions for further review by the project developer and community leaders, not prescriptions.

### 7.1 MITIGATION MEASURES

The project contributes to meeting the islandwide need for housing. It fits in with government policy encouraging growth in 'Ewa. As a result, it contributes to the regional problem of coordinating development so that infrastructure, housing, and services are all provided efficiently. It can also contribute to the solution.

Potential adverse impacts of the project fall under three general headings, as shown in Exhibit 7-A on the next page.

- **Quality of Life.** Potential adverse impacts are inadequate regional physical and social infrastructure; limited community facilities on site for residents, and irritation due to traffic congestion.

The problems of limited regional infrastructure and facilities (discussed in Section 6) can be addressed through:

- *Coordinated planning among regional landowners for infrastructure development.* Schuler Homes, Inc. is already attempting such planning.

**Exhibit 7-A  
POSSIBLE MITIGATION MEASURES**

POTENTIAL IMPACTS	MITIGATION MEASURES
<p><b>QUALITY OF LIFE</b></p> <p>Regional: inadequate physical and social infrastructure for growing community</p> <p>On site: lack of child care; limited community space</p> <p>Irritation due to traffic congestion</p>	<ul style="list-style-type: none"> <li>▪ Develop infrastructure for project in coordination with other regional developers</li> <li>▪ Work with community groups and landowners to plan for regional facilities</li> <li>▪ Provide incentives to agencies to develop needed facilities on time</li> <li>▪ Provide community facilities or support community associations' use of park space</li> <li>▪ Allow family child care homes in CC+Rs</li> <li>▪ Work for speedy development of North- South Road and other highway improvements</li> </ul>
<p><b>HEALTH &amp; SAFETY</b></p> <p>Construction dust, noise</p> <p>Students on North-South road</p>	<ul style="list-style-type: none"> <li>▪ Follow City and State regulations governing construction</li> <li>▪ Plan construction timing to limit duration of impact on adjoining areas</li> <li>▪ Anticipate, respond to resident complaints</li> <li>▪ Work with government planners</li> </ul>
<p><b>COMMUNITY CHARACTER</b></p> <p>Loss of "country" character</p>	<ul style="list-style-type: none"> <li>▪ Design sensitive to 'Ewa Villages (in nearby sections of Phase 1)</li> </ul>

- *Continuing work with community associations, landowners and interest groups to plan for regional facilities. Beyond infrastructure planning, 'Ewa landowners and communities may seek to cooperate in identifying needed services in government centers to be developed in Kapolei. Again, cooperation will be needed to insure that regional park plans — in existing developments and at*

Barbers Point NAS — respond to local needs and are developed as soon as needed.

- *Incentives to spur public agencies to develop facilities when needed.* While government policy supports new development in `Ewa, budgets are tight. Agencies and legislators may understandably delay construction of needed facilities in `Ewa. Campbell Estate's practice of making land donation contingent upon timely development of the land (as at the UHWO site) provides an example of how to offer an incentive to government to give priority to `Ewa's needs.
- The East Kapolei project consists at the moment of little more than a conceptual plan. As a result, provision of community facilities on site is only indicated by the allocation of park space. Two potential adverse impacts are visible:
  - *Community facilities and spaces.* Project plans include parks and schools as sites for neighborhood and community life, but no other community facility spaces have as yet been identified. While community halls may often not be well used, it is doubtful that open space in two parks will suffice to support an active and varied community life. Potential mitigations include (a) providing space for additional community or neighborhood social facilities and (b) supporting community groups to organize and use available park or school space.
  - *Child care needs.* While Kapolei will have a large child care center, project residents are likely to need additional services. In Hawaii, most working parents prefer to find child care in family home settings — with relatives, friends, or other providers — for children younger than three years old. Because of the distance between `Ewa and older urban areas, many families may find it impossible or impractical to take young children to relatives on a daily basis, and may need child care facilities nearby. Their needs can be met by skilled private providers in the project area so long as (a) the project CC+Rs allow family care homes and (b) child care providers and support services such as Traveling Preschools are allowed to use community parks.

In the near term, project contributions to regional traffic congestion will affect the quality of life of residents depending on Farrington Highway and the Fort Weaver Road interchange. The most effective mitigation strategy would be to work to encourage government agencies to

develop additional roadways — North-South road and its interchange with H-1, above all — as quickly as possible.

- **Health and Safety.** Two separate potential impacts are of concern:
  - *Construction impacts* are recognized irritants on the dry `Ewa Plain. The project can work to minimize construction dust and noise by (a) following government regulations and (b) planning the timing of construction so that adjoining properties are affected by project construction only for a limited period of time. Construction of Phase 1 blocks adjoining `Ewa Villages can be planned to limit the length of time than construction occurs near any particular village. Similarly, construction of blocks across the North-South road from the University site can be timed to occur before the University opens, minimizing potential impact on UHWO.

In addition, the developer may consider establishing a hotline for complaints about construction impacts and delegating employees to respond to these. While this action is a form of community response, it also can help in monitoring the performance of construction crews, insuring that they meet standards needed to minimize construction impacts.

- *Safety of children along the North-South road* is the responsibility of highway planners more than of the developer. The developer can work with government planners to see that pedestrian overpasses and walkways are provided, and children and traffic on this major regional road do not mix.
- **Community Character.** `Ewa is being urbanized, and the project cannot be held accountable for that fact. However, the project is situated next to `Ewa Villages, where an attempt is being made to preserve a plantation community and a "country" ambiance through restoration and design of new homes. In order to support this effort, some attention may be necessary to coordinate design of Phase 1 areas near `Ewa Villages with the Villages.

## 7.2 COMMUNITY OUTREACH AND BENEFITS

Community involvement is advisable to increase the fit of the project with surrounding areas, to encourage regional cooperation in planning, and to identify effective mitigations for local-level impacts. Such involvement, by the developer and by resident community groups, can further help to counter the regional trend

toward a split between old and new communities. The developer has begun community involvement through presentations to community groups and close communication with recognized community leaders.

Further steps toward cooperation and interaction could include:

- Planning paths, roads, and bikeways that link neighboring communities; and
- Encouraging inter-community activities through community associations, sports leagues, and regional events.

The project is currently separated from nearby communities by gullies and a proposed golf course. These limit the possibility of creating a continuous landscape, rather than a set of discontinuous subdivisions. Nonetheless, the project developer can consider landscaping and design choices that minimize incongruity between nearby areas. (First, however, it may be necessary to learn whether harmonious design is wanted or even thought possible. There may be little point in making parts of the project harmonize in design with the old plantation villages if the City's new development, surrounding those villages, does not.)

**APPENDIX A:  
DETAILED EXHIBITS ON  
EXISTING CONDITIONS**

**Appendix A**  
**1. DEMOGRAPHIC CHARACTERISTICS, SELECTED DP AREAS, 1990**

	Honolulu County	SELECTED DP AREAS		
		Ewa (1)	Central (1)	Waianae
<b>POPULATION</b>	836,231	42,960	130,474	37,411
<b>ETHNICITY</b>				
Caucasian	32%	40%	30%	23%
Japanese	23%	9%	20%	6%
Filipino	14%	28%	24%	16%
Hawaiian	11%	10%	8%	41%
Other	20%	13%	18%	15%
<b>AGE</b>				
Less than 5 years	7%	10%	10%	10%
5 to 17 years	17%	21%	20%	26%
18 to 34 years	31%	35%	34%	27%
35 to 64 years	34%	29%	29%	30%
65 or more years	11%	5%	6%	7%
Median age (years)	32.2	N/A	N/A	26.3
<b>EDUCATION OF PERSONS AGED 25 &amp; OVER (2)</b>				
High School Diploma (3)	81%	80%	82%	69%
College Degree (4)	33%	25%	29%	15%
<b>PERSONS AGED 5 &amp; OVER WHO SPEAK A LANGUAGE OTHER THAN ENGLISH AT HOME (2)</b>	26%	24%	26%	19%
<b>PERSONS WITH MOBILITY OR SELF-CARE LIMITATIONS (2)</b>				
% of persons aged 16 to 64	4%	5%	4%	6%
% of persons aged 65 or more	18%	20%	20%	26%

NOTES: (1) See Appendix A-6 for a detailed list of equivalent Census regions for these Development Plan Areas.  
(2) Based on 15% sample; hence, figures represent estimates only.  
(3) All persons with a high school diploma, including those with college education.  
(4) Includes Associate, Bachelor's, and graduate degrees.

SOURCES: U.S. Bureau of the Census, 1992, 1991.



**Appendix A**  
**2. GEOGRAPHIC MOBILITY, SELECTED DP AREAS, 1990 (1)**

	Honolulu County	SELECTED DP AREAS		
		Ewa	Central	Waianae
<b>PERSONS (2)</b>				
<b>PLACE OF BIRTH</b>				
Born in Hawaii	54%	46%	51%	74%
Other U.S.-born (3)	30%	38%	35%	18%
Foreign-born	16%	16%	15%	8%
<b>RESIDENCE 5 YEARS PREVIOUS FOR PERSONS AGED 5 &amp; OVER</b>				
Same house	50%	38%	43%	55%
Same county, different house	26%	29%	27%	33%
Same state, different county	1%	1%	1%	1%
Different state	17%	26%	24%	9%
Lived abroad	5%	6%	6%	2%
<b>HOUSEHOLDERS (2)</b>				
<b>WHEN HOUSEHOLDER MOVED INTO UNIT</b>				
In the last 5 years	53%	66%	62%	52%
6 to 20 years ago	29%	26%	26%	35%
21 to 30 years ago	10%	6%	8%	7%
31 years ago or more	8%	3%	4%	6%

NOTES: (1) Based on 15% sample; hence, figures represent estimates only.  
(2) Base figures used in calculating these data may be different than in 100% count.  
(3) Includes persons born in U.S. territories, and persons born abroad or at sea to American parents.

SOURCE: U.S. Bureau of the Census, 1992.

**Appendix A**  
**3. HOUSING CHARACTERISTICS, SELECTED DP AREAS, 1990**

	Honolulu County	SELECTED DP AREAS		
		Ewa	Central	Waianae
<b>HOUSING UNITS</b>	281,683	11,734	36,260	10,680
<b>TOTAL VACANT UNITS</b>	6%	3%	2%	12%
Seasonal/recreational	2%	0%	0%	4%
<b>AGE OF STRUCTURE (1)</b>				
1 year	2%	7%	3%	1%
2 to 10 to years	14%	15%	28%	13%
11 to 20 years	30%	29%	29%	42%
21 years or more	54%	48%	40%	44%
<b>UNITS IN STRUCTURE</b>				
1 unit	55%	80%	65%	70%
2 to 4 units	7%	7%	9%	5%
5 or more units	36%	11%	24%	23%
Trailer, other	1%	1%	1%	2%
<b>NOT COMPLETE PLUMBING (1)</b>	1%	0%	0%	1%
<b>HOUSEHOLDS</b>	265,304	11,434	35,443	9,417
<b>HOUSEHOLD TYPE</b>				
1 or more non-relatives	12%	12%	10%	15%
No non-relatives	88%	88%	90%	85%
<b>TENURE</b>				
Owner-occupied	52%	53%	55%	52%
Renter-occupied	48%	47%	45%	48%
<b>PERSONS PER HOUSEHOLD</b>	3.02	3.66	3.49	3.93
<b>CROWDED HOUSEHOLDS</b>				
Mildly crowded (2)	8%	11%	10%	16%
Very crowded (3)	8%	9%	8%	18%
<b>MEAN VALUE (4)</b>	\$312,624	\$232,270	\$265,169	\$168,784

NOTES: (1) Based on 15% sample; hence, figures represent estimates only.  
(2) Indicated by households with 1.00 to 1.50 persons per room.  
(3) Indicated by households with 1.51 or more persons per room.  
(4) For owner-occupied, non-condominium housing units.

SOURCES: U.S. Bureau of the Census, 1992, 1991.

**Appendix A**  
**4. INCOME CHARACTERISTICS, SELECTED DP AREAS, 1990 (1)**

	Honolulu County	SELECTED DP AREAS		
		Ewa	Central	Waianae
<b>HOUSEHOLDS (2)</b>				
<b>INCOME LEVEL</b>				
Lowest (3)	13%	9%	11%	22%
Highest (4)	17%	12%	15%	9%
Mean Income (5)	\$49,959	\$44,759	\$47,540	\$38,310
Interquartile Range (6)	\$43,154	\$36,073	\$39,906	\$35,239
<b>WITH SELECTED INCOME SOURCES</b>				
Social Security Income	24%	15%	17%	23%
Retirement Income	20%	17%	17%	21%
Public Assistance Income	6%	6%	8%	22%
<b>OWNER HOUSING COSTS (7)</b>				
35% or more of Household Income	15%	21%	20%	14%
Mean Monthly Costs	\$909	\$968	\$1,041	\$607
<b>RENTER HOUSING COSTS (8)</b>				
35% or more of Household Income	34%	36%	37%	44%
Mean Gross Rent	\$711	\$810	\$717	\$617
Mean Contract Rent (9)	\$655	\$738	\$652	\$551
<b>POPULATION (2)</b>				
<b>PERSONS BELOW POVERTY LEVEL</b>				
% of persons aged 18 to 64	7%	5%	7%	19%
% of persons aged 65 or more	6%	4%	5%	15%
% of related children aged less than 18	8%	4%	9%	14%
% of unrelated individuals	10%	5%	10%	26%
	19%	17%	18%	33%

- NOTES: (1) Based on 15% sample (except "Mean Contract Rent"); hence, figures represent estimates only.  
(2) Base figures used in calculating this data may be different than in 100% count.  
(3) Incomes of less than \$15,000 (based on lowest 14.8% of incomes statewide).  
(4) Incomes of \$75,000 or more (based on highest 15.8% of incomes statewide).  
(5) In 1989 dollars.  
(6) A smaller range means less difference between rich and poor, while a larger range means a greater difference between rich and poor.  
(7) Owner costs include (but are not limited to) mortgage, real property tax, property insurance, utilities, and fuels.  
(8) Renter costs include (but are not limited to) rent, utilities, and fuels.  
(9) Monthly cash rent only. Does not include other costs.

SOURCES: U.S. Bureau of the Census, 1992, 1991.

**Appendix A**  
**5. LABOR FORCE CHARACTERISTICS, SELECTED DP AREAS, 1990 (1)**

	Honolulu County	SELECTED DP AREAS		
		Ewa	Central	Waianae
<b>POPULATION AGED 16 &amp; OVER</b>	651,920	30,788	94,346	24,973
In Armed Forces	8%	17%	16%	2%
<b>POTENTIAL CIVILIAN LABOR FORCE</b>	598,371	25,556	78,949	24,377
In Civilian Labor Force	69%	71%	72%	62%
<b>CIVILIAN LABOR FORCE</b>	410,023	18,081	57,071	15,107
<b>MALE</b>				
Labor force participation (2)	75%	79%	79%	71%
Unemployed	4%	5%	4%	8%
<b>FEMALE</b>				
Labor force participation (2)	63%	64%	67%	53%
Unemployed	3%	5%	4%	8%
<b>EMPLOYED CIVILIAN LABOR FORCE</b>	395,811	17,120	54,571	13,901
<b>BY SELECTED INDUSTRY</b>				
Agriculture, forestry, fisheries, mining	2%	2%	2%	4%
Construction	7%	8%	8%	12%
Manufacturing	6%	9%	8%	8%
Transportation	7%	7%	7%	7%
Retail trade	19%	20%	19%	17%
Finance, insurance, real estate	8%	7%	7%	4%
Personal, entertainment, recreation	8%	6%	7%	7%
Health, education, professional	22%	17%	19%	19%
Public administration	9%	11%	12%	9%
<b>BY OCCUPATION</b>				
Managerial, professional	28%	18%	23%	17%
Technical, sales, support	35%	35%	35%	27%
Service	17%	18%	17%	18%
Farming, forestry, fishing	2%	2%	2%	4%
Precision, craft, repair	10%	13%	12%	14%
Operators, cleaners, laborers	9%	14%	11%	20%
<b>COMMUTE TO WORK</b>				
More than 45 minutes	16%	21%	20%	40%
Mean travel time (minutes)	25	N/A	N/A	36

NOTES: (1) Based on 15% sample; hence, figures represent estimates only.  
(2) Calculated by dividing "Civilian Labor Force" by "Potential Civilian Labor Force."

SOURCE: U.S. Bureau of the Census, 1992.

**Appendix A**  
**6. 'EWA AND CENTRAL DP AREAS IN CENSUS TERMS**

Region	1990 Population
<b>'EWA DP AREA</b>	42,983
<b>APPROXIMATE CENSUS AREAS</b>	42,960
Tract 83.01	5,786
Tract 83.02	6,699
Tract 87.98 (BG 9 only)	826
Tract 84	9,677
Tract 85	4,529
Tract 86.03 (all except BG 1)	5,907
Tract 86.04	4,015
Tract 86.98	5,521
<b>DIFFERENCE</b>	23
<hr/>	
<b>CENTRAL DP AREA</b>	130,474
<b>APPROXIMATE CENSUS AREAS</b>	130,474
Tract 82	0
Tract 86.03 (BG 1 only)	602
Tract 87.01	7,598
Tract 87.02	4,161
Tract 87.98 (all except BG 9)	3,645
Tract 88	6,172
Tract 89.01	8,084
Tract 89.04	5,183
Tract 89.05	7,561
Tract 89.06	4,025
Tract 89.07	4,560
Tract 89.08	6,688
Tract 89.09	3,779
Tract 89.10	10,444
Tract 89.11	11,893
Tract 89.12	2,193
Wahiawa Division (1)	43,886
<b>DIFFERENCE</b>	0

NOTE: (1) Comprised of Tracts 90, 91, 92, 93, 94, 95.01, 95.02, 95.03, 95.04, and 95.05

SOURCES: U.S. Bureau of the Census, 1992.  
Steve Young, City & County Planning Department ('Ewa DP — 2/13/92; Central DP — 8/8/94).

**Appendix A**  
**7. EXISTING & PLANNED RESIDENTIAL DEVELOPMENTS IN 'EWA**

Existing & Planned Developments		Units		Year (to be) Completed
Description	Developer	Number	Type	
<b>CITY OF KAPOLEI</b> Mauka Makai		750 2,000		1996 to 2010
<b>'EWA BY GENTRY</b> 1,000 acres Coronado Palm Court & Palm Villas Soda Creek I and II Summerhill Sun Terra Sun Rise Sun Terra on the Park Sun Terra South The Arbors	Gentry Development Co.	8,000	138 60% affordable 562 multi-family 2,100 single- & 305 multi-family 240 townhouse 386 184 72 280 low-rise condo	2000  1990
<b>'EWA MARINA</b> 1,100 acres Residential Units Visitor Units Marina 27-hole Golf Course Health/Fitness Center Maritime Commercial Center	HASEKO ('Ewa) Inc.	4,850 950 1,400	10 to 30% affordable boat slips	Projected construction start-time is 1995 1995 to 2010 or 2015
<b>EWA VILLAGES</b> 610 acres Tenney Village Varona Village Renton Village New Residential Development Elementary School Neighborhood Retail Center Parks/Recreation Facilities 18-hole Municipal Golf Course Historical Buildings Restoration	DHCD (2)	273  957 17 acres 252 acres	revitalize existing  60% affordable 40% market	8-phase project 1997 to 2000  Under construction
<b>KAPOLEI KNOLLS</b> 79.5 acres	Finance Realty	380	single-family & market	200 units, Dec. 1995
<b>KO 'OLINA</b> 1,000 acres Phase I: Residential Units Visitor Units Marina 18-hole Golf Course Clubhouse 'Ihiani Resort Sandy Beaches Hawaiian Cultural Center Shopping Center Restaurants	West Beach Estates	3,700 1,500 4,000 350-400 1 4	apt./condo, med.-rise low-density/golf course slips	Groundbreaking: 1988  Completed  Open

Existing & Planned Developments		Units		Year (to be) Completed
Description	Developer	Number	Type	
Phase II: Residential Units Hotels Local Commercial Center 18-hole Golf Course		3,500 2		Undetermined
MAKAIWA HILLS 2,000 acres Residential Regional Mall Public Parks Elementary School	Campbell Estate	1,066 1 M s.f.	market & affordable single-/multi-family	Groundbreaking: 1996 2001 to 2010
MAKAKILO Cambridge Park WestPark at Makakilo Heights Palehua Pointe Palehua Nani & Palehua Villas Makakilo Cliffs Makakilo Cluster Park Makakilo Ridge Royal Ridge Westview at Makakilo Heights	Finance Realty	6,174 112 affordable 47 lots 23 affordable 24 40		1962 to 1999
THE VILLAGES OF KAPOLEI 890 acres V.1. Kumu 'Iki V.2. A'eioa V.3. Malanai V.4. Kekuilani V.5. Kulalani V.6 Pae Ko Gardens V.7 V.8 Elementary School Intermediate School High School Commercial Services Community Park Recreation Center 18-hole Public Golf Course	Schuler Homes, Inc.	72 single-family, fee simple 500 townhomes, 10% afford.		Phase I, Nov. 1993 2005
	HFDC (3) Castle & Cooke Properties, Inc. Watt Hawai'i Watt Hawai'i Waieili Development Corp. West Beach Estates Kumi Kei Development Watt Hawai'i Waieili Development Corp.	519 571 mixed density 384 645 mixed density 128 multi-family townhomes 128 multi-family townhomes 492 618 2 1 1		1991 late 1994 1992 1st delivery, 1994 Occupancy July 1994 Occupancy Dec. 1994 1993: Kapolei Elem. 1998 school year
WEST LOCH SUBDIVISIONS 500 acres Phase I subdivision West Beach Estates West Loch Fairways Townhomes Project West Loch Village for the Elderly and Disabled Commercial Center Church Child Care Center Asing Community Park 18-hole Municipal Golf Course 40-acre Shoreline Park	DHCD/West Loch, Inc.  Fletcher Pacific, Inc.	593 718 single-/multi-family 136 multi-family rental 150		1989 1994 1993 1993 1990

NOTES: (1) Inventory as of late 1994. Non-residential components shown in italics.  
(2) DHCD = Department of Housing & Community Development.  
(3) HFDC = Housing & Finance Development Corporation.

SOURCES: Calls to developers by CRI, 1994; Honolulu Planning Department, 1992, 1993; Atwater, 1994. The Estate of James Campbell, 1993a, 1993b, 1993c; Helber Hastert & Fee, Planners, 1992.

**Appendix A**  
**8. DEMOGRAPHIC CHARACTERISTICS, SELECTED `EWA AREAS, 1990**

	Honolulu County	Barber's Point	`Ewa Beach	`Ewa Villages	Makakilo	`Ewa Gentry
<b>POPULATION</b>	836,231	2,218	14,315	3,780	9,828	1,992
<b>ETHNICITY</b>						
Caucasian	32%	78%	23%	8%	47%	31%
Japanese	23%	1%	9%	14%	10%	18%
Filipino	14%	8%	39%	67%	16%	28%
Hawaiian	11%	1%	17%	5%	13%	7%
Other	20%	15%	12%	5%	14%	15%
<b>AGE</b>						
Less than 5 years	7%	19%	7%	7%	8%	10%
5 to 17 years	17%	10%	23%	21%	19%	15%
18 to 34 years	31%	81%	30%	27%	34%	48%
35 to 64 years	34%	9%	33%	30%	36%	27%
65 or more years	11%	0%	7%	15%	3%	3%
Median age (years)	32.2	24.7	28.6	32.4	29.8	28.4
<b>EDUCATION OF PERSONS AGED 25 &amp; OVER (1)</b>						
High School Diploma (2)	81%	90%	71%	55%	90%	88%
College Degree (3)	33%	15%	17%	12%	37%	37%
<b>PERSONS AGED 5 &amp; OVER WHO SPEAK A LANGUAGE OTHER THAN ENGLISH AT HOME (1)</b>	26%	15%	29%	46%	16%	24%
<b>PERSONS WITH MOBILITY OR SELF-CARE LIMITATIONS (1)</b>						
% of persons aged 18 to 64	4%	2%	6%	4%	5%	3%
% of persons aged 65 or more	18%	0%	18%	22%	15%	0%

NOTES: (1) Based on 15% sample; hence, figures represent estimates only.  
(2) All persons with a high school diploma, including those with college education.  
(3) Includes Associate, Bachelor's, and graduate degrees.

SOURCES: U.S. Bureau of the Census, 1992, 1991.



**Appendix A**  
**9. GEOGRAPHIC MOBILITY, SELECTED 'EWA AREAS, 1990 (1)**

	Honolulu County	Barber's Point	'Ewa Beach	'Ewa Villages	Makakilo	'Ewa Gentry
<b>PERSONS (2)</b>						
<b>PLACE OF BIRTH</b>						
Born in Hawaii	54%	13%	63%	62%	45%	52%
Other U.S.-born (3)	30%	78%	18%	5%	43%	31%
Foreign-born	16%	9%	20%	33%	12%	17%
<b>RESIDENCE 5 YEARS PREVIOUS FOR PERSONS AGED 5 &amp; OVER</b>						
Same house	50%	2%	61%	43%	40%	2%
Same county, different house	26%	5%	29%	50%	29%	76%
Same state, different county	1%	0%	1%	1%	1%	2%
Different state	17%	79%	6%	3%	25%	16%
Lived abroad	5%	14%	3%	4%	6%	3%
<b>HOUSEHOLDERS (2)</b>						
<b>WHEN HOUSEHOLDER MOVED INTO UNIT</b>						
In the last 5 years	53%	99%	39%	56%	64%	100%
6 to 20 years ago	29%	1%	49%	23%	26%	0%
21 to 30 years ago	10%	0%	8%	3%	10%	0%
31 years ago or more	8%	0%	3%	18%	0%	0%

- NOTES: (1) Based on 15% sample; hence, figures represent estimates only.  
(2) Base figures used in calculating these data may be different than in 100% count.  
(3) Includes persons born in U.S. territories, and persons born abroad or at sea to American parents.

SOURCE: U.S. Bureau of the Census, 1992.

**Appendix A**  
**10. HOUSING CHARACTERISTICS, SELECTED 'EWA AREAS, 1990**

	Honolulu County	Barber's Point	'Ewa Beach	'Ewa Villages	Makakilo	'Ewa Gentry
<b>HOUSING UNITS</b>	281,683	866	3,426	939	3,050	752
<b>TOTAL VACANT UNITS</b>	6%	1%	2%	4%	2%	6%
Seasonal/recreational	2%	0%	0%	0%	0%	0%
<b>AGE OF STRUCTURE (1)</b>						
1 year	2%	1%	1%	5%	1%	71%
2 to 10 to years	14%	1%	7%	43%	28%	29%
11 to 20 years	30%	5%	41%	1%	44%	0%
21 years or more	54%	93%	52%	51%	27%	0%
<b>UNITS IN STRUCTURE</b>						
1 unit	55%	49%	86%	95%	79%	50%
2 to 4 units	7%	19%	4%	2%	7%	5%
5 or more units	36%	30%	9%	1%	13%	44%
Trailer, other	1%	2%	1%	3%	1%	1%
<b>NOT COMPLETE PLUMBING (1)</b>	1%	0%	1%	0%	0%	0%
<b>HOUSEHOLDS</b>	265,304	854	3,355	902	2,978	708
<b>HOUSEHOLD TYPE</b>						
1 or more non-relatives	12%	2%	15%	8%	16%	17%
No non-relatives	88%	88%	85%	92%	84%	83%
<b>TENURE</b>						
Owner-occupied	52%	0%	69%	66%	74%	80%
Renter-occupied	48%	100%	31%	34%	26%	20%
<b>PERSONS PER HOUSEHOLD</b>	3.02	2.52	4.26	4.19	3.30	2.81
<b>CROWDED HOUSEHOLDS</b>						
Mildly crowded (2)	8%	4%	17%	21%	7%	10%
Very crowded (3)	8%	1%	15%	21%	5%	7%
<b>MEDIAN VALUE (4)</b>	\$283,600	\$275,000	\$216,900	\$116,500	\$246,600	\$277,600

NOTES: (1) Based on 15% sample; hence, figures represent estimates only.  
(2) Indicated by households with 1.00 to 1.50 persons per room.  
(3) Indicated by households with 1.51 or more persons per room.  
(4) For owner-occupied, non-condominium housing units.

SOURCES: U.S. Bureau of the Census, 1992, 1991.

**Appendix A**  
**11. INCOME CHARACTERISTICS, SELECTED 'EWA AREAS, 1990 (1)**

	Honolulu County	Barber's Point	'Ewa Beach	'Ewa Villages	Makakilo	'Ewa Gentry
<b>HOUSEHOLDS (2)</b>						
<b>INCOME LEVEL</b>						
Lowest (3)	13%	14%	11%	13%	3%	5%
Highest (4)	17%	1%	16%	8%	20%	8%
Median Income (5)	\$40,581	\$23,908	\$45,184	\$40,924	\$50,284	\$45,824
Interquartile Range (6)	\$43,154	\$13,490	\$37,672	\$37,023	\$34,317	\$33,156
<b>WITH SELECTED INCOME SOURCES</b>						
Social Security Income	24%	3%	23%	47%	10%	7%
Retirement Income	20%	3%	28%	32%	17%	8%
Public Assistance Income	6%	1%	14%	5%	3%	3%
<b>OWNER HOUSING COSTS (7)</b>						
35% or more of Household Income	15%	N/A	16%	12%	24%	38%
Median Monthly Costs	\$1,121	N/A	\$910	\$710	\$1,268	\$1,393
<b>RENTER HOUSING COSTS (8)</b>						
35% or more of Household Income	34%	15%	31%	5%	48%	78%
Median Gross Rent	\$663	\$664	\$755	\$127	\$971	\$923
Median Contract Rent (9)	\$615	\$644	\$701	\$99	\$960	\$907
<b>POPULATION (2)</b>						
<b>PERSONS BELOW POVERTY LEVEL</b>						
% of persons aged 18 to 64	7%	1%	7%	1%	3%	6%
% of persons aged 65 or more	6%	1%	6%	1%	3%	4%
% of related children aged less than 18	8%	0%	4%	3%	4%	0%
% of unrelated individuals	10%	2%	7%	1%	4%	8%
	19%	0%	29%	20%	6%	8%

- NOTES:**
- (1) Based on 15% sample (except "Median Contract Rent"); hence, figures represent estimates only.
  - (2) Base figures used in calculating this data may be different than in 100% count.
  - (3) Incomes of less than \$15,000 (based on lowest 14.8% of incomes statewide).
  - (4) Incomes of \$75,000 or more (based on highest 15.8% of incomes statewide).
  - (5) In 1989 dollars.
  - (6) A smaller range means less difference between rich and poor, while a larger range means a greater difference between rich and poor.
  - (7) Owner costs include (but are not limited to) mortgage, real property tax, property insurance, utilities, and fuels.
  - (8) Renter costs include (but are not limited to) rent, utilities, and fuels.
  - (9) Monthly cash rent only. Does not include other costs.

**SOURCES:** U.S. Bureau of the Census, 1992, 1991.

**Appendix A**  
**12. LABOR FORCE CHARACTERISTICS, SELECTED `EWA AREAS, 1990 (1)**

	Honolulu County	Barber's Point	`Ewa Beach	`Ewa Villages	Makakilo	`Ewa Gentry
<b>POPULATION AGED 16 &amp; OVER</b>	651,920	1,681	10,499	2,855	7,286	1,634
In Armed Forces	8%	52%	3%	1%	13%	12%
<b>POTENTIAL CIVILIAN LABOR FORCE</b>	598,371	802	10,221	2,831	6,308	1,443
In Civilian Labor Force	69%	73%	70%	67%	76%	87%
<b>CIVILIAN LABOR FORCE</b>	410,023	589	7,129	1,899	4,768	1,255
<b>MALE</b>						
Labor force participation (2)	75%	82%	76%	72%	84%	94%
Unemployed	4%	21%	6%	5%	5%	1%
<b>FEMALE</b>						
Labor force participation (2)	63%	71%	63%	62%	67%	81%
Unemployed	3%	21%	4%	5%	4%	1%
<b>EMPLOYED CIVILIAN LABOR FORCE</b>	395,811	486	6,773	1,808	4,541	1,243
<b>BY SELECTED INDUSTRY</b>						
Agriculture, forestry, fisheries, mining	2%	1%	1%	11%	1%	0%
Construction	7%	9%	9%	6%	8%	7%
Manufacturing	6%	3%	8%	13%	9%	10%
Transportation	7%	4%	7%	7%	8%	7%
Retail trade	19%	29%	24%	20%	16%	16%
Finance, insurance, real estate	8%	7%	7%	5%	6%	11%
Personal, entertainment, recreation	8%	4%	7%	8%	4%	7%
Health, education, professional	22%	20%	15%	10%	20%	16%
Public administration	9%	19%	7%	9%	15%	15%
<b>BY OCCUPATION</b>						
Managerial, professional	28%	15%	12%	9%	26%	26%
Technical, sales, support	35%	39%	34%	27%	36%	36%
Service	17%	28%	22%	20%	13%	14%
Farming, forestry, fishing	2%	0%	1%	8%	1%	0%
Precision, craft, repair	10%	13%	14%	13%	13%	11%
Operators, cleaners, laborers	9%	5%	17%	23%	10%	12%
<b>COMMUTE TO WORK</b>						
More than 45 minutes	16%	5%	31%	22%	19%	30%
Mean travel time (minutes)	25	13	34	29	29	33

NOTES: (1) Based on 15% sample; hence, figures represent estimates only.  
(2) Calculated by dividing "Civilian Labor Force" by "Potential Civilian Labor Force."

SOURCE: U.S. Bureau of the Census, 1992.

**APPENDIX B:  
KEY INFORMANTS**

## Appendix B KEY INFORMANTS

The following list acknowledges persons interviewed by Community Resources, Inc. in September 1994, to learn of community expectations and concerns. Positions and/or organizational affiliations are mentioned to indicate the range and variety of interested parties. Interviewees were not asked to speak on behalf of their organizations.

KEY INFORMANT	POSITION AND/OR ORGANIZATION
Jeffrey R. Alexander	President, Save 'Ewa Beach 'Ohana 'Ewa Neighborhood Board 'Ewa Beach Resident
Richard Beamer	President, 'Ewa Beach Community Association
John Bickel	Former Chair, 'Ewa Beach Neighborhood Board Former Teacher, Campbell High School Former 'Ewa Beach Resident
Ka'uila Clark	President, West O'ahu Employment Corporation
Kathy Cozzens	Renton Village Resident Board Member, Friends for 'Ewa
Henry Eng	Manager, Land Planning, Estate of James Campbell
Sue Flint	'Ewa Beach Resident Member, Save 'Ewa Beach 'Ohana
James Floody	President, 'Ewa by Gentry Community Association
Cynthia Fu	Manager, 'Ewa Beach Branch, First Hawaiian Bank President, 'Ewa Beach Shopping Center Merchants' Association Member, 'Ewa Beach Professional Business Association Member, 'Ewa Beach Community Association
David A. Gilbert	Chair, 'Ewa Neighborhood Board Makakilo Resident
Alan Gottlieb	Part-Owner, Kahua Nursery
LaVerne Hatch	President, Makakilo Community Association President, Ahahui Siwila Hawai'i O Kapolei
Deborah Higa	Vice President, West O'ahu Employment Corporation
David Kawamura	Manager, Foodland at 'Ewa Beach Shopping Center Member, 'Ewa Beach Business Association
Terri Kita	Assistant to the Manager, Villages of Kapolei Association Kapolei Resid
Ellie Kupau	President, D.E. Thompson Senior Village Trustee, 'Ewa Villages Community Association

KEY INFORMANT	POSITION AND/OR ORGANIZATION
Florence Lomaoang	Member, 'Ewa Villages Non-Profit Development Corp. Tenney Village Resident
Paula Loring	President, Kapolei Elementary School Kapolei Resident
Richard Lyman	President, West Loch Fairways Community Association
Emogene Martin	President, Friends for 'Ewa 'Ewa Resident
Eric Murakami	Manager, Kapolei Safeway
Irene Nakamoto	Principal, 'Ewa Elementary School
Eleanor Niino	Fernandez Village Resident Board Member, 'Ewa Villages Community Association Volunteer, 'Ewa Elementary School
Jane Oamilda	Vice President, Friends for 'Ewa 'Ewa Beach Resident
Pastor David Parker	Pastor, Friendship Bible Church Director, Friendship Youth Center
Rodolfo V. Ramos	President, 'Ewa Villages Community Association Member, 'Ewa Neighborhood Board
Frances Rivero	Program Coordinator, Boys and Girls Club of 'Ewa Beach Board Member, HASEKO 'Ewa Beach Coordinating Council Board Member, 'Ewa Beach Community Association
Kari Tamura	Renton Village Resident
Arline E. West	Member, 'Ewa Neighborhood Board Employment Counselor, DHS-JOBS Wai'anae Makakilo Resident
Roy Wickramaratna	Makakilo Resident President, Makakilo Senior Citizens Club Member, Barbers Point Re-Use and Environmental Committees Former President, Makakilo Community Association Former President, Makakilo Gardens II Homeowners' Association
Michael K.H. Wong	Member, 'Ewa Neighborhood Board Kapolei Resident
Robert Yu	President, West Loch Estates Community Association

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**APPENDIX C:  
COMMUNITY INTERVIEW  
GUIDE & HANDOUT**



**Appendix C**  
**1. COMMUNITY INTERVIEW GUIDE**

**A: QUESTIONS FOR PARTICULAR INTERVIEWEES**

**For Residents of a Particular Neighborhood**

1. How long have you lived in `Ewa?
2. How old is your neighborhood?
3. How long have your neighbors lived in this neighborhood?
4. How well do your neighbors know one another? Would you say there's a sense of "neighborhood" there?
5. What kinds of issues or problems has your neighborhood dealt with in the last one or two years? How were these issues or problems resolved? Does your neighborhood have a residents' association that addresses these types of issues?
6. Are there issues that your neighborhood is currently dealing with? What are they?

**For Community Associations of Residential Developments**

1. When was your community association formed?
2. What is the purpose of the community association?
3. Who can be a member of the association?
4. Currently, how many members are there?
5. What kinds of issues or concerns is the association presently addressing?
6. What kinds of supports — through volunteers, activities, dedicated space, equipment — does your association provide for residents of your development?

7. Does your association maintain any contact with other `Ewa community associations? Which ones? What kinds of things do you discuss with one another? Do the associations get together and talk about regional matters, or is that done only through the `Ewa Neighborhood Board?
8. Who in these associations can you suggest I talk to?

**For Local Businesses or Business Associations**

1. How long has your business been in `Ewa? Why did you decide to locate your business in `Ewa?
2. What issues or concerns must a business person in `Ewa confront? What are the top three issues that a business person in this region must address?

**For Civic Organizations**

1. When was your organization formed? What is its purpose/mission?
2. What does your organization do?
3. Who can join your organization?
4. What kinds of issues and concerns does your organization address?
5. What are the needs of people in the `Ewa region?
6. Do you see your organization helping to fulfill these needs? How so?
7. Does your organization ever team up with other groups in the `Ewa region? What kinds of things do you discuss or work on?

**For Human Services**

1. What is the mission of your organization?
2. How long has your organization been in the `Ewa region?
3. What kinds of programs and services does your organization offer?
4. Who can take part in them? (probe for criteria: age, income level, geographic boundary, referral sources, other)

5. Do you charge a fee for your programs or services?
6. About how many participants are there currently? Are most of them from the `Ewa region?
7. What kinds of needs do people in `Ewa have?
8. Does your organization have any plans to expand or upgrade your program(s) or facilities in that community?
9. Are there are other organizations in the community that you work with?

#### **B: QUESTIONS FOR ALL INTERVIEWEES**

##### **Regional Change**

1. Is there anything about `Ewa that you wish would stay the same? What are some threats to the things you value about this place?
2. How have things changed in `Ewa?
3. What would you like to change?
4. What do you think `Ewa will be like in ten or twenty years?
5. What kind of future would you like for `Ewa?
6. What is needed to make this future come true? What are some present obstacles? What are the things (people, things, activities) right now that can make it happen?

[Use Kapolei Area Long-Range Master Plan map to orient interviewee, if needed, for the following questions.]

7. What are your thoughts about `Ewa becoming a major urban center? What are your thoughts about the various planned projects and projects in development? Do you think it will make `Ewa a better place to live? (If so, how? If not, why not?)
8. How do you think these developments will change `Ewa? [For local businesses: How will regional development affect your business? Existing small businesses?]

9. The naval air station at Barbers Point is scheduled to close sometime 1997. How will `Ewa be affected by this closing?

**Project (Impacts and Mitigations)**

[Present map of Schuler project and briefly describe the proposed project, which is over 1,022 acres]

1. What kind of impacts do you expect from this project — for your neighborhood, for `Ewa, for the island [vary the order]? [Check for impacts to: infrastructure, traffic, social (affiliation, crime, need for services and other types of supports), education, other.]
2. How can the negative impacts be prevented or minimized?  
  
[Get at how the addition of 10,000 homes over 20 years will figure into the future-scape of `Ewa.]
3. How will `Ewa benefit from this project? How about the island? How about your neighborhood?
4. How well does the project "fit" with the other `Ewa communities?

**Appendix C**  
**2. INTERVIEW HANDOUT**

**PROJECT DESCRIPTION OF SCHULER EAST KAPOLEI PROJECT**

Schuler Homes, working with the Galbraith Trust, proposes to develop a residential area in 'Ewa. The land was planted in sugar, but will otherwise be vacant when Oahu Sugar closes. The project includes homes, small parks, a school, and small commercial areas. The project would take quite a while to build out. The first house could be built by 1997, but the project still might not be finished until some time after 2020. Phase 1, on the south side of the project, would be built between 1996 and perhaps 2004. Only when it's finished would Schuler move on to the northern Phase 2 section.

Phase 1 would include about 5,000 housing units. These would be a mix of single-family and multi-family homes. The homes will be marketed to island residents, much as Schuler Homes' other projects are. Phase 2 would be similar in size to Phase 1.

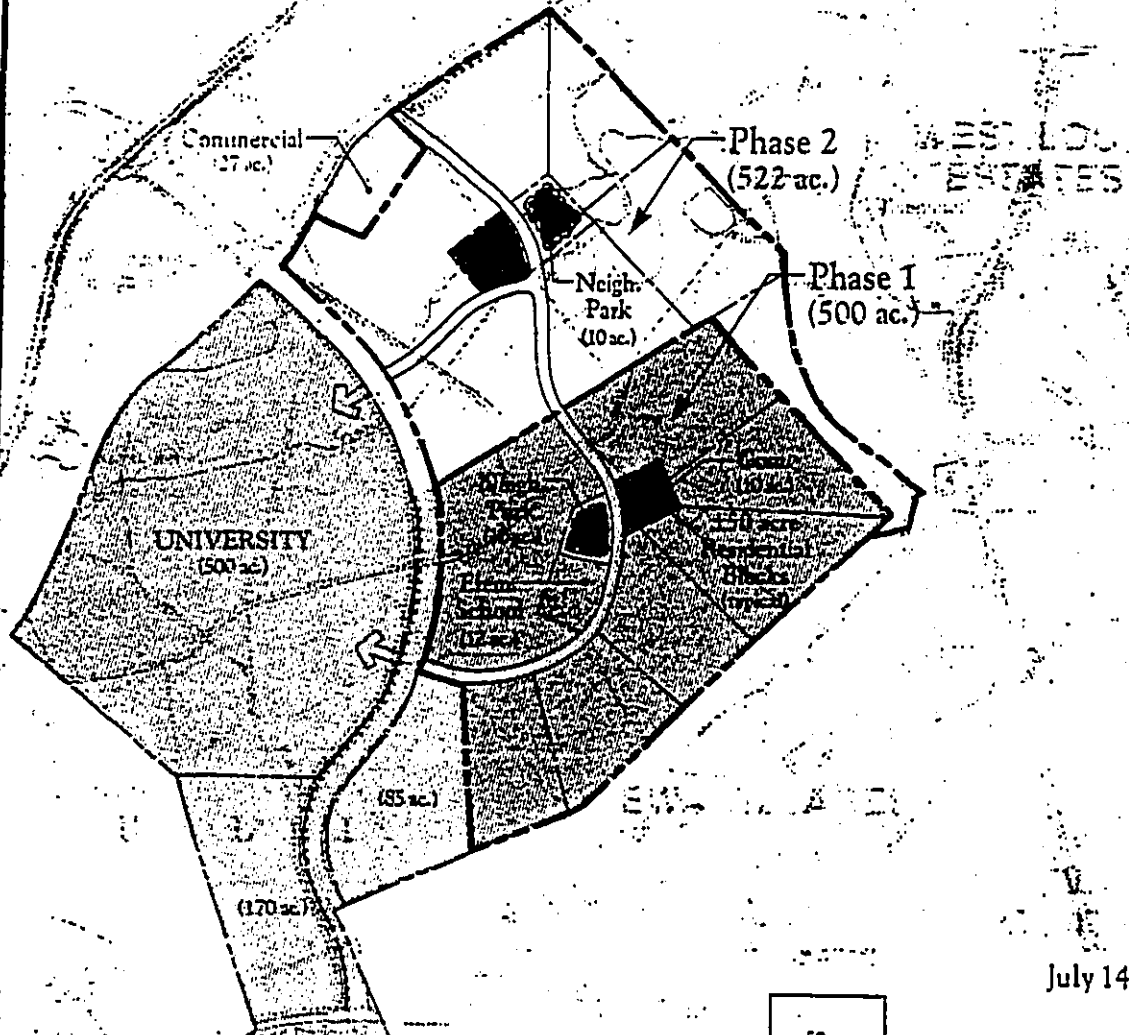
(The Phase 1 land is being transferred to the Galbraith Estate by the State, in exchange for pineapple land up near Wahiawa. It's part of the agreement between Schuler Homes and the Galbraith Estate, that Phase 1 is developed first.)

\*\*\*

Community Resources, Inc. is an independent consulting firm, working on a socio-economic impact assessment of the Schuler project. We will discuss the major findings of these interviews in our report, and will list the people we spoke with. We will not identify opinions as coming from any particular person.

Land Use Summary (Acres)			
Land Use	Phase 1	Phase 2	Total
Residential	458	490	826
Commercial	10	10	20
School	12	0	12
Parks	10	10	20
Circulation	10	12	22
<b>Total</b>	<b>500</b>	<b>522</b>	<b>1,022</b>

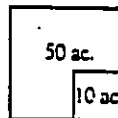
1,300 acres  
State Parcel



July 14, 1994

Preliminary Concept Plan  
**EAST KAPOLEI PROJECT**

Schuler Homes, Inc./Hawaiian Trust Co., Ltd.



Helber Hastert & Fee, Planners

**APPENDIX D:**  
**RESIDENTS' ISSUES & CONCERNS**  
**RELATED TO THE PROJECT**

**Appendix D**  
**RESIDENTS' ISSUES & CONCERNS RELATED TO PROJECT**

ISSUE/CONCERN	COMMENT (1)
Traffic	Concerned that increase in resident population will aggravate existing traffic congestion.
Inadequate infrastructure: Safe accesses for pedestrians	Assure that safe pedestrian accesses are constructed from project to adjacent properties along the North-South Road.
Inadequate facilities:	Great concern based on recent experiences with new residential developments.
Parks	Residents of project may have to use neighboring park facilities, aggravating the existing shortage of park space. Loss of green space and views.
Schools	Overtax existing school facilities. Development will attract more students to the private school.
Land for churches	
Community Character	Schuler development will reinforce the evolving bedroom character of 'Ewa.
"Turf" Conflicts over Common Areas	Possible clashes between people (including youth) of different socio-economic groups on common areas such as neighborhood parks.
Inflated Property Taxes	Having a community of new homes next to an old neighborhood may increase property taxes for existing residents, who cannot afford the increase.
Early Childhood Education & Care	Increased need for quality child services.
Construction Dust	Construction dust may aggravate respiratory conditions.
Crime	The development will decrease youth gangs, because the poor people will be "squeezed out" of the region and the new residents will spur community action.
General Aviation Airport at Barbers Point	Possible alternatives of runway design may include flight path over project area, affecting the project (noise, risk to areas under a flight path).
Urbanization	Growth in 'Ewa region will lead to the demise of agriculture and loss of rural identity.  The development may escalate crime rates, by furthering the difference between the "haves" and the "have nots."
Housing in General	Will provide needed housing for O'ahu.  Housing may not be affordable for many leeward residents, thus providing no relief of housing shortage for leeward.
More Community	New people will join the community associations and offer fresh input.  More friendship and community activities.
Employment	Will increase short-term employment on construction jobs.

NOTE: (1) Comments expand on interviewees' statements. These are not assessments by CRI.



**APPENDIX E:  
REFERENCES**

**Appendix E  
REFERENCES**

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**SOCIO-ECONOMIC IMPACT ASSESSMENT  
OF EAST KAPOLEI RESIDENTIAL PROJECT:**

**UPDATE MEMORANDUM**

**December 1995**

**Prepared for:  
Schuler Homes, Inc.**

**Prepared by:  
Community Resources, a division of  
SMS Research and Marketing Services, Inc.**

**SMS affiliations:**

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This report provides an update of the socio-economic impact assessment (SIA) of the East Kapolei Project prepared by Community Resources, Inc. (1994). It refers to a new version of that project. The new version covers a smaller land area than that proposed earlier. (See Helber Hastert & Fee, 1995 for description and assessments.) With a total of 8,000 units at buildout, the new version of the project is smaller than that proposed earlier.

The report mentions changes in the project, its surroundings, and its impacts. It does not repeat the various findings of the original assessment if these remain true of the project.

## **PROJECT**

The proposed project covers some 794 acres in Kapolei, `Ewa District, O`ahu. The proposed project would include at buildout,

- Both single-family and multifamily residential units, occupying about 650 acres of land. A total of 8,000 units is planned. (In the earlier version of the project, 10,000 units were proposed.)
- Some 16 acres for neighborhood commercial development,
- A total of 25 acres for schools -- eight acres each for elementary schools, and a nine-acre contribution toward an intermediate school proposed for land abutting another future development area.
- Some 32 acres for parks, of which two eight-acre parcels would adjoin elementary schools.

Some 794 acres are in the East Kapolei project. Development of some 52 acres for off-site infrastructure (for water storage and drainage) is also proposed. The project itself occupies two parcels, separated by Farrington Highway and a site for a future commercial area, retained by the Estate of James Campbell. (Such a site was planned by the Estate in proximity to the earlier East Kapolei project.)

The land use allocation described here includes larger school and park dedications than were proposed earlier, along with smaller residential and commercial areas.

## EXISTING AND EMERGING CONDITIONS

As described in the preceding SIA, the project is planned as part of the "second city" of O`ahu at Kapolei, now beginning to emerge on the `Ewa Plain. The project responds to the recognized need on O`ahu for housing.

The last year has seen continuing growth in `Ewa District. Residential development continues to lead overall development, although the City of Kapolei has seen commercial development. In general, plans for development of the district have changed little.

Plans for educational institutions have changed. Kapolei High School has been moved back to the Villages of Kapolei. Consequently, development along the future North-South road is being deferred.

The Planning Department, City and County of Honolulu, has issued proposals for revising the `Ewa and Central O`ahu Development Plans. These have undergone public review, and will likely be forwarded to the City Council in 1996. The `Ewa plan (Honolulu Planning Department, 1995) presented a vision as follows:

Ewa is seen as the site of a new second city, growing out of the former cane fields over the next 25 to 40 years.

At the core of this development will be the City of Kapolei with an urban mix of commercial, office and residential uses. By 2020, it is projected that the City of Kapolei will house over 7,000 residents and provide work sites for 25,000 private jobs and 5,000 City and State jobs (located at the City's Civic Center). The City Center will become a regional commercial center, attracting customers from all parts of Oahu. . . .

Substantial residential growth (almost 28,000 new units by 2020) will occur primarily in master planned communities including the City of Kapolei, East Kapolei, Ewa by Gentry, Ewa Marina, Ewa Villages, Laulani, Makaiwa Hills, Makakilo, and the Villages of Kapolei.

The Planning Department emphasizes job growth, open space, and greenways as part of `Ewa development.

## **ECONOMIC IMPACTS**

The East Kapolei project is expected to build out between 1998 and 2013. In most years, about 550 units would be produced. As shown in Exhibit A, the resident population would grow to about 22,400 when the project is fully built. This is 80% of the population anticipated for the earlier version of the project. (As a rule, the current proposal is for a smaller version of the earlier proposal. Differences in design and timing mean that the economic impacts calculated here are not all simply 80% of those shown in the previous version.)

Project construction would provide about 700 direct jobs annually, and support another 1,600 indirect and induced jobs each year during the construction phase. (See Exhibit B.) Operations jobs -- permanent jobs on-site -- would be few at first, and eventually grow to more than 700 jobs (as shown in Exhibit C). These in turn would support an additional 420 indirect and induced jobs in Hawaii.

Incomes associated with the project would reach a high of about \$90 million annually (1994 dollars) after the year 2000, when construction remains at a high pitch but some operations jobs will have begun at the site. After buildout, the on-site jobs would support some \$10 million in payrolls, and indirect and induced jobs associated with them would support another \$10 million annually. (Exhibit D shows more detail concerning wages.)

Workers associated with project operations would occupy an estimated 586 households in Leeward Oahu. (See Exhibit E for calculations.) Of those, some 80 to 171 units would amount to new demand, i.e., the residents would likely be forming new households, given their project-related jobs. These figures are far less than the total housing supply in the project.

Exhibits F and G itemize major government revenues associated with the project. Property tax revenues for the City and County of Honolulu would climb to about \$5.4 million annually at buildout. (The cumulative increase in revenues by 2015 would reach \$58 million.) State revenues associated with construction are projected as reaching about \$85 million over the entire construction period.

## **SOCIAL IMPACTS**

Social impacts of the new East Kapolei project will closely resemble those anticipated in the previous SIA. Above all, the project will contribute toward relieving the limited supply and increasing cost of housing on Oahu. As a result, the project will intensify demand for regional infrastructure, facilities, and services. Likely results include increased problems in the short run, leading to community pressure for timely construction of facilities and delivery of civic services. As the regional population grows, the pressure for expensive projects such as the North-

South Road will also grow. Over the long term, development of the project is expected to lead to construction of the infrastructure planned for 'Ewa as an integrated urban area.

Impacts on public facilities will, as with the earlier version of the project, be light. No new medical, fire or police facility is needed in connection with the project. Recreational needs will be addressed in part by the developer, who plans to allocate 32 acres for recreation. In addition, the City is planning an extensive regional park at the Barbers Point Naval Air Station site. This park, which will likely take decades to develop, can provide a shared recreational focus for residents of the many planned communities of the 'Ewa Plain.

The project residents will need schools. These are in large part planned as part of the project. Total enrollments in public schools will reach 2,400 at buildout. This figure includes elementary-school pupil counts greater than the total enrollment of a single school and counts of intermediate and high school students that are less than half the enrollment of such schools. (Exhibit H shows the growth of enrollments.)

Residents now dependent on Fort Weaver Road have expressed concern that congestion on this artery and its interchange with H-1 must be relieved immediately. The project's traffic will flow into Farrington Highway and Fort Weaver Road. When the North-South Road is built, project residents will be able to use this road and avoid Fort Weaver Road. Over the long term, the project will add to the volume of traffic that can use Fort Weaver Road. During the first years of project development, the project will depend overwhelmingly on the Fort Weaver interchange, adding to the difficulties that residents already face.

## MITIGATIONS

No additional mitigations are needed. The downsizing of the project and its location on land that will not affect Kalo'i Gulch can be counted as mitigations of impacts of the initial project.



### Exhibit A: PROJECT CONSTRUCTION, SALES AND OCCUPANCY

	1998	2000	2005	2010	2015
Units Built	180	550	550	550	0
During Year	180	1,150	3,900	6,650	8,000
Cumulative					
Units Sold (1)	90	449	550	550	0
During Year	90	817	3,533	6,283	8,000
Cumulative					
Units Occupied (2)	0	349	2,834	5,447	7,600
Cumulative					
Resident Population (3)	257	2,327	9,974	17,593	22,400

**NOTES:**

- (1) Estimated on assumption that 50% of units delivered in each year are sold in that year, and 75% of unsold inventory is sold in the year.
- (2) Estimated on assumption that 95% of units sold through the end of the previous year will be occupied.
- (3) Estimated from Planning Department analysis of 1990 and expected 2010 average household size for the comparable developments -- West Loch and Ewa by Gentry (2.90 in 1990, and 2.80 in 2010). This approach allocates population to all units, including vacant ones. After 2010, household size is held constant.

**SOURCE:** Honolulu Planning Department, 1993b.

### Exhibit B: CONSTRUCTION EMPLOYMENT

	Annual Averages:				Cumulative, 1996-2015
	1996-2000	2001-2005	2006-2010	2011-2015	
Construction Spending (1) (in Millions of \$)	\$48.0	\$84.6	\$82.0	\$54.0	\$1,234.8
Direct Jobs (2)	410	722	699	460	10,537
Indirect and Induced Jobs (3)	887	1,563	1,514	997	22,809
<b>TOTAL EMPLOYMENT</b>	<b>1,297</b>	<b>2,285</b>	<b>2,213</b>	<b>1,457</b>	<b>33,346</b>

**NOTES:**

1. Estimate does not include land, planning, marketing, sales, and other costs.
2. Estimated from relation between construction spending and workforce (on average, from 1993 construction put in place and construction workforce data) -- 8.53 jobs per million dollars spent on construction.
3. Estimated on basis of unpublished DBEDT Input-Output Model. Employment multiplier of 2.16 is a weighted average of multipliers for single-family (2.29), multi-family (2.17), heavy (1.97) and commercial (1.76) construction.

**SOURCES:** Bank of Hawaii 1994; Unpublished tables, Department of Business, Economic Development and Tourism.

### Exhibit C: OPERATIONS EMPLOYMENT

	1998	2000	2005	2010	2015
<b>A. DIRECT JOBS</b>					
Real Estate Sales (1)	9	33	37	37	0
Property Management, Maintenance (2)	4	23	78	133	160
Commercial (3)	0	70	279	418	558
<b>Total</b>	<b>13</b>	<b>126</b>	<b>393</b>	<b>588</b>	<b>718</b>
<b>DIRECT JOBS – BY INDUSTRY (4)</b>					
Finance	11	45	76	103	80
Agriculture (Landscaping)	2	12	39	67	80
Retail Trade	0	56	223	335	446
Automobile, Misc. Services	0	14	56	84	112
<b>B. INDIRECT AND INDUCED JOBS ASSOCIATED WITH DIRECT JOBS IN:</b>					
Finance	11	45	76	103	80
Agriculture (Landscaping)	1	5	18	30	36
Retail Trade	0	32	127	191	254
Automobile, Misc. Services	0	7	27	40	54
<b>TOTAL OPERATIONS-RELATED EMPLOYMENT (A+B)</b>	<b>24</b>	<b>214</b>	<b>641</b>	<b>952</b>	<b>1,141</b>

- NOTES:** (1) Based on an estimated ten jobs per 100 unsold units in inventory.  
(2) Based on an average of 2 jobs per 100 units built.  
(3) Based on average of 4 jobs per 1,000 square feet of commercial space, assuming a net buildable area of 20% of the commercial acreage.  
(4) Allocation of jobs to industry categories by Community Resources, Inc. Indirect and induced jobs supported by operations jobs from unpublished State Input-Output model Type II employment multipliers for these industries.

### Exhibit D: PERSONAL INCOME ASSOCIATED WITH PROJECT-RELATED JOBS

	ANNUAL AVERAGE INCOME (\$ Millions)			
	1996-2000	2001-2005	2006-2010	2011-2015
<b>DIRECT JOBS</b>				
Construction (1)	\$18.2	\$32.1	\$31.1	\$15.3
Operations	\$0.8	\$4.4	\$7.4	\$9.9
<b>INDIRECT AND INDUCED JOBS</b>				
Construction (1)	\$24.6	\$43.3	\$42.0	\$20.7
Operations	\$0.9	\$5.1	\$8.8	\$11.8
<b>TOTAL</b>	<b>\$44.6</b>	<b>\$84.9</b>	<b>\$89.2</b>	<b>\$50.5</b>

**NOTES:** Incomes estimates from reports of statewide average income by industry in 1994, with jobs allocated by industry as shown in earlier exhibits.  
Indirect and induced employment wages estimated from statewide average annual wage, all covered employment

- (1) With construction ending in 2013, the average construction income for the five-year period is lowered by two years without such income.

**SOURCES:** Hawaii Department of Labor and Industrial Relations, 1995.

**Exhibit E: POPULATION AND HOUSING  
ASSOCIATED WITH PROJECT-RELATED JOBS**

	1998	2000	2005	2010	2015
<b>OPERATIONS JOBS</b>					
Total Direct Jobs	13	128	393	588	718
Total Indirect and Induced Jobs	12	88	247	364	424
<b>LEEWARD OAHU SHARE OF JOBS (2)</b>					
Direct Jobs	1	12	388	582	718
Indirect and Induced Jobs	2	19	61	103	137
<b>POPULATION SUPPORTED BY WORKFORCE (INCLUDING WORKERS) (3)</b>					
Statewide	50	444	1,328	1,970	2,363
Leeward	28	290	930	1,419	1,789
<b>WORKFORCE HOUSEHOLDS (4)</b>					
Statewide	17	147	439	652	782
Leeward	9	86	308	470	586
<b>ESTIMATED EVENTUAL DEMAND FOR NEW HOUSING</b>					
<b>Low Range (5)</b>					
Statewide	2	22	66	98	11
Leeward	1	14	46	70	88
<b>High Range (6)</b>					
Statewide	5	44	132	186	235
Leeward	3	29	92	14	176

**NOTES:**

- (1) From Exhibit 3-C.
- (2) Estimated on assumption that 85% of real estate sales jobs are on site, all other direct operations jobs are on site. Regional share of indirect and induced jobs is estimated as 20% at first, but as increasing to 32.4% 2015. This increase in regional share (at a rate of 2.7% annually) from a weighted average of the Planning Department's projection of growth in support jobs in the region by 2010.
- (3) Assumes 2.07 persons per operations job, based on 1990 County average of 1.48 workers per household.
- (4) Based on 1990 County average of 3.02 persons per household.
- (5) Assuming that 15% of worker households will eventually require new
- (6) Assumes that 30% of worker households will eventually need new

**Exhibit F: REAL PROPERTY VALUES AND TAXES,  
EAST KAPOLEI PROJECT**

	1994 (1)	1998	2000	2005	2010	2015
<b>A. AREAS (ACRES)</b>						
ACREAGE TO BE DEVELOPED	669	669	573	343	114	0
Unimproved Res.	0	669	573	343	114	0
Agricultural	669	0	0	0	0	0
NEWLY DEVELOPED ACREAGE (ANN.)		0	19	19	19	0
Improved Residential		0	26	26	26	0
Apartment		0	0	2	0	0
Commercial						
CUMULATIVE DEVELOPED:		0	40	135	231	277
Improved Residential		0	54	183	313	376
Apartment		0	2	8	12	16
Commercial						
TOTAL AREA DEVELOPED		0	96	327	555	669
<b>B. VALUES (\$1,000s)</b>						
ACREAGE TO BE DEVELOPED		\$56,893	\$48,740	\$29,141	\$9,711	\$0
Unimproved Res.		\$0	\$0	\$0	\$0	\$0
Agricultural						
ANNUAL NEW DEVELOPED LAND VALUE		\$0	\$9,326	\$9,326	\$9,326	\$0
Improved Residential		\$0	\$22,234	\$22,234	\$22,234	\$0
Apartment		\$0	\$0	\$703	\$0	\$0
Commercial						
CUMULATIVE DEVELOPED LAND VALUE:		\$0	\$19,499	\$66,128	\$112,756	\$135,648
Improved Residential		\$0	\$48,489	\$157,660	\$268,831	\$323,405
Apartment		\$0	\$703	\$2,813	\$4,219	\$5,626
Commercial						
ANNUAL NEW IMPROVED VALUE		\$0	\$31,429	\$31,429	\$31,429	\$0
Improved Residential		\$0	\$57,021	\$57,021	\$57,021	\$0
Apartment (New Units)		\$0	\$0	\$0	\$198	\$198
Apartment (Buybacks) (2)		\$0	\$0	\$1,467	\$0	\$0
Commercial						
CUMULATIVE IMPROVED VALUE		\$0	\$85,716	\$222,862	\$380,009	\$457,154
Improved Residential		\$0	\$119,228	\$404,330	\$689,848	\$830,799
Apartment		\$0	\$1,467	\$5,867	\$8,801	\$11,734
Commercial						
TOTAL VALUE (LAND + IMPROVED)		\$56,893	\$301,840	\$888,801	\$1,474,175	\$1,784,364

**Exhibit F (Cont.)**

	1994 (1)	1998	2000	2005	2010	2015
<b>C. EXEMPTIONS (3)</b>						
VALUE (\$1,000s)						
Improved Residential		\$0	\$11,960	\$40,560	\$69,160	\$83,200
Apartment		\$0	\$34,040	\$115,440	\$106,840	\$238,800
CUMULATIVE TAXABLE LAND VALUE						
Improved Residential		\$0	\$7,539	\$25,568	\$43,596	\$52,446
Apartment		\$0	\$12,449	\$42,220	\$71,991	\$68,605
Commercial		\$0	\$1,467	\$5,867	\$8,801	\$11,734
<b>D. TAXES (\$1,000s)</b>						
ACREAGE TO BE DEVELOPED						
Unimproved Res.		\$223	\$191	\$114	\$38	\$0
Agricultural	\$5	\$0	\$0	\$0	\$0	\$0
DEVELOPED LAND VALUE						
Improved Residential		\$0	\$24	\$80	\$138	\$164
Apartment		\$0	\$44	\$149	\$253	\$305
Commercial		\$0	\$12	\$50	\$75	\$100
IMPROVED VALUE						
Improved Residential		\$0	\$258	\$874	\$1,490	\$1,792
Apartment		\$0	\$420	\$1,423	\$2,428	\$2,924
Commercial, Industrial		\$0	\$12	\$50	\$75	\$100
TOTAL TAXES		\$223	\$961	\$2,739	\$4,495	\$5,385
<b>E. INCREASE IN TAX REVENUES (\$1,000s)</b>						
TAX REVENUES BEFORE DEVELOPMENT (4)						
	\$5					
DIFFERENCE IN TAX REVENUES						
TOTAL TAXES:						
Annual		\$218	\$955	\$2,734	\$4,490	\$5,379
Cumulative		\$218	\$2,116	\$12,228	\$31,163	\$58,059

- NOTES:
- \* All figures in thousands of dollars, except Areas (in acres).
  - (1) Acreage "to be developed" is taxable area, excluding schools, parks, roads. Analysis based on increase in value from time of initial agreements between Schuler Homes and Campbell Estate. Taxable value of low-income and gap-group units assumed to be constrained by buybacks for ten years, after which it would rise to market value.
  - (2) Standard homeowner's exemption (\$40,000) assumed for all units.

SOURCES: Honolulu City and County 1994-1995 real property tax rates; City and County tax records

**Exhibit G: STATE REVENUES  
ASSOCIATED WITH PROJECT CONSTRUCTION**

	ANNUAL AVERAGE REVENUES (Thousands \$s)			
	1996-2000	2001-2005	2006-2010	2011-2015
<b>EXCISE TAXES</b>				
Construction Spending (1)	\$1,921	\$3,384	\$3,278	\$1,619
Construction-Related Workforce Spending (2)	\$554	\$976	\$946	\$467
<b>CORPORATE INCOME TAX (3)</b>				
Construction (3)	\$120	\$212	\$205	\$101
<b>PERSONAL INCOME TAX (4)</b>				
Construction-Related Workforce Incomes	\$735	\$1,295	\$1,255	\$620
<b>TOTAL</b>	<b>\$3,330</b>	<b>\$5,868</b>	<b>\$5,684</b>	<b>\$2,807</b>

NOTES: Cumulative total revenues, 1996-2015: \$85.6 million  
 (1) Calculated at 4% of direct construction spending.  
 (2) Calculated at 4% of workforce income spent on taxable items. Disposable income estimated from 1988-1989 U.S. Bureau of Labor Statistics Survey.  
 (3) Calculated at 0.25% of construction spending, from 1989-1990 data on business receipts and corporate income taxes collected.  
 (4) Calculated at 4.04% of wages.

SOURCES: Hawaii Department of Business, Economic Development and Tourism, 1992; Hawaii Department of Taxation, 1992; Tax Foundation of Hawaii, 1991, 1992.

**Exhibit H: ESTIMATED DOE SCHOOL ENROLLMENTS,  
EAST KAPOLEI PROJECT RESIDENTS**

	1998	2000	2005	2010	Buildout
<b>UNITS BUILT (1)</b>	180	1,150	3,900	6,650	8,000
<b>DOE STUDENTS (2)</b>					
Elementary (K to 6)	32	204	691	1,178	1,418
Intermediate (7 to 8)	9	58	195	333	400
High (9 to 12)	13	82	277	472	568
<b>TOTAL</b>	<b>54</b>	<b>343</b>	<b>1,163</b>	<b>1,983</b>	<b>2,386</b>

NOTES: (1) From Exhibit A.  
 (2) Based on average number of expected students per 100 households as calculated by the DOE (letter from Dr. Herman Alzawa, Superintendent, November 4, 1994).

## REFERENCES

Community Resources, Inc. Socio-Economic Impact Assessment of East Kapolei Residential Project. November 1994. IN Helber Hastert & Fee, Planners, Draft Environmental Impact Statement, East Kapolei Project, Ewa, Oahu, Hawaii. Prepared for Schuler Homes, Inc. Honolulu, HI, January 1995.

Honolulu, City and County, Planning Department. Ewa Development Plan: Public Review Draft. Honolulu, HI, 1995.

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ENVIRONMENTAL NOISE ASSESSMENT, EAST KAPOLEI PROJECT,  
SEPTEMBER 1994;  
ENVIRONMENTAL NOISE ASSESSMENT, EAST KAPOLEI PROJECT (UPDATE),  
DECEMBER 13, 1995.

DARBY & ASSOCIATES

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#94-20

ENVIRONMENTAL NOISE ASSESSMENT  
SCHULER-EWA DEVELOPMENT  
EWA, OAHU, HAWAII

SEPTEMBER 16, 1994

PREPARED FOR:  
SCHULER HOMES  
828 FORT STREET MALL  
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CONTENTS

<u>Section</u>		<u>Page</u>
1.0	Summary	1
2.0	Project Description	1
3.0	Noise Standards	2
4.0	Existing Acoustical Environment	4
5.0	Potential Noise Impact Due to Project	5
6.0	Potential Noise Impact on the Project	6
	Reference	8
	Appendix A - Acoustical Terminology	

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## 1.0 SUMMARY

- 1.1 The proposed project site is currently exposed to low ambient noise levels of approximately 48 to 55 dBA which is typical of rural areas. The dominant noise sources include wind in foliage and occasional distant aircraft flyovers.
- 1.2 Nearby noise sensitive areas include the Ewa Villages which currently experiences low ambient noise levels of approximately 47 to 50 dBA.
- 1.3 Traffic noise level increases along Farrington Highway due to additional traffic generated by the project will be negligible at locations along Farrington Highway.
- 1.4 The dominant noise source during project construction will probably be earth moving equipment, such as bulldozers and diesel-powered trucks. Any noise impact on the Ewa Villages from such activity should, however, be relatively short-term.
- 1.5 The day-night average sound level, Ldn, at the project site due to aircraft operations is less than 55 dBA, thus compatible with the State DOT residential land use guidelines. Although at times audible, infrequent aircraft operations associated with HIA and BPNAS should not significantly impact the proposed development.
- 1.6 Results indicate that residences along the interior arterials should be exposed to Ldn levels less than 65 dBA which corresponds to HUD's "Acceptable" Site.
- 1.7 Residences along Farrington Highway and North-South Road may be exposed to future day-night average sound levels, Ldn, greater than the HUD recommended limit of 65 dBA due to traffic noise if located too close to the roadways. Noise mitigation should be implemented to conform with HUD noise exposure guidelines for housing.

## 2.0 PROJECT DESCRIPTION

The Schuler-Ewa Development project involves 1,022 acres of land in Ewa, Oahu, Hawaii. The project site is located makai of Farrington Highway as shown in Figure 1. Currently, the project area is used for agriculture, specifically sugarcane. The project site is bordered to the south by Ewa Villages, to the east by sugarcane fields, and to the west by sugarcane fields. Sugarcane operations are slated to be phased out within a few years. The current development plan includes 10,750 residential units, schools, and parks. It is assumed that Phase 1 will be completed in 2005 with 5,000 units, and Phase 2 will be completed in 2011 with an additional 5,750 units. The Schuler-Ewa Development Plan is shown in Figure 2.

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## 3.0 NOISE STANDARDS

Various local and federal agencies specify guidelines and standards in assessing environmental noise and set noise limits as a function of land use. A brief description of common acoustic terminology is presented in Appendix A.

- 3.1 State Department of Health - DOH specifies allowable property line noise levels that shall not be exceeded for more than 10% of the time during any 20-minute period [Reference 1]. These are enforced for any location at or beyond the property line. The specified noise limits vary depending on the land use and time of day as shown in Figure 3. DOH also specifies the following with respect to adjacent zoning and order of precedence.

"Where the allowable noise level between two adjacent zoning districts differ, the lower allowable noise level shall be used. For example, the allowable noise level for the residential district shall be used at the property line between residential and business districts.

The limits specified in the allowable noise levels table shall apply subject to the order of precedence in which uses were initiated after the effective date of this rule; provided that a new order of precedence is established when any use is discontinued. The initiation of use shall be measured by the date of rezoning. For example, if agricultural or industrial operations are conducted next to a lot used as residence, the agricultural or industrial limits would apply if the building permit for the residence was obtained after the agricultural or industrial operations had been initiated, after the effective date of this rule. Residential limits would apply if the building permit for the residence was obtained before agricultural or industrial operations had been initiated."

- 3.2 City and County of Honolulu Land Use Ordinance (LUO) - The Department of Land Utilization specifies maximum allowable levels at the property line [Reference 2]. The LUO criteria differ from those of the DOH in that they use octave band sound levels instead of A-weighted levels and no temporal factor is involved. LUO noise regulations are theoretically enforced by the Building Department, however, since they do not have noise measurement capability, noise complaints are usually handled by DOH.
- 3.3 State Department of Transportation, Airports Division - The Department of Transportation (DOT) specifies land use compatibility guidelines for aircraft noise exposure [Reference 3]. These guidelines are based on

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maximum allowable yearly day-night average sound levels, Ldn, for various specified land uses. A residential land use, which is specified as single-family homes, apartments, hotels, and resorts, is compatible with an aircraft generated Ldn less than or equal to 60 dBA. However, DOT states,

"Where the community determines that these uses must be allowed, Noise Level Reduction (NLR) measures to achieve interior levels of 45 Ldn or less should be incorporated into building codes and be considered in individual approvals. Normal local construction employing natural ventilation can be expected to provide an average NLR of approximately 9 dB. Total closure, plus air conditioning, may be required to provide additional outdoor to indoor NLR, and will not eliminate outdoor noise problems."

The DOT guidelines also specify 60 dBA as the maximum allowable Ldn level for school, day care center, and church uses without any mitigation measures. Commercial uses such as retail shops, restaurants, shopping centers, etc. are compatible with Ldn levels up to 65 dB without any mitigation measures. With noise mitigation measures implemented, such commercial uses are allowed in areas exposed to an Ldn as high as 75 dBA.

- 3.4 U.S. Federal Highway Administration - The Federal Highway Administration (FHWA) has established a set of design goals for traffic noise exposure [Reference 4]. The FHWA defines four land use categories and assigns corresponding maximum hourly equivalent sound levels, Leq. For example, Category B, defined as picnic and recreation areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals, has a corresponding maximum exterior Leq of 67 dBA and a maximum interior Leq of 52 dBA. These limits are viewed as design goals, and all projects which are developed to meet these limits are deemed in conformance with the FHWA noise standards.
- 3.5 U.S. Department of Housing and Urban Development - The U.S. Department of Housing and Urban Development (HUD) has established Site Acceptability Standards for interior and exterior noise for housing [Reference 5]. These standards are based on day-night average sound levels, Ldn, and identify the need for noise abatement, either at the site property line or in the building construction. HUD Site Acceptability Criteria rank sites as Acceptable, Normally Unacceptable, or Unacceptable. "Acceptable" sites are those where noise levels do not exceed an Ldn of 65 dBA. Housing on acceptable sites do not require additional noise attenuation other than that provided in customary building techniques. "Normally unacceptable" sites are those where the Ldn is above 65 dBA, but does not exceed 75 dBA. Housing on normally unacceptable sites requires some means of noise abatement, either at the property line or

in the building construction, to ensure the interior noise levels are acceptable. "Unacceptable" sites are those where the Ldn is 75 dBA or higher. The term "unacceptable" does not necessarily mean that housing cannot be built on these sites, but rather that more sophisticated sound attenuation would likely be needed.

- 3.6 U.S. Environmental Protection Agency - The U.S. Environmental Protection Agency (EPA) has identified a range of yearly day-night average sound levels, Ldn, sufficient to protect public health and welfare from the effects of environmental noise [Reference 6]. The EPA has established a goal to reduce exterior environmental noise to an Ldn not exceeding 65 dBA and a future goal to further reduce exterior environmental noise to an Ldn not exceeding 55 dBA. Additionally, the EPA states that these goals are not intended as regulations as they have no authority to regulate noise levels, but rather these goals are intended to be viewed as levels below which the general population will not be at risk from any of the identified effects of noise.

#### 4.0 EXISTING ACOUSTICAL ENVIRONMENT

- 4.1 General - Ambient noise measurements were conducted on September 8, 1994 to assess the existing acoustical environment within and adjacent to the project site. The noise measurement locations are shown in Figure 4. Noise level measurements were taken using a Larson-Davis Laboratories Model 700 Type 2 Integrating Sound Level Meter. The noise measurement results are expressed in terms of the 90-Percentile Exceedence Sound Level, L90, which represents a measure of the residual or background noise minimally influenced by nearby discrete events. A brief description of statistical noise levels commonly used to describe environmental noise is presented in Appendix A.
- 4.2 Project Site - The proposed project site, which is currently planted in sugarcane, experiences relatively low noise levels. The existing ambient noise level (L90) is approximately 48 to 55 dBA within the project site, which is typical of rural areas. Presently, the dominant noise sources include wind, traffic and occasional distant aircraft flyovers. An additional potential noise source within the project site is from sugarcane operations, however, no sugarcane operations were experienced during the field measurements.
- 4.3 Project Vicinity - The sugarcane fields surrounding the project site experience an acoustical environment similar to the project site with wind, traffic, and occasional distant aircraft being the dominant noise sources. Presently, the nearest residential area is the Ewa Villages south of the project site. The Ewa Villages experiences an ambient noise level (L90) of approximately 47 to 50 dBA.

5.0 POTENTIAL NOISE IMPACT DUE TO PROJECT

5.1 Additional Traffic Generated by the Project - Measured traffic noise levels and predicted traffic volumes [Reference 7] were used in conjunction with the Federal Highway Administration (FHWA) Traffic Noise Prediction Model [Reference 8] to estimate the traffic noise increase as a result of the project. The traffic noise increase along Farrington Highway was predicted. The projected future (2005 and 2011) traffic noise level increases during peak traffic hours are summarized in Table 5.1.

TABLE 5.1  
Projected Future (2005 and 2011) Traffic Noise Level  
Leq or Ldn (dBA) Increases During Peak Traffic Hours  
Along Farrington Highway

	Without Project	With Project	Due to Project
Future 2005 Traffic Noise Level Increase (dBA)			
AM	4.2	4.7	0.5
PM	3.4	4.1	0.7
Future 2011 Traffic Noise Level Increase (dBA)			
AM	4.7	4.7	0.0
PM	4.1	6.6	2.5

The predicted traffic noise level increases along Farrington Highway due to additional traffic generated by the project were less than or equal to 2.5 dB. Therefore, the traffic noise level increase due to project generated traffic may be perceptible by some people at noise sensitive locations along Farrington Highway.

5.3 Construction Noise - Development of the project will involve excavation, grading, and the construction of infrastructure and buildings. The various construction phases of the project may generate significant amounts of noise, which may impact the nearby residential areas south of the project site. The actual noise is dependent upon the methods employed during each stage of the construction process. Typical ranges of construction equipment noise are shown in Figure 5. Earthmoving equipment, such as bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction.

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In cases where construction noise exceeds, or is expected to exceed, the DOH's "allowable" property line limits, a permit must be obtained from the DOH to allow the operation of vehicles, construction equipment, power tools, etc. which emit noise levels in excess of the "allowable" limits. Required permit conditions for construction activities are:

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

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

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

In addition, construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers. Also, construction vehicles using traffic-ways must satisfy the DOH's vehicular noise requirements [Reference 9].

Blasting, if required, could also produce noise impacts. However, blasting at construction sites near populated areas is usually accomplished by using numerous small charges detonated with small time delays. Blast mats can also be used to assist in directing the explosive energy into the rock, controlling flying debris, and muffling the noise. Thus, with the appropriate blast design techniques, the noise from blasting can be controlled within acceptable limits at the closest noise sensitive locations.

## 6.0 POTENTIAL NOISE IMPACT ON THE PROJECT

- 6.1 Aircraft - The proposed project site is within approximately four to eight miles of Honolulu International Airport (including Hickam AFB) (HIA) and Barbers Point Naval Air Station (BPNAS). Due to the distance from the project site, the overall day-night average sound level, Ldn, due to air traffic associated with HIA and BPNAS will be less than 55 dBA at the project site [References 10 and 11], which is compatible with the State DOT residential guidelines. However, due to the vicinity of the project site to flight tracks associated with HIA and BPNAS infrequent aircraft flyovers may, at times, be audible at the project site. As shown in Figures 6 and 7, the project site is approximately 1.5 miles from HIA arrival flight track 17 & 18 & 20 and departure track 16 which conducts an average of approximately 120 general aviation aircraft



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operations per day (daytime only) [Reference 10]. As shown in Figure 8, the project site is near BPNAS flight track 22RHA1/04D1 which conducts an average of approximately 10 helicopter operations per day (daytime and nighttime) [Reference 11]. Although these aircraft flyovers may, at times, be audible, aircraft noise should not significantly impact the proposed development.

- 6.2 Traffic Noise - The proposed plan for traffic circulation within the project site is shown in Figure 9. The proposed residential areas within the project site will potentially be impacted by traffic noise. The Federal Highway Administration (FHWA) Traffic Noise Prediction Model has been used along with traffic data provided in the referenced traffic study to predict future traffic noise levels along Farrington Highway, North-South Road, and interior arterials. Traffic noise was predicted at the locations shown in Figure 9.

Future traffic noise levels along Farrington Highway were based on the predicted peak hour traffic volumes with a 2.5% medium truck and 1.5% heavy truck mix, a 35 mph posted speed limit, and a future expansion to a four-lane roadway. The day-night average sound levels, Ldn, were estimated from the peak hour equivalent-continuous noise levels, Leq, as specified by HUD [Reference 5]. Results at Location A indicate that residences less than approximately 74 ft from the centerline of the right-of-way (ROW) will be exposed to Ldn levels between 75 and 70 dBA (HUD "Normally Unacceptable" Site), and residences between approximately 74 and 219 ft from the centerline will be exposed to Ldn levels between 70 and 65 dBA (HUD "Normally Unacceptable" Site). These distances are based on a four-lane roadway without a median or center island between the directional traffic. If the four-lane roadway will include a median, this analysis would require updating to account for the increased distance between the directional traffic. Similar results at Location B indicate that residences less than approximately 104 ft from the centerline will be exposed to Ldn levels between 75 and 70 dBA, and residences between approximately 104 ft and 299 ft from the centerline will be exposed to Ldn levels between 70 and 65 dBA. These results are summarized in Table 6.1 with respect to HUD criteria.

The project is bordered on the west by the proposed North-South Road. Future traffic noise levels along North-South Road were based on the predicted peak hour traffic volumes with a 2.5% medium truck and 1.5% heavy truck mix, a 35 mph posted speed limit, and a four-lane roadway. Results at Locations D and E are also summarized in Table 6.1.

Future traffic noise levels along the interior arterials were based on the predicted peak hour traffic volumes with a 2.5% medium truck and 0.5% heavy truck mix, a 25 mph posted speed limit, and a four-lane roadway. Results indicate that residences along the interior arterials should be exposed to Ldn levels less than 65 dBA (HUD "Acceptable" Site).

The minimum setbacks listed in Table 6.1 are worst cases and detailed analysis of specific building projects may allow smaller setbacks. For example, if the roadway is elevated above future housing, a barrier may effectively shield windows in second-floor units allowing substantially less setback if optimum planning, grading, and design are incorporated.

Table 6.1  
Estimated minimum setback distances\* for multi-story, naturally ventilated residences required by HUD traffic noise criteria

Location	Roadway	HUD "Acceptable" Site	HUD "Normally Unacceptable" Site		HUD "Unacceptable" Site
		Ldn < 65	Ldn 65-70	Ldn 70-75	Ldn >75
A	Farrington Hwy	>219'	219 to 74'	74' to ROW	-
B	Farrington Hwy	>299'	299 to 104'	104' to ROW	-
D	North-South Rd	>220'	220 to 80'	80' to ROW	-
E	North-South Rd	>295'	295 to 98'	98' to ROW	-

\*Based on distance from right-of-way (ROW) centerline and 6.5 feet HUD requirement between noise level prediction location and the building setback line.

As previously discussed in Section 3.5, HUD has established Site Acceptability Standards for interior and exterior noise exposure at housing areas. These standards are based on Ldn levels and identify the need for noise abatement. Housing areas exposed to Ldn levels between 65 and 75 dBA require some means of noise abatement, either at the property line or in the building construction in order to meet HUD criteria and, thus, be eligible for potential HUD/FHA financing. Therefore, noise mitigation measures should be implemented to reduce the traffic noise exposure along Farrington Highway and North-South Road. HUD standards for residential developments exposed to Ldn levels between 65 and 70 dBA, require the building construction to provide a minimum of 5 dB attenuation in addition to "attenuation provided by buildings as commonly constructed in the area, and requiring open windows for ventilation". Similarly, HUD standards require a minimum of 10 dB additional attenuation for residential developments exposed to Ldn levels between 70 and 75 dBA.

Mitigation of traffic noise along Farrington Highway and North-South Road would include properly constructing a sound barrier along the roadway, such as a noise barrier wall and/or a landscaped earth berm, which clearly blocks the line-of-sight to the traffic. While a noise barrier along the roadway may provide adequate traffic noise attenuation at the first level of naturally ventilated residences, it may be impractical to construct a barrier tall enough to afford noise reduction at

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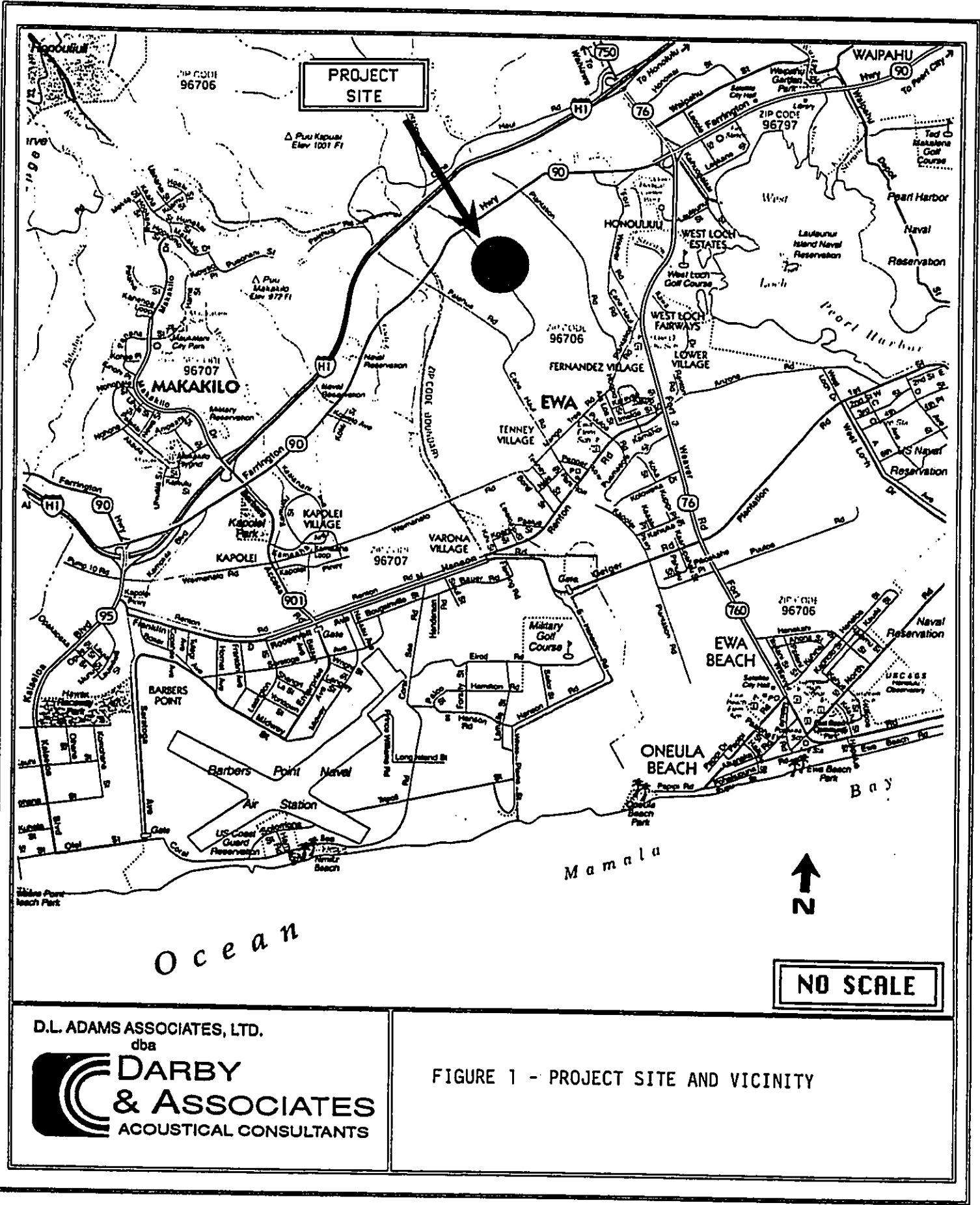
the upper levels of multi-story residences. Therefore, by HUD requirements, the upper-level units of the apartment buildings exposed to Ldn levels between 70 and 75 dBA, must provide an additional 10 dB interior attenuation. However, an additional 10 dB room attenuation is somewhat difficult to achieve with sound absorptive materials commonly used in noise sensitive living spaces. Therefore, the upper-level of the residences within the 70 to 75 Ldn zone should be air-conditioned to allow closed windows for noise reduction purposes. Similarly, by HUD requirements, the residences exposed to Ldn levels between 65 and 70 dBA, must provide an additional 5 dB room attenuation. Additional room attenuation is commonly achieved in naturally ventilated living spaces, such as bedrooms, by installing carpeting (with pad), louvered closet doors, and absorptive ceiling tiles (as opposed to the standard hard tile floors, solid-faced closet doors, and hard-surface ceilings, respectively).

- 6.3 Sugarcane Agriculture - Sugarcane agriculture involves activities such as land preparation, harvesting, hauling, etc., which are characterized by periods of intense activity with equipment operating 24 hours per day. Lands both west and east of the proposed project site are currently sugarcane. If nearby sugarcane operations continue beyond the completion of the proposed project, noise from agriculture activities may impact nearby noise sensitive residential areas.

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REFERENCES:

1. Chapter 43 - Community Noise Control for Oahu, Department of Health, State of Hawaii, Administrative Rules, Title 11, November 6, 1981.
2. Section 3.11, Noise Regulations, Land Use Ordinance, City and County of Honolulu, Oahu 22, 1986.
3. Study Recommendations for Local Land Use Compatibility with Yearly Day-Night Average Sound Levels, State Department of Transportation, Airports Division, Received August 1991, published in Reference 10.
4. Department of Transportation, Federal Highway Administration Procedures for Abatement of Highway Traffic Noise, Title 23, CFR, Chapter 1, Subchapter J, Part 772, 38 FR 15953, June 19, 1973, Revised at 47 FR 29654, July 8, 1982.
5. HUD Environment Criteria and Standards, 24 CFR 51, Federal Register, Volume 44, No. 135, July 12, 1979; Amended 49 FR 880, January 6, 1984.
6. Toward a National Strategy for Noise Control, U.S. Environmental Protection Agency, April 1977.
7. 2005 and 2011 Traffic Forecasts, Schuler-Ewa Development, Pacific Planning & Engineering, Inc., August 25, 1994.
8. FHWA Highway Traffic Noise Prediction Model, FHWA - RD - 77 - 108; U.S. Department of Transportation, December 1978.
9. Chapter 42 - Vehicular Noise Control for Oahu, Department of Health, State of Hawaii, Administrative Rules, Title 11, November 6, 1981.
10. Honolulu International Airport Master Plan Update & Noise Compatibility Program, State of Hawaii Department of Transportation, Airports Division, Vol. 2, October 1989.
11. Naval Air Station Barbers Point Air Installations Compatible Use Zones (AICUZ) Noise Contours and Supporting Data, Naval Facilities Engineering Command, Alexandria, VA, July, 1989.



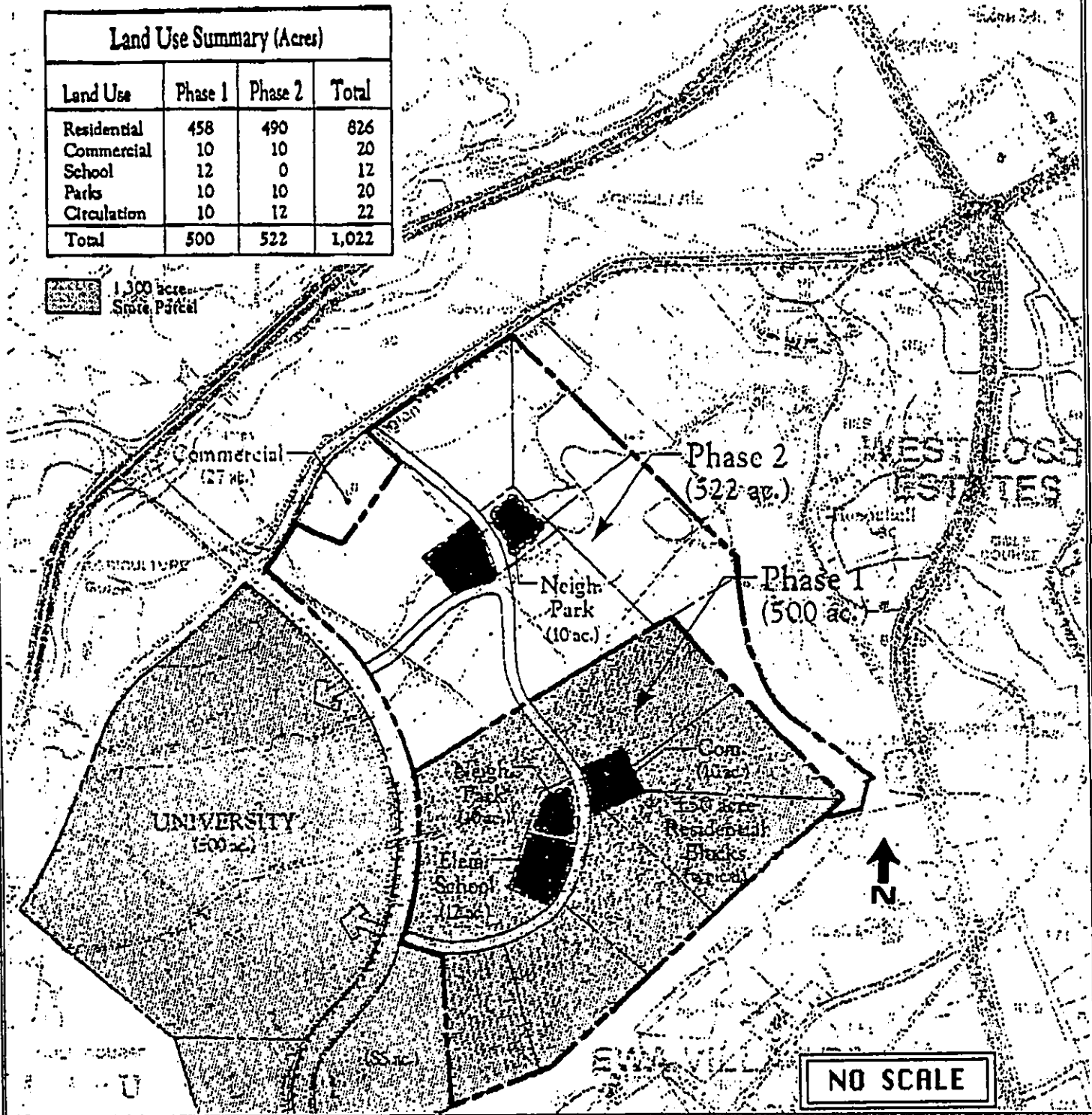
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dba



FIGURE 1 - PROJECT SITE AND VICINITY

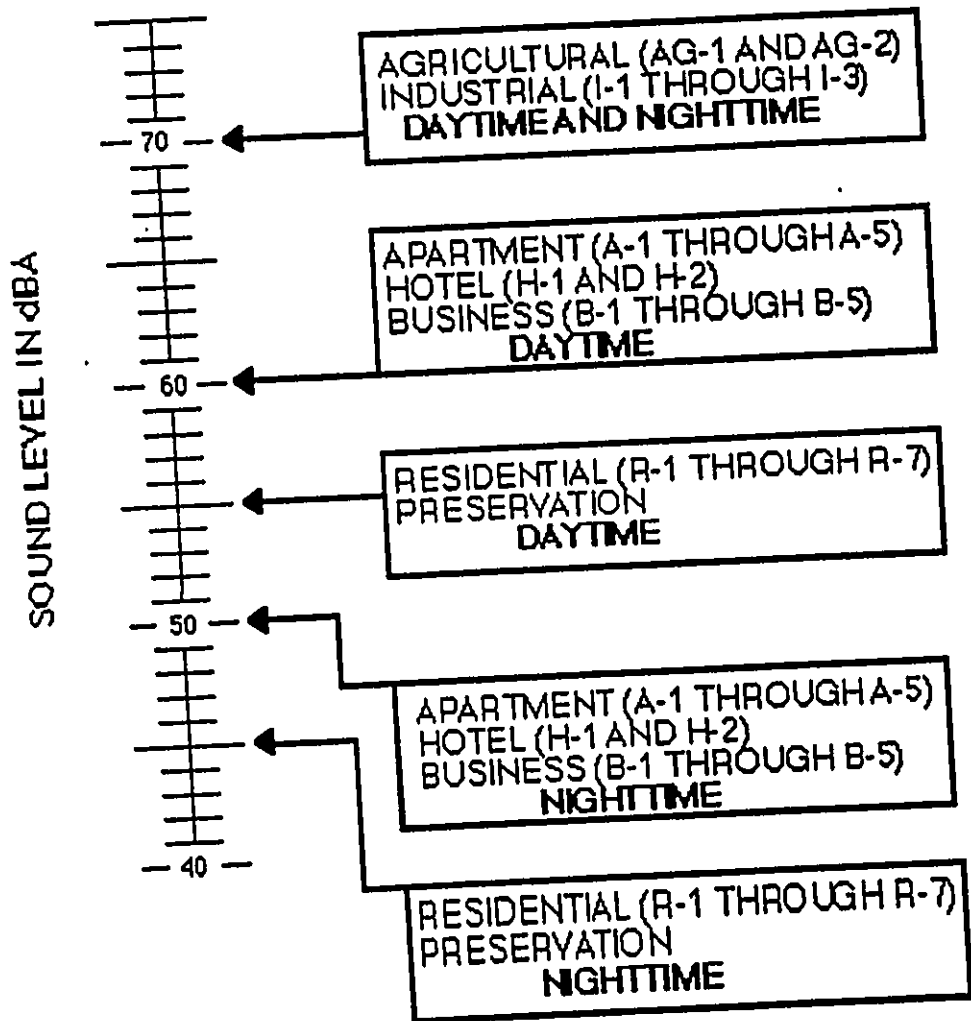
Land Use Summary (Acres)			
Land Use	Phase 1	Phase 2	Total
Residential	458	490	826
Commercial	10	10	20
School	12	0	12
Parks	10	10	20
Circulation	10	12	22
<b>Total</b>	<b>500</b>	<b>522</b>	<b>1,022</b>

1,300 acre State Parcel



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FIGURE 2 - SCHULER-EWA DEVELOPMENT PLAN

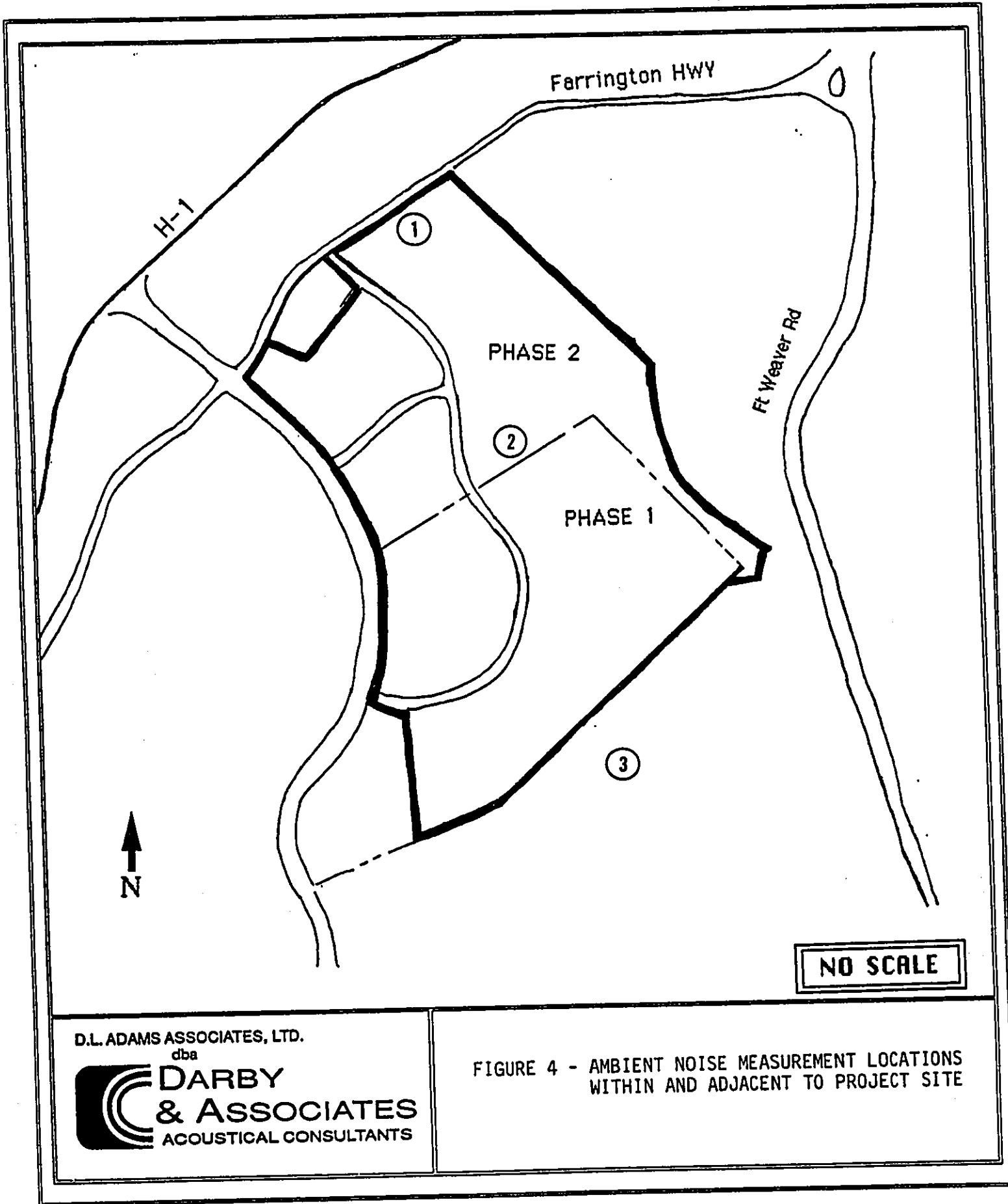


NOTE: LEVELS INDICATED BY ZONING DISTRICT ARE THE "ALLOWABLE" LEVELS THAT SHALL NOT BE EXCEEDED FOR MORE THAN TEN PERCENT OF THE TIME WITHIN ANY TWENTY MINUTE PERIOD DURING THE TIME PERIOD SHOWN (DAYTIME: 7:00 A.M. TO 10:00 P.M., NIGHTTIME: 10:00 P.M. TO 7:00 A.M.)

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FIGURE 3 - ALLOWABLE NOISE LEVELS FOR VARIOUS ZONING DISTRICTS (COMMUNITY NOISE CONTROL FOR OAHU, STATE OF HAWAII DEPARTMENT OF HEALTH)



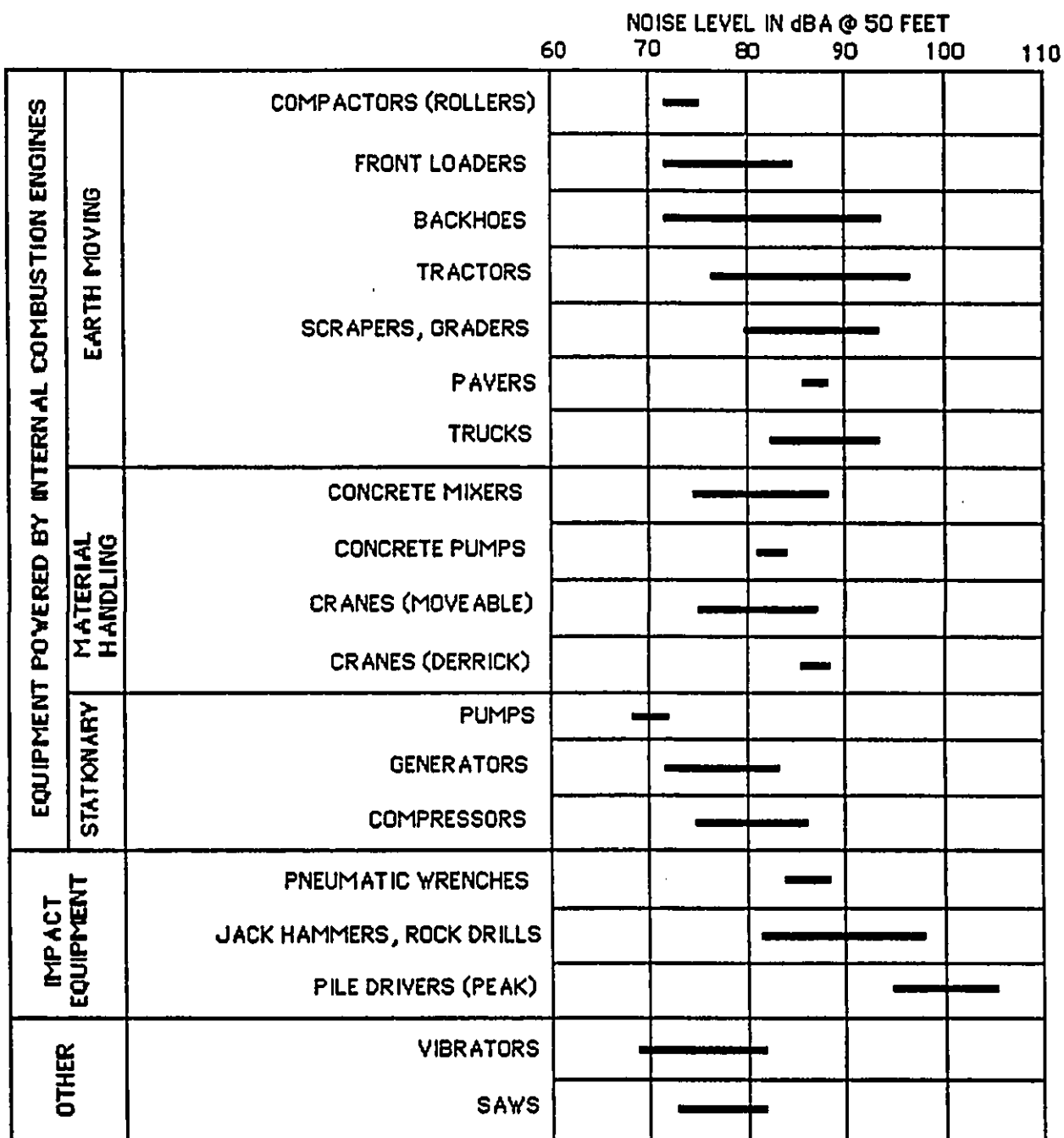
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FIGURE 4 - AMBIENT NOISE MEASUREMENT LOCATIONS  
WITHIN AND ADJACENT TO PROJECT SITE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100





NOTE: BASED ON AVAILABLE DATA SAMPLES

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FIGURE 5 - TYPICAL SOUND PRESSURE LEVELS FROM CONSTRUCTION EQUIPMENT

SOURCE: U.S. ENVIRONMENTAL PROTECTION AGENCY 1972

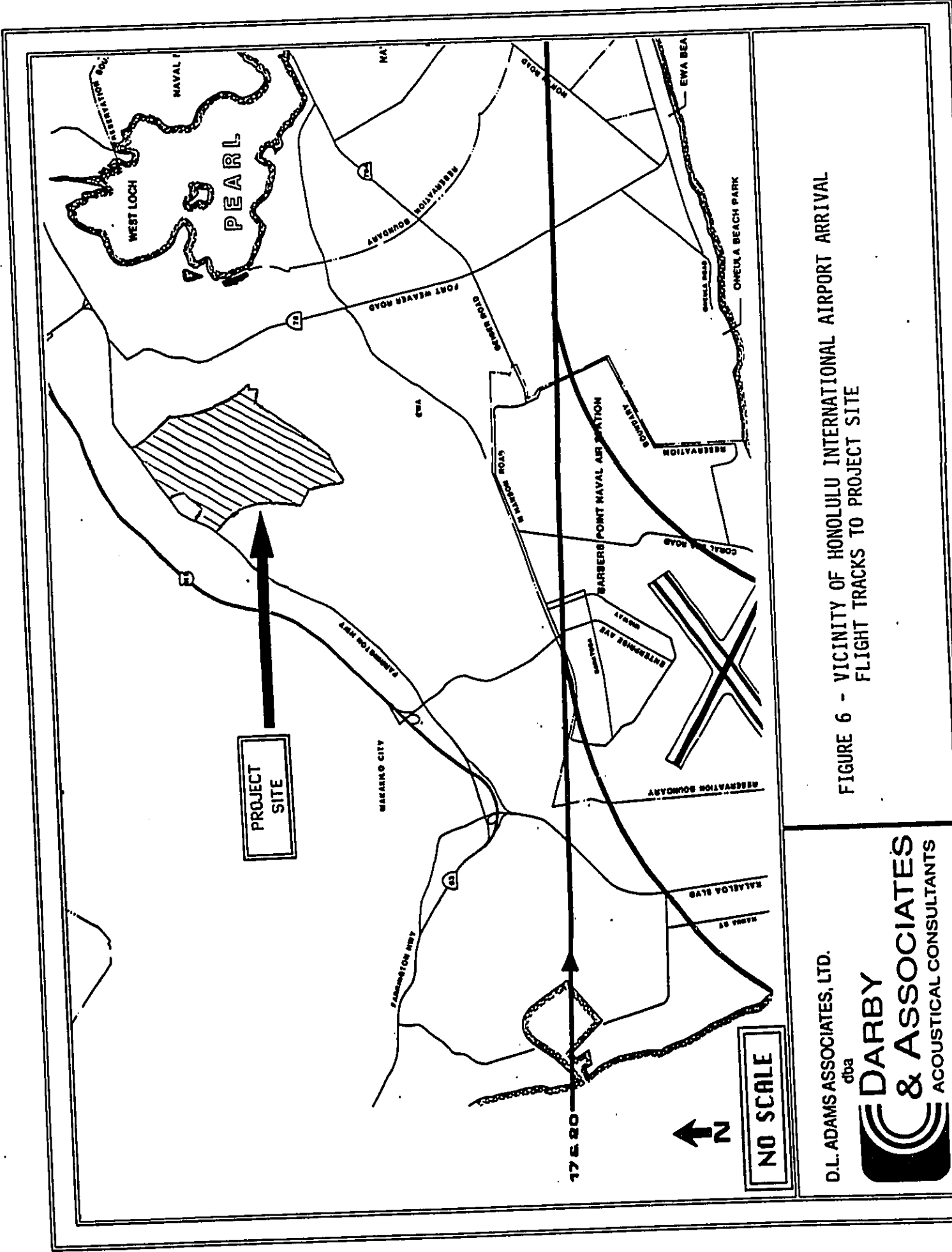


FIGURE 6 - VICINITY OF HONOLULU INTERNATIONAL AIRPORT ARRIVAL FLIGHT TRACKS TO PROJECT SITE

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NO SCALE



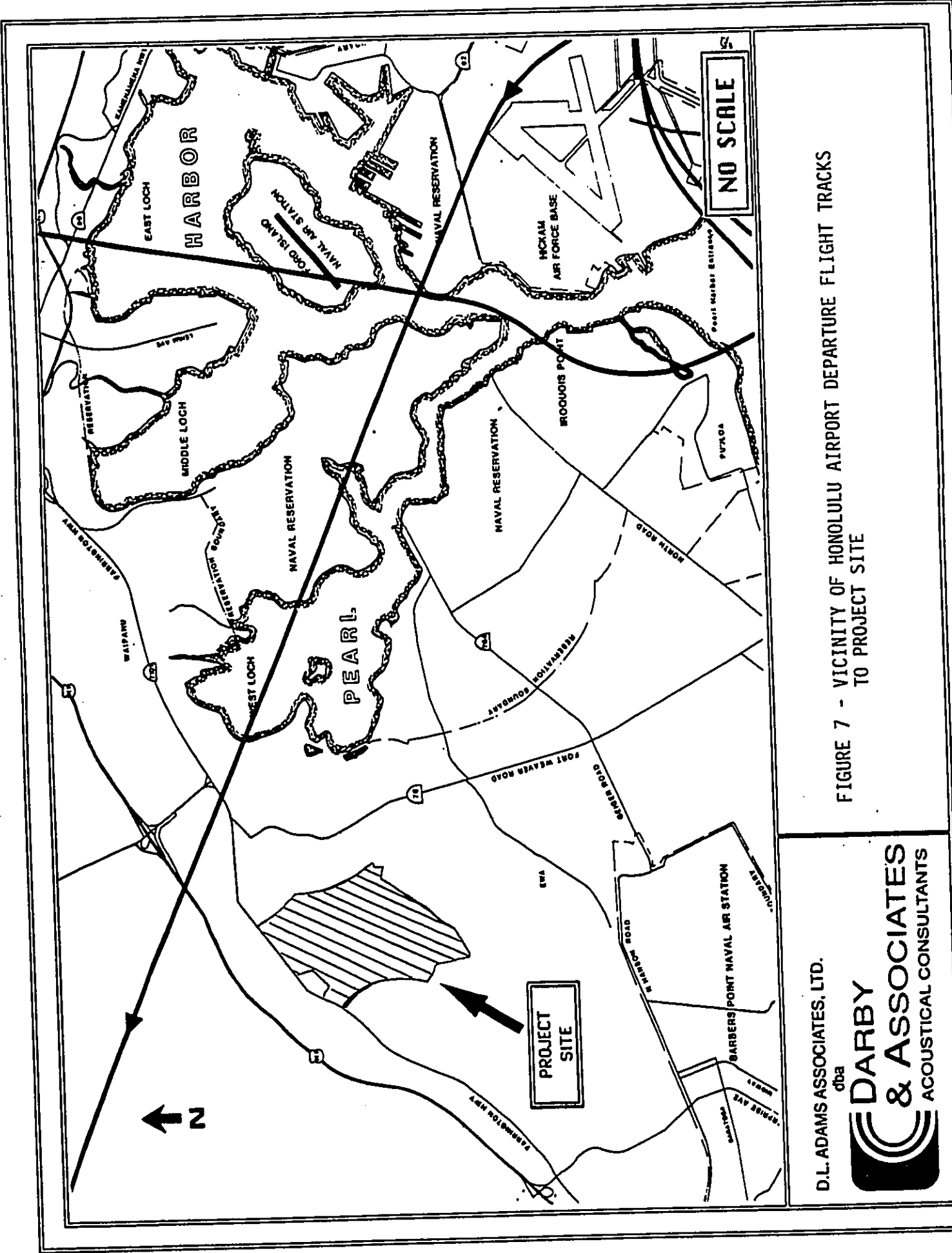


FIGURE 7 - VICINITY OF HONOLULU AIRPORT DEPARTURE FLIGHT TRACKS TO PROJECT SITE

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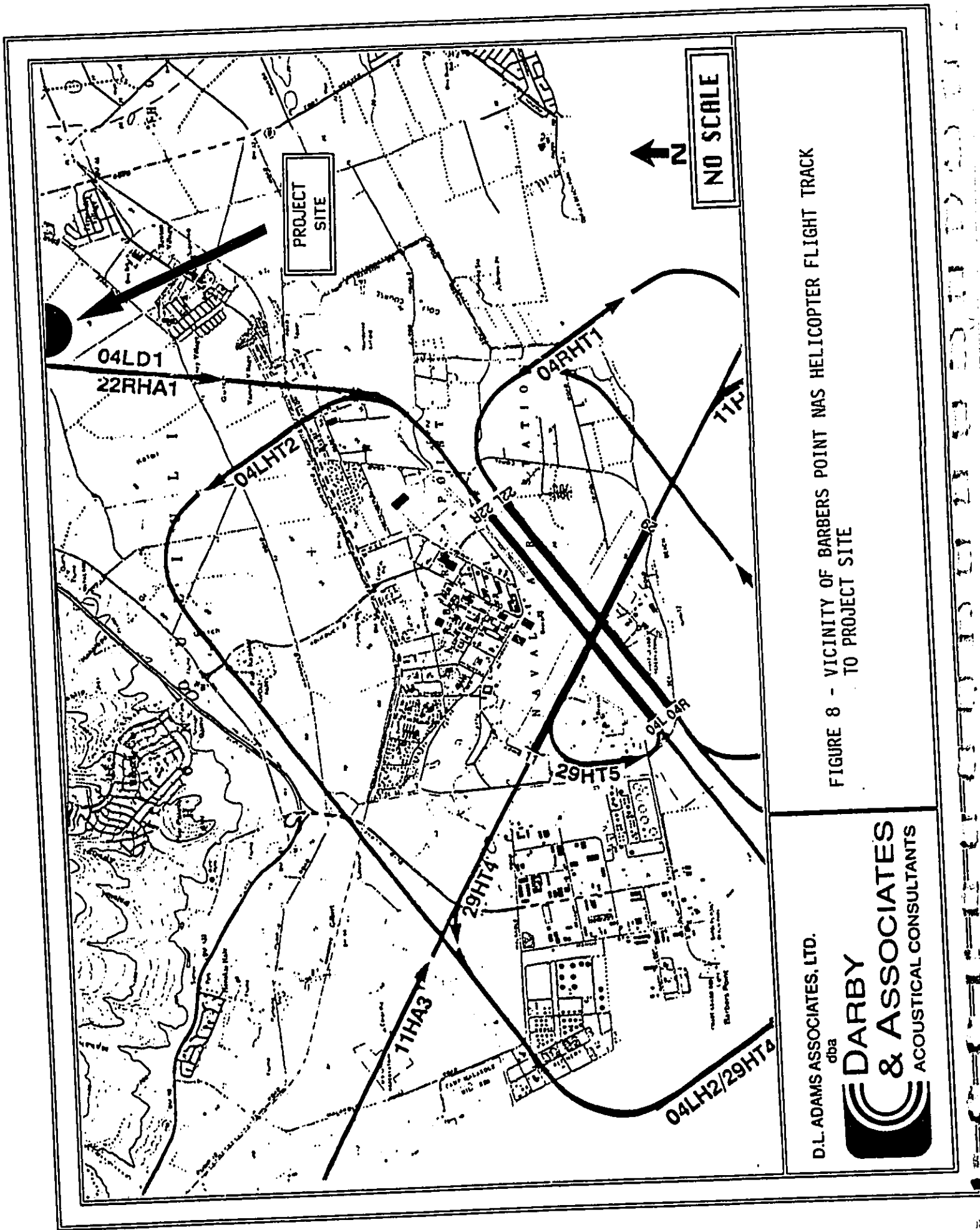
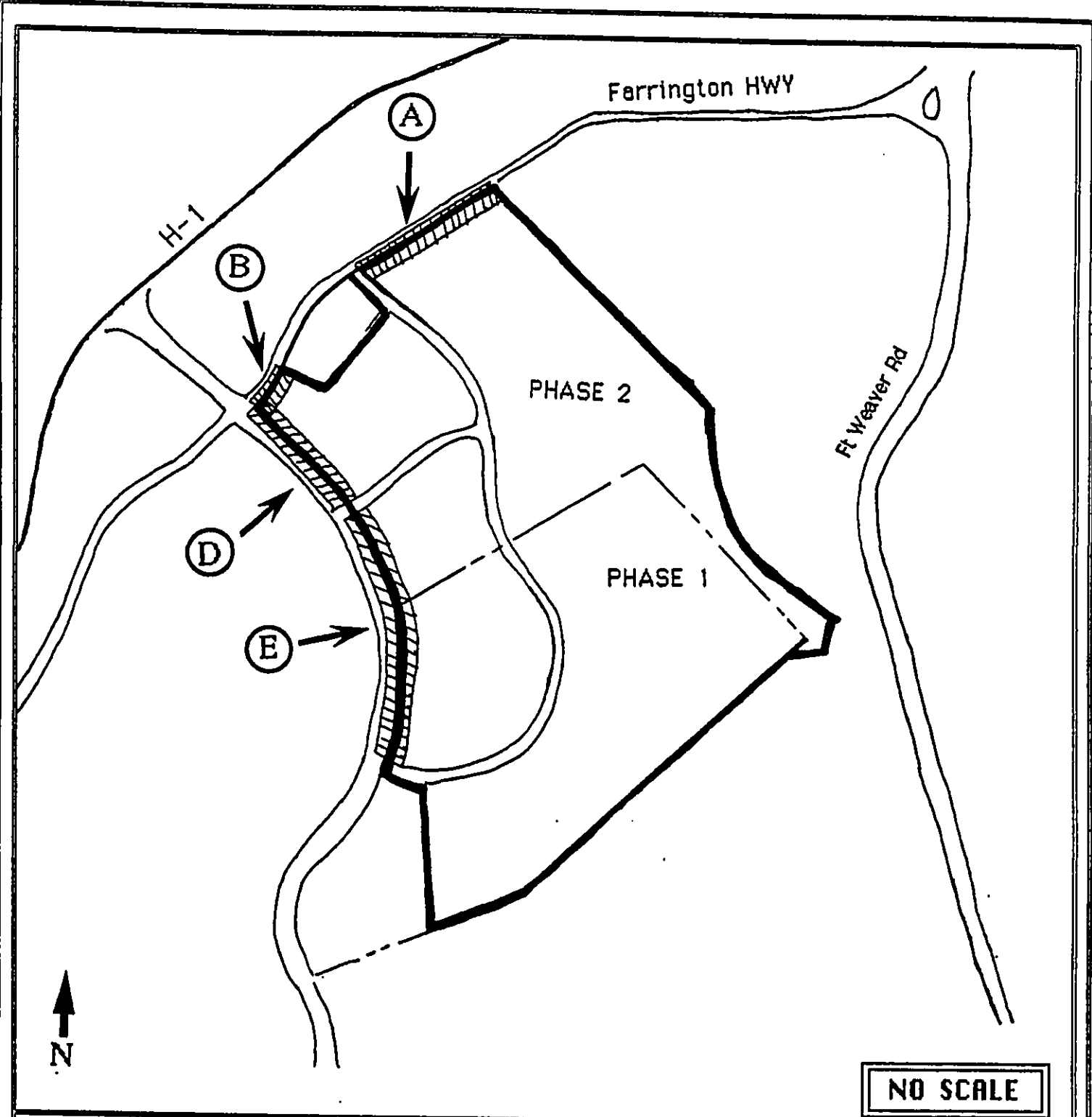


FIGURE 8 - VICINITY OF BARBERS POINT NAS HELICOPTER FLIGHT TRACK TO PROJECT SITE

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FIGURE 9 - TRAFFIC NOISE ASSESSMENT LOCATIONS

APPENDIX A  
ACOUSTICAL TERMINOLOGY

Sound (Noise) Level

Sound or noise consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. It is measured in terms of decibels (dB) using precision instruments known as sound level meters.

Sound Level or Sound Pressure Level is defined as:

$$\text{SPL} = 20 \log (P/\text{Pref}) \text{ dB}$$

where P is the sound pressure fluctuation (above or below atmospheric pressure) and Pref is 20 micropascals, which is approximately the lowest sound pressure that can be detected by the human ear. For example, if P is 20 micropascals, then SPL = 0 dB, or if P is 200 micropascals, then SPL = 20 dB. The relation between sound pressure in micropascals and sound pressure level in decibels (dB) is shown in Figure A-1.

The sound level that results from a combination of noise sources is not the sum of the individual sound levels, but rather the logarithmic sum. For example, two sound levels of 50 dB produce a combined level of 53 dB, not 100 dB; two sound levels of 40 and 50 dB produce a combined level of 50.4 dB.

Human sensitivity to changes in sound level is highly individualized. Sensitivity to sound depends on frequency content, time of occurrence, duration, and psychological factors such as emotion and expectations. However, in general, a change of 1 or 2 dB in the level of a sound is difficult for most people to detect, a 3 to 5 dB change corresponds to a small but noticeable change in loudness, and a 10 dB change corresponds to an approximate doubling or halving in loudness.

A-Weighted Sound Level

The human ear is more sensitive to sound with frequencies above 1000 Hertz (Hz), than with frequencies below 125 Hz. Due to this type of frequency response, a weighting system, A-weight, was developed to approximate the frequency response of the human ear. A-weighted sound level (dBA) de-emphasizes the low frequency portion of the spectrum of a signal. The A-weighted (dBA) level of a sound is a good measure of the loudness of that sound, and so different sounds having the same A-weighted level sound about equally as loud. Typical values of the A-weighted sound level of various noise sources are listed in Figure A-1.

Appendix A  
Acoustical Terminology  
(Continued)

Statistical Sound (Noise) Levels

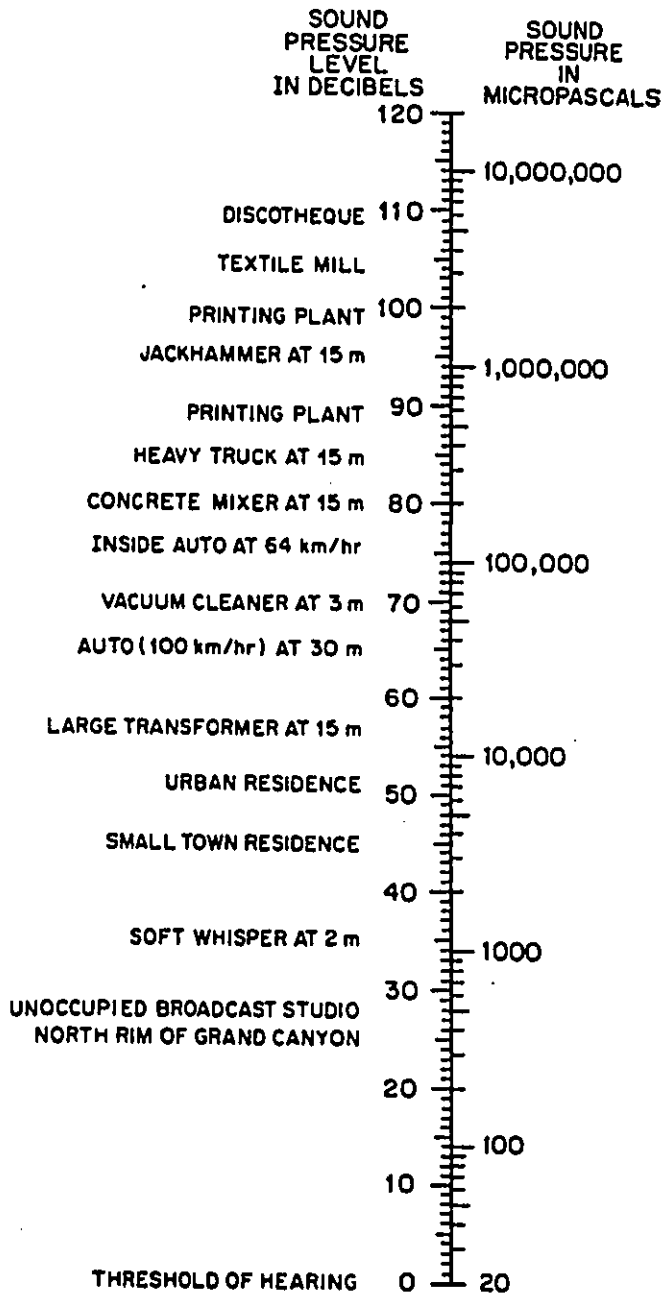
The sound levels of long-term noise producing activities, such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, several statistical noise levels have been developed and instrumentation are available to measure them. Common statistical sound levels include Equivalent Continuous Noise Level,  $L_{eq}$ , and Percentile Exceedence Level,  $L_x$ .

The Equivalent Continuous Noise Level,  $L_{eq}$ , represents a constant level with the same amount of total acoustic energy as that contained in the actual time-varying sound being measured over a specific time period.  $L_{eq}$  is commonly used to describe community noise, traffic noise, and hearing damage potential.

A Percentile Exceedence Level,  $L_x$ , represents the sound level which is exceeded for  $x\%$  of the measured time period. For example,  $L_{10} = 60$  dBA describes that over the measured time period, the measured noise exceeded 60 dBA for 10% of the time. Common Percentile Exceedence Levels include  $L_1$ ,  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$ , which are widely used to assess community and environmental noise. Figure A-2 illustrates the relationship between selected statistical noise levels.

Day Night Average Sound Level

The Day Night Average Sound Level,  $L_{dn}$ , is essentially the Equivalent Continuous Noise Level measured over a 24-hour period. However, in calculating the  $L_{dn}$ , 10 dBA is added to the noise levels recorded between 10 pm and 7 am to account for people's higher sensitivity to noise at night. The  $L_{dn}$  is a commonly used noise descriptor in assessing land use compatibility, and is used by federal and local agencies and standards organizations. Qualitative descriptions, as well as local examples of  $L_{dn}$ , are shown in Figure A-3.

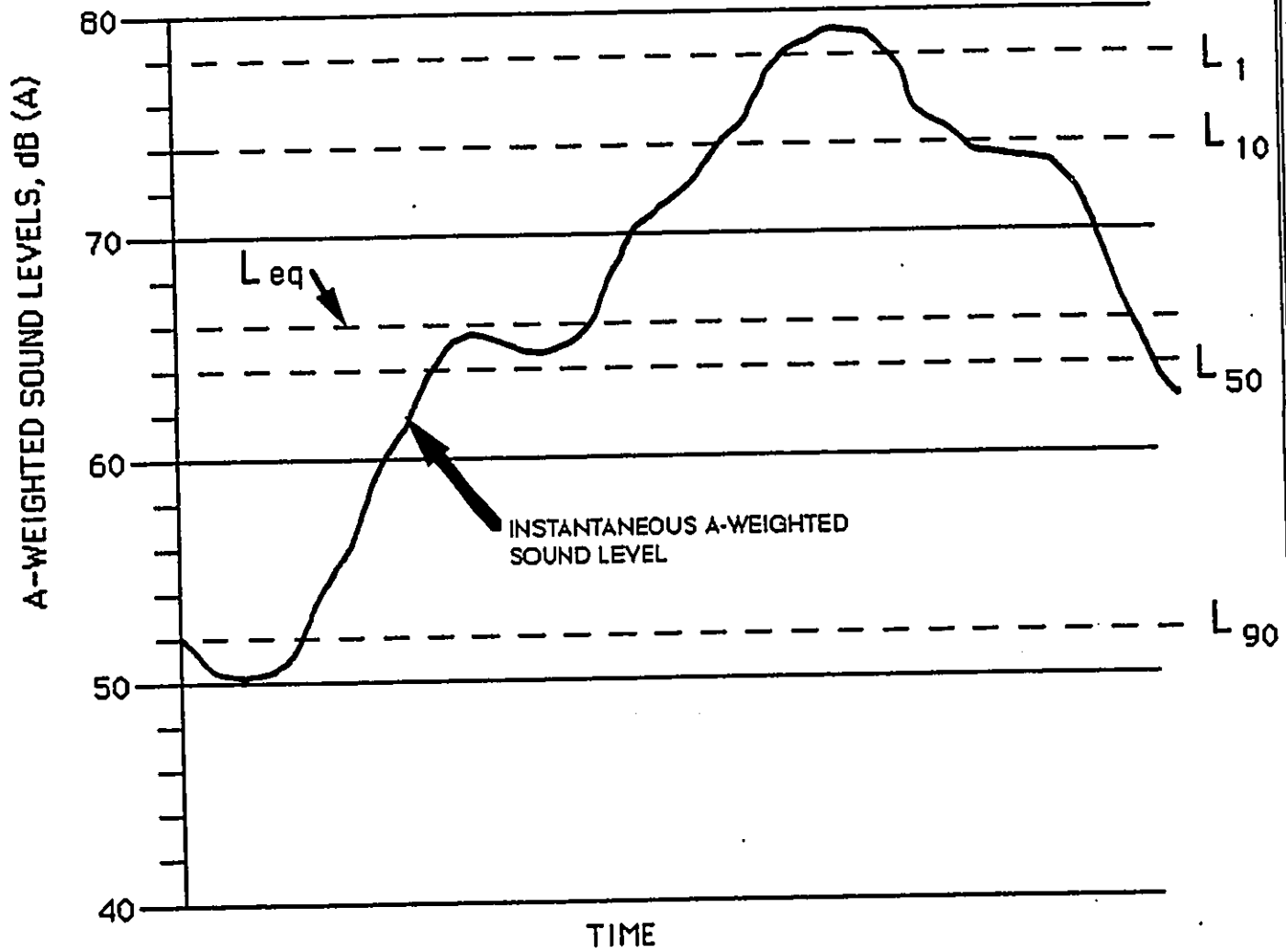


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FIGURE A-1 THE RELATION BETWEEN SOUND PRESSURE, P, AND SOUND PRESSURE LEVEL, SPL. ALSO SHOWN ARE TYPICAL VALUES OF A-WEIGHTED SOUND LEVELS OF VARIOUS NOISE SOURCES.



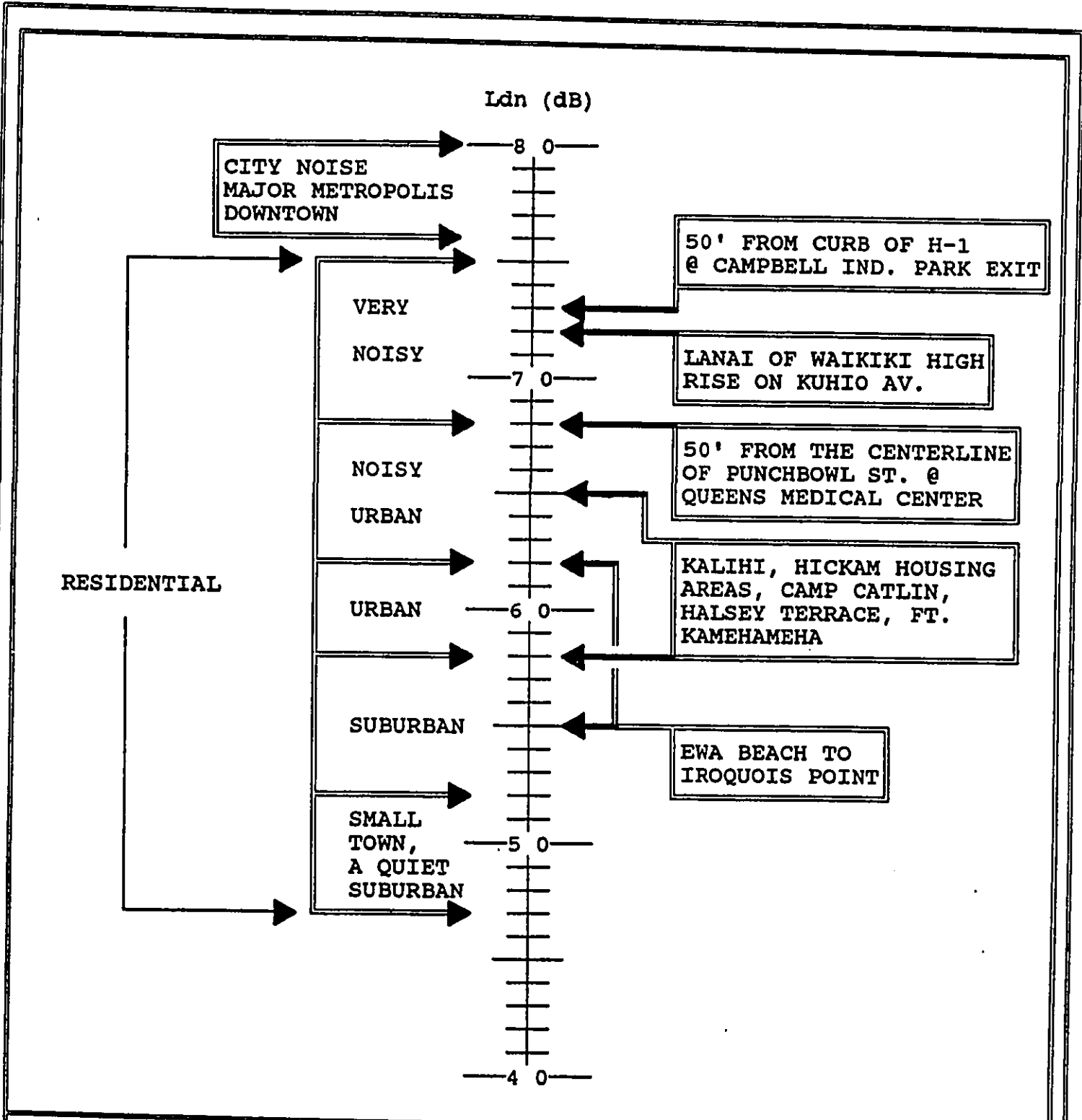


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FIGURE A-2

COMPARISON OF AN INSTANTANEOUS  
SOUND LEVEL AND THE CORRESPONDING  
STATISTICAL SOUND LEVELS



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FIGURE A-3

QUALITATIVE DESCRIPTION OF THE DAY-NIGHT SOUND LEVELS (Ldn) AND EXAMPLE Ldn's AT SELECTED LOCATIONS ON OAHU

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Project No. 94-20A

ENVIRONMENTAL NOISE ASSESSMENT STUDY  
EAST KAPOLEI PROJECT  
KAPOLEI, EWA, OAHU, HAWAII

December 13, 1995

Prepared for  
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## CONTENTS

<u>Section</u>	<u>Description</u>	<u>Page</u>
1.0	Summary	1
2.0	Project Description	2
3.0	Noise Standards	2
4.0	Existing Acoustical Environment	4
5.0	Potential Noise Impact Due to the Project and Noise Mitigation	5
6.0	Potential Noise Impact on the Project and Noise Mitigation	6
	References	9
	Appendix A - Acoustical Terminology	
<u>Tables</u>		
1	Projected Future (2010) Traffic Noise Level (Ldn in dBA)	
2	Assumed Truck Mix Percentages and Characteristics of Roadway	
3	Estimated Minimum Setback Distances for Multi-Story Naturally Ventilated Residences as Required by HUD Traffic Noise Criteria	
<u>Figures</u>		
1	Project Site and Vicinity	
2	Development Plan of the East Kapolei "application area"	
3	Allowable Noise Levels for Various Zoning Districts	
4	Ambient Noise Measurement Locations	
5	Typical Sound Pressure Levels from Construction Equipment	
6	Traffic Noise Assessment Locations	
7	Vicinity of Honolulu International Airport Arrival Flight Tracks to Proposed Residential Areas of Project	
8	Vicinity of Honolulu International Airport Departure Flight Tracks to Proposed Residential Areas of Project	
9	Vicinity of Barbers Point NAS Helicopter Flight Tracks to Proposed Residential Areas of Project	

## 1.0 SUMMARY

- 1.1 The East Kapolei Project involves development of 4 parcels and constructing several new roadways to and within two of the parcels. These two parcels of the Project are designated as the "application area." The current development plan for the "application area" includes residential units, commercial facilities, schools and parks.
- 1.2 The proposed East Kapolei "application area" is currently exposed to low daytime ambient noise level of approximately 48 dBA which is typical of rural areas. The dominant noise sources include traffic, wind-in-foliage and occasional distant aircraft flyovers or flybys.
- 1.3 Nearby noise sensitive areas include the Ewa Villages, a residential area which currently experiences low ambient noise level of approximately 47 dBA.
- 1.4 The predicted maximum traffic noise level increase along Farrington Highway due to additional traffic generated by the Project was determined to be 2.1 dB. A traffic noise level increase of 2.1 dB may be perceptible by some people at the noise sensitive locations along Farrington Highway, but to most people such a small increase would be imperceptible. Traffic noise increase along H-1 Freeway due to project generated traffic was estimated to be insignificant.
- 1.5 The dominant noise source during project construction will probably be earth moving equipment, such as bulldozers and diesel-powered trucks unless pile driving is necessary. Noise from construction activities should be relatively short-term, occur only during daytime hours, and must comply with DOH noise regulations.
- 1.6 Results indicate that traffic noise along North-South Road should not impact nearby residential areas based on the present development plan.
- 1.7 Residences along H-1 Freeway, Farrington Highway and the main interior arterials may be exposed to future day-night average sound levels,  $L_{dn}$ , greater than the HUD recommended limit of 65 dBA due to traffic noise if located too close to the roadways. Noise mitigation should be implemented to conform with HUD noise exposure guidelines for housing. Traffic noise level exposures of residences along these roadways vary with building setback, height of building and fenestration, local topography, foliage and possible shielding from neighboring structures.
- 1.8 The day-night average sound level,  $L_{dn}$ , at the project site due to aircraft operations is less than 55 dBA, and thus, compatible with the State DOT residential land use guidelines. Although at times audible, infrequent aircraft operations associated with HIA and BPNAS should not significantly impact the proposed development.

## 2.0 PROJECT DESCRIPTION

The East Kapolei Project involves four parcels of land totaling 794 acres of land in Kapolei, Ewa, Oahu, Hawaii. Two of these parcels, totalling 52 acres, are to be used for off-site infrastructure (water wells, detention basins, etc.) and are not considered significant to this noise study. Locations of the four parcels are shown in Figure 1. TMK Parcel: 9-1-17: por. 4 of the East Kapolei Project is in the same general location of the previous Ewa Development Project area for which an environmental noise assessment report was prepared in September, 1994 [Reference 1]. Due to changes in proposed acreage and land uses, the East Kapolei Project is an amendment of Ewa Development Project.

Currently, the majority of the East Kapolei "project area" is used for agriculture, specifically sugarcane. Sugarcane operations are slated to be phased out within a few years. The current development plan for the East Kapolei "application area," which consists of TMK Parcel: 9-1-18: por.1 and 9-1-17: por. 4, is proposed to have 8,000 residential units, commercial facilities, schools and parks as shown in Figure 2.

## 3.0 NOISE STANDARDS

Various local and federal agencies have established guidelines and standards for assessing environmental noise impacts and set noise limits as a function of land use. A brief description of common acoustic terminology used in these guidelines and standards is presented in Appendix A.

- 3.1 State Department of Health - The State Department of Health (DOH) specifies allowable property line noise levels that shall not be exceeded for more than 10% of the time during any 20-minute period [Reference 2]. These are enforced for any location at or beyond the property line. The specific noise limits which apply are dependant on the zoning and time of day as shown in Figure 3. DOH also specifies the following with respect to adjacent zoning and order of precedence.

"Where the allowable noise level between two adjacent zoning districts differ, the lower allowable noise level shall be used. For example, the allowable noise level for the residential district shall be used at the property line between residential and business districts.

The limits specified in the allowable noise levels table shall apply subject to the order of precedence in which uses were initiated after the effective date of this rule; provided that a new order of precedence is established when any use is discontinued. The initiation of use shall be measured by the date of rezoning. For example, if agricultural or industrial operations are

conducted next to a lot used as residence, the agricultural or industrial limits would apply if the building permit for the residence was obtained after the agricultural or industrial operations had been initiated, after the effective date of this rule. Residential limits would apply if the building permit for the residence was obtained before agricultural or industrial operations had been initiated."

- 3.2 City and County of Honolulu Land Use Ordinance - The Department of Land Utilization (LUO) specifies maximum allowable levels at the property line [Reference 3]. The LUO criteria differ from those of the DOH in that they use octave band sound levels instead of A-weighted levels and no temporal factor is involved. LUO noise regulations are theoretically enforced by the Building Department, however, since this Department does not have noise measurement capability, noise complaints are usually handled by DOH.
- 3.3 U.S. Federal Highway Administration - The Federal Highway Administration (FHWA) has established design goals for traffic noise exposure [Reference 4]. The FHWA defines four land use categories and assigns corresponding maximum hourly equivalent sound levels,  $L_{eq}$ . For example, Category B, defined as picnic and recreation areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals, has a corresponding maximum exterior  $L_{eq}$  of 67 dBA and a maximum interior  $L_{eq}$  of 52 dBA. These limits are viewed as design goals, and all projects which are developed to meet these limits are deemed in conformance with the FHWA noise standards.
- 3.4 U.S. Department of Housing and Urban Development - The U.S. Department of Housing and Urban Development (HUD) has established Site Acceptability Standards for interior and exterior noise for housing [Reference 5]. These standards are based on day-night equivalent sound levels,  $L_{dn}$ , and identify the need for noise abatement, either at the site property line or in the building construction. HUD Site Acceptability Criteria rank sites as Acceptable, Normally Unacceptable, or Unacceptable. "Acceptable" sites are those where exterior noise levels do not exceed an  $L_{dn}$  of 65 dBA. Housing on Acceptable sites do not require additional noise attenuation other than that provided in customary building techniques. "Normally Unacceptable" sites are those where the  $L_{dn}$  is above 65 dBA, but does not exceed 75 dBA. Housing on Normally Unacceptable sites requires some means of noise abatement, either at the property line or in the building construction, to ensure the interior noise levels are acceptable. "Unacceptable" sites are those where the  $L_{dn}$  is 75 dBA or higher. The term "unacceptable" does not necessarily mean that housing cannot be built on these sites, but rather that more sophisticated sound attenuation would likely be needed.
- 3.5 State Department of Transportation, Airports Division - The Department of Transportation (DOT) specifies land use compatibility guidelines for aircraft noise exposure [Reference 6]. These guidelines are based on maximum allowable yearly

day-night equivalent sound levels,  $L_{dn}$ , for various specified land uses. A residential land use, which is specified as single-family homes, apartments, hotels, and resorts, is compatible with an aircraft generated  $L_{dn}$  less than or equal to 60 dBA. However, DOT states,

"Where the community determines that these uses must be allowed, Noise Level Reduction (NLR) measures to achieve interior levels of 45  $L_{dn}$  or less should be incorporated into building codes and be considered in individual approvals. Normal local construction employing natural ventilation can be expected to provide an average NLR of approximately 9 dB. Total closure, plus air conditioning, may be required to provide additional outdoor to indoor NLR, and will not eliminate outdoor noise problems."

The DOT guidelines also specify 60 dBA as the maximum allowable  $L_{dn}$  level for school, day care center, and church uses without any noise mitigation. Commercial uses such as retail shops, restaurants, shopping centers, etc. are compatible with  $L_{dn}$  levels up to 65 dBA without any noise mitigation. With noise mitigation, such commercial uses are allowed in areas exposed to  $L_{dn}$ 's as high as 75 dBA.

- 3.6 U.S. Environmental Protection Agency - The U.S. Environmental Protection Agency (EPA) has identified a range of yearly day-night equivalent sound levels,  $L_{dn}$ , sufficient to protect public health and welfare from the effects of environmental noise [Reference 7]. The EPA has established a goal to reduce exterior environmental noise to an  $L_{dn}$  not exceeding 65 dBA and a future goal to further reduce exterior environmental noise to an  $L_{dn}$  not exceeding 55 dBA. Additionally, the EPA states that these goals are not intended as regulations as it has no authority to regulate noise levels, but rather they are intended to be viewed as levels below which the general population will not be at risk from any of the identified effects of noise.

#### 4.0 EXISTING ACOUSTICAL ENVIRONMENT

As stated previously, TMK Parcel: 9-1-17: por. 4 of the East Kapolei Project is in the general location of the Ewa Development Project area. Therefore, the ambient noise measurements obtained on September 8, 1994 for the Ewa Development Project are applicable to the East Kapolei Project. Additional noise measurements for the East Kapolei Project were conducted on November 27, 1995. The ambient noise measurement locations for the project are shown in Figure 4. Noise level measurements were taken using a Larson Davis Laboratories, Model 700, Type 2 Integrating Sound Level Meter. The following sound levels, expressed in units of A-weighted decibels (dBA) and in terms of the 90-Percentile Exceedence Sound Level,  $L_{90}$ , were measured:



<u>Measurement Location</u>	<u>L<sub>90</sub> (dBA)</u>
1	47.0
2	48.0
3	47.0

L<sub>90</sub> represents a measure of the residual or background noise minimally influenced by nearby discrete events. A brief description of statistical noise levels commonly used to describe environmental noise is presented in Appendix A.

Presently, the dominant noise sources at Locations 1 and 2 of the project area include wind, traffic on H-1 Freeway and Farrington Highway and occasional distant aircraft flybys. An additional noise source within the project area is from sugarcane operations; however, no sugarcane operations were experienced during the field measurements. The acoustical environment at Location 3 of the nearest residential area, Ewa Villages, is similar to that of the project area with wind, traffic and occasional distant aircraft flybys being the dominant noise sources.

## 5.0 POTENTIAL NOISE IMPACT DUE TO THE PROJECT AND NOISE MITIGATION

- 5.1 Additional Traffic Generated by the Project - Measured traffic noise levels and predicted traffic volumes [Reference 8] were used in conjunction with the Federal Highway Administration (FHWA) Traffic Noise Prediction Model [Reference 9] to estimate the traffic noise level increases as a result of the Project. Traffic noise level increases along Farrington Highway and H-1 Freeway with and without the Project were predicted. The projected future (2010) traffic noise level increases during peak traffic hours are summarized in Table 1. The predicted maximum traffic noise level increase along Farrington Highway due to additional traffic generated by the Project was determined to be 2.1 dB. A traffic noise level increase of 2.1 dB may be perceptible by some people at noise sensitive locations along Farrington Highway, but to most people such a small increase would be imperceptible. The traffic noise increase along H-1 Freeway due to project generated traffic, 0.2 dB, is considered insignificant.
- 5.2 Construction Noise - Development of the East Kapolei Project will involve excavation, grading, and the construction of infrastructure and buildings. The various construction phases of the project may generate significant amounts of noise, which may impact the nearby residential areas. The actual noise is dependent upon the methods employed during each stage of the construction process. Typical ranges of construction equipment noise are shown in Figure 5. Earthmoving equipment, e.g., bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction, assuming that pile driving will not be required.

In cases where construction noise exceeds, or is expected to exceed the DOH's "allowable" property line noise levels [Reference 2], a permit must be obtained from the DOH to allow the operation of vehicles, construction equipment, power tools, etc., which emit noise levels in excess of the "allowable" levels. Required permit conditions for construction activities are:

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

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

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

In addition, construction equipment and on-site vehicles or devices whose operations involves the exhausting of gas or air must be equipped with mufflers, and construction vehicles using traffic-ways must satisfy the DOH's vehicular noise requirements [Reference 10].

Blasting, if required, could also produce noise impacts. However, blasting at construction sites near populated areas is usually accomplished by using numerous small charges detonated with small time delays. Blast mats can also be used to assist in directing the explosive energy into the rock, controlling flying debris, and muffling the noise. Thus, with the appropriate blast design techniques, the noise from blasting can be controlled within acceptable limits at the closest noise sensitive locations.

## 6.0 POTENTIAL NOISE IMPACT ON THE PROJECT AND NOISE MITIGATION

6.1 Traffic Noise - The proposed plan for traffic circulation within the East Kapolei "application area" is shown in Figure 2. The proposed residential areas within these parcels could be impacted by traffic noise. The FHWA Traffic Noise Prediction Model was used along with traffic data provided in the referenced traffic study to predict future traffic noise levels along H-1 Freeway, Farrington Highway, North-South Road and interior arterials. Traffic-generated noise levels were predicted at the locations shown in Figure 6.

The future traffic noise levels were based on the predicted peak hour traffic volumes with the assumptions of truck mix percentage, posted speed limit and roadway characteristics summarized in Table 2. The day-night average sound levels,  $L_{dn}$ , were estimated from the peak hour equivalent-continuous noise levels,  $L_{eq}$ , as indicated by

HUD [Reference 5]. The results indicate that residences at the traffic noise assessment locations shown in Figure 6 will fall within the HUD "Acceptable" category at the estimated setback distances listed in Table 3. It should be noted that the estimated setback distances listed in Table 3 are worst cases. Detailed analysis of specific building projects may allow smaller setbacks. For example, if portions of specific roadways are elevated above the future housing, e.g., along the H-1 Freeway, a barrier may effectively shield windows of second floor units allowing substantially less setback, if optimum planning, grading and design are incorporated. In addition, if the 4-lane roadways assumed for Farrington Highway and North-South Road include a median or center island, the distance between directional traffic will increase and this analysis would require updating. In general, traffic noise level exposures vary with building setback, height of building and fenestration, local topography, foliage and possible shielding from neighboring structures.

In accordance with HUD standards, housing areas exposed to  $L_{dn}$  levels above 65 dBA, but not exceeding 75 dBA, require some means of noise abatement either at the property line or in the building interior in order to be eligible for HUD/FHA financing. HUD standards for housing areas exposed to  $L_{dn}$  levels between 65 and 70 dBA, require a minimum of 5 dB attenuation in addition to the "attenuation provided by buildings as commonly constructed in the area, and requiring open windows for ventilation." A minimum of 10 dB attenuation is required for housing areas exposed to  $L_{dn}$  levels of 70 and 75 dBA. The standards also state, "Emphasis shall be given to noise sensitive interior spaces such as bedrooms."

An additional 5 dB of attenuation can usually be achieved by one of the following measures:

- a) Constructing a noise barrier wall which blocks the line-of-sight between the noise source and the units' windows.
- b) Installing carpeting with minimum 40 oz. padding, louvered closet doors, and/or absorptive ceiling tiles in the affected bedrooms.

An additional 10 dB of attenuation can usually be achieved by implementing both measures a) and b) above or providing air conditioning and using standard windows with good seals in conjunction with normal double wall construction with insulation. Jalousie windows should not be used in the impacted dwellings. Housing areas exposed to  $L_{dn}$  levels exceeding 75 dBA would most often require high sound transmission loss glazing and air conditioning according to HUD.

6.2 Aircraft Noise - The proposed residential areas of the project are within approximately four to eight miles of Honolulu International Airport (HIA) and Barbers Point Naval Air Station (BPNAS). Due to the distance from the residential areas, the day-night average sound level,  $L_{dn}$ , due to air traffic associated with HIA and BPNAS will be

less than 55 dBA at the residential areas [Reference 11 and 12], which is compatible with the State DOT residential guidelines. However, due to the vicinity of the residential areas to flight tracks associated with HIA and BPNAS as shown in Figures 7, 8 and 9, infrequent aircraft flyovers or flybys may, at times, be audible in the residential areas. Although these aircraft operations may, at times, be audible, aircraft noise should not significant impact the proposed residential development.

- 6.3 Sugarcane Agriculture - Sugarcane agriculture involves activities such as land preparation, harvesting, hauling, etc., which are characterized by periods of intense activity with equipment operating 24 hours per day. Lands west of the East Kapolei "application area" are currently cultivated in sugarcane. If nearby sugarcane operations continue beyond the completion of the proposed project, noise from agriculture activities may impact nearby noise sensitive residential areas. However, sugarcane growing in the area is anticipated to end in the near future.
- 6.4 Hawaiian Electric Company (HECO) Station - A HECO substation is located southeast of the Project. Potential noise sources at the substation include transformers, radiators, and other stationary equipment. During typical traffic hours, traffic noise along Farrington Highway and H-1 Freeway will generally mask the noise produced by the substation. However, when the traffic volume is low, e.g., from midnight to 5 a.m., the noise sources at the station could be audible at nearby noise sensitive residential areas. Noise mitigation in the form of a barrier wall on the two sides of the substation facing Project residential areas would be effective.
- 6.5 Quarry Site - The Project is approximately 1 mile east of an existing rock quarry site. Noise produced by the activities at the quarry site should not significantly impact the nearby residential areas due to the distance between the site and the residential areas.

## REFERENCES:

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2. *Chapter 43 - Community Noise Control for Oahu*, Department of Health, State of Hawaii, Administrative Rules, Title 11, November 6, 1981.
3. *Section 3.11, Noise Regulations*, Land Use Ordinance, City and County of Honolulu, Oahu October 22, 1986.
4. *Department of Transportation, Federal Highway Administration Procedures for Abatement of Highway Traffic Noise*, Title 23, CFR, Chapter 1, Subchapter J, Part 772, 38 FR 15953, June 19, 1973, Revised at 47 FR 29654, July 8, 1982.
5. *HUD Environment Criteria and Standards*, 24 CFR 51, Federal Register, Volume 44, No. 135, July 12, 1979; Amended 49 FR 880, January 6, 1984.
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11. *Honolulu International Airport Master Plan Update & Noise Compatibility Program*, State of Hawaii, Department of Transportation, Airports Division, Vol. 2, October 1989.
12. *Naval Air Station Barbers Point Air Installations Compatible Use Zone (AICUZ) Noise Contours and Supporting Data*, Naval Facilities Engineering Command, Alexandria, VA, July 1989.

## APPENDIX A

### ACOUSTICAL TERMINOLOGY

#### Sound Pressure Level

Sound or noise consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. It is measured in terms of decibels (dB) using precision instruments known as sound level meters. Noise is defined as "unwanted" sound.

Technically, sound pressure level (SPL) is defined as:

$$\text{SPL} = 20 \log (P/\text{Pref}) \text{ dB}$$

where P is the sound pressure fluctuation (above or below atmospheric pressure) and Pref is the reference pressure, 20 micropascals, which is approximately the lowest sound pressure that can be detected by the human ear. For example, if P is 20 micropascals, then SPL = 0 dB, or if P is 200 micropascals, then SPL = 20 dB. The relation between sound pressure in micropascals and sound pressure level in decibels (dB) is shown in Figure A-1.

The sound pressure level that results from a combination of noise sources is not the arithmetic sum of the individual sound levels, but rather the logarithmic sum. For example, two sound levels of 50 dB produce a combined level of 53 dB, not 100 dB; two sound levels of 40 and 50 dB produce a combined level of 50.4 dB.

Human sensitivity to changes in sound pressure level is highly individualized. Sensitivity to sound depends on frequency content, time of occurrence, duration, and psychological factors such as emotions and expectations. However, in general, a change of 1 or 2 dB in the level of a sound is difficult for most people to detect. A 3 dB change is commonly taken as the smallest perceptible change and a 5 dB change corresponds to a noticeable change in loudness. A 10 dB increase or decrease in sound level corresponds to an approximate doubling or halving of loudness, respectively.

#### A-Weighted Sound Level

The human ear is more sensitive to sound in the frequency range of 250 Hertz (Hz) and higher, than in frequencies below 250 Hz. Due to this type of frequency response, a frequency weighting system, was developed to emulate the frequency response of the human ear. This system expresses sound levels in units of A-weighted decibels (dBA). A-weighted sound levels de-emphasizes the low frequency portion of the spectrum of a signal. The A-weighted level of a sound is a good measure of the loudness of that sound. Different sounds having the same A-weighted sound level are perceived as being about equally loud. Typical values of the A-weighted sound level of various noise sources are shown in Figure A-1.

### Statistical Sound Levels

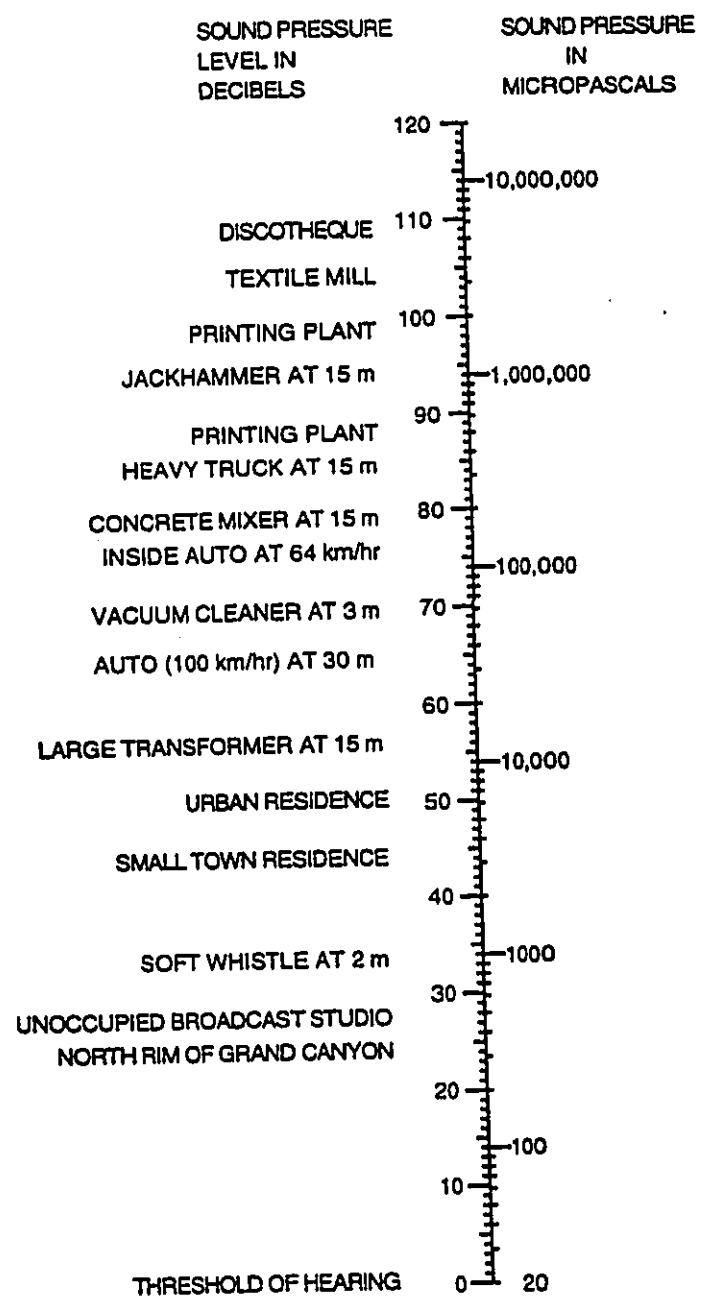
The sound levels of long-term noise producing activities, such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, a statistically-based method of expressing sound or noise levels developed. It is known as the Exceedence Level,  $L_n$ . The Exceedence Level,  $L_n$ , represents the sound level which is exceeded for  $n\%$  of the measurement time period. For example,  $L_{10} = 60$  dBA indicates that for the duration at the measurement period, the sound level exceeded 60 dBA 10% of the time. Commonly used Exceedence Levels include  $L_1$ ,  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$ , which are widely used to assess community and environmental noise. Figure A-2 illustrates the relationship between selected statistical noise levels.

### Equivalent Sound Level

The Equivalent Sound Level,  $L_{eq}$ , represents a constant level of sound having the same total acoustic energy as that contained in the actual time-varying sound being measured over a specific time period.  $L_{eq}$  is commonly used to describe community noise, traffic noise, and hearing damage potential. It has units of dBA and is illustrated in Figure A-2.

### Day-Night Equivalent Sound Level

The Day-Night Equivalent Sound Level,  $L_{dn}$ , is the Equivalent Sound Level,  $L_{eq}$ , measured over a 24-hour period. However, a 10 dB penalty is added to the noise levels recorded between 10 pm and 7 am to account for people's higher sensitivity to noise at night when the background noise level is typically lower. The  $L_{dn}$  is a commonly used noise descriptor in assessing land use compatibility, and is widely used by federal and local agencies and standards organizations. Qualitative descriptions, as well as local examples of  $L_{dn}$ , are shown in Figure A-3.

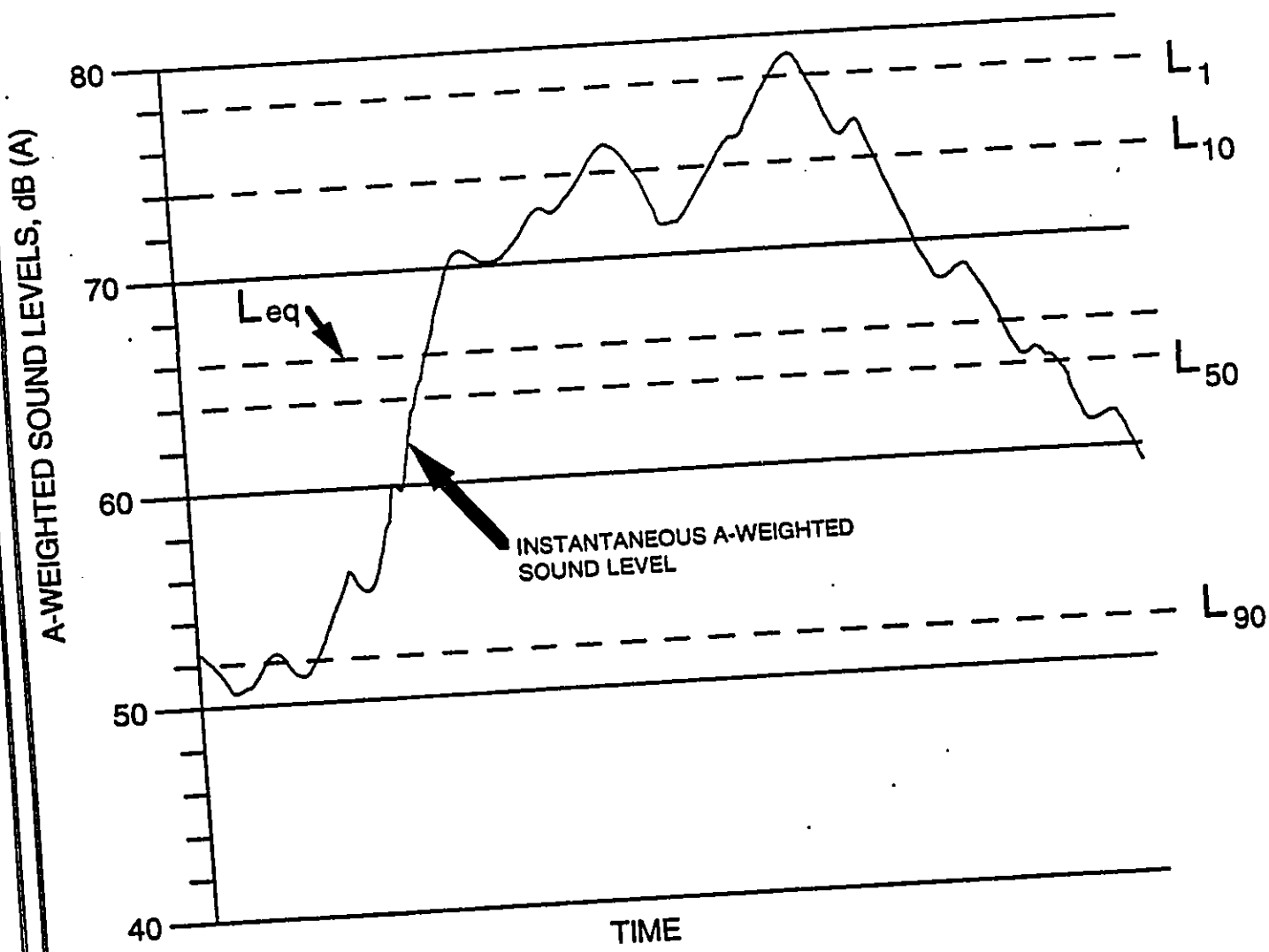


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FIGURE A-1 THE RELATION BETWEEN SOUND PRESSURE, P, AND SOUND PRESSURE LEVEL, SPL. ALSO SHOWN ARE TYPICAL VALUES OF A-WEIGHTED SOUND LEVELS OF VARIOUS NOISE SOURCES.

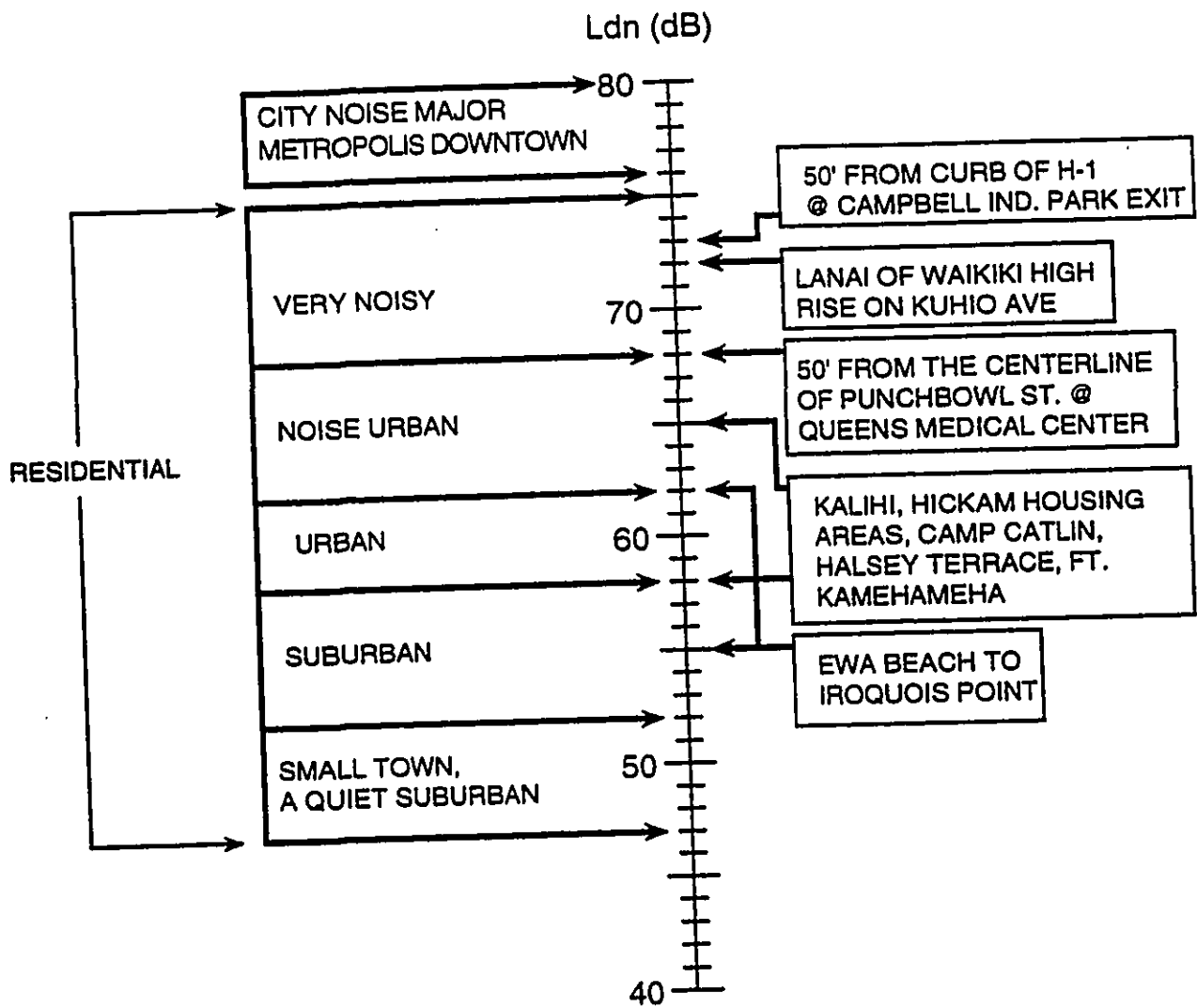




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FIGURE A-2 COMPARISON OF AN INSTANTANEOUS SOUND LEVEL AND THE CORRESPONDING STATISTICAL SOUND LEVELS



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FIGURE A-3 QUALITATIVE DESCRIPTION OF THE DAY-NIGHT SOUND LEVELS (Ldn) AND EXAMPLE Ldn's AT SELECTED LOCATIONS ON OAHU

TABLE 1  
 PROJECTED FUTURE (2010) TRAFFIC NOISE LEVEL  
 ( $L_{dn}$  in dBA) INCREASES DURING PEAK TRAFFIC HOURS

Roadway	Without Project		With Project	
	AM	PM	AM	PM
Farrington Highway	3.1	0.2	3.3	2.3
H-1 Freeway	2.1	2.2	2.1	2.4

TABLE 2  
ASSUMED TRUCK MIX PERCENTAGES  
AND CHARACTERISTICS OF ROADWAY

Location <sup>(1)</sup> & Roadway	Description	PSL <sup>(2)</sup> (mph)	Truck Mix %	
			MT <sup>(3)</sup>	HT <sup>(4)</sup>
1 H-1 Freeway	6-Lane Roadway With 20 ft. Median	55	2.5	3.5
2 Farrington Hwy.	4-Lane Roadway Without Median or Center Island	35	2.5	1.5
3 Farrington Hwy.	Lane Roadway Without Median or Center Island	35	2.5	1.5
4 North-South Rd.	4-Lane Roadway Without Median or Center Island	35	2.5	1.5
5 Interior Arterial	4-Lane Roadway Without Median or Center Island	25	2.5	0.5
6 Interior Arterial	4-Lane Roadway Without Median or Center Island	25	2.5	0.5
7 Interior Arterial	4-Lane Roadway Without Median or Center Island	25	2.5	0.5

(1) See Figure 6

(2) PSL = Posted Speed Limit

(3) MT = Medium Truck

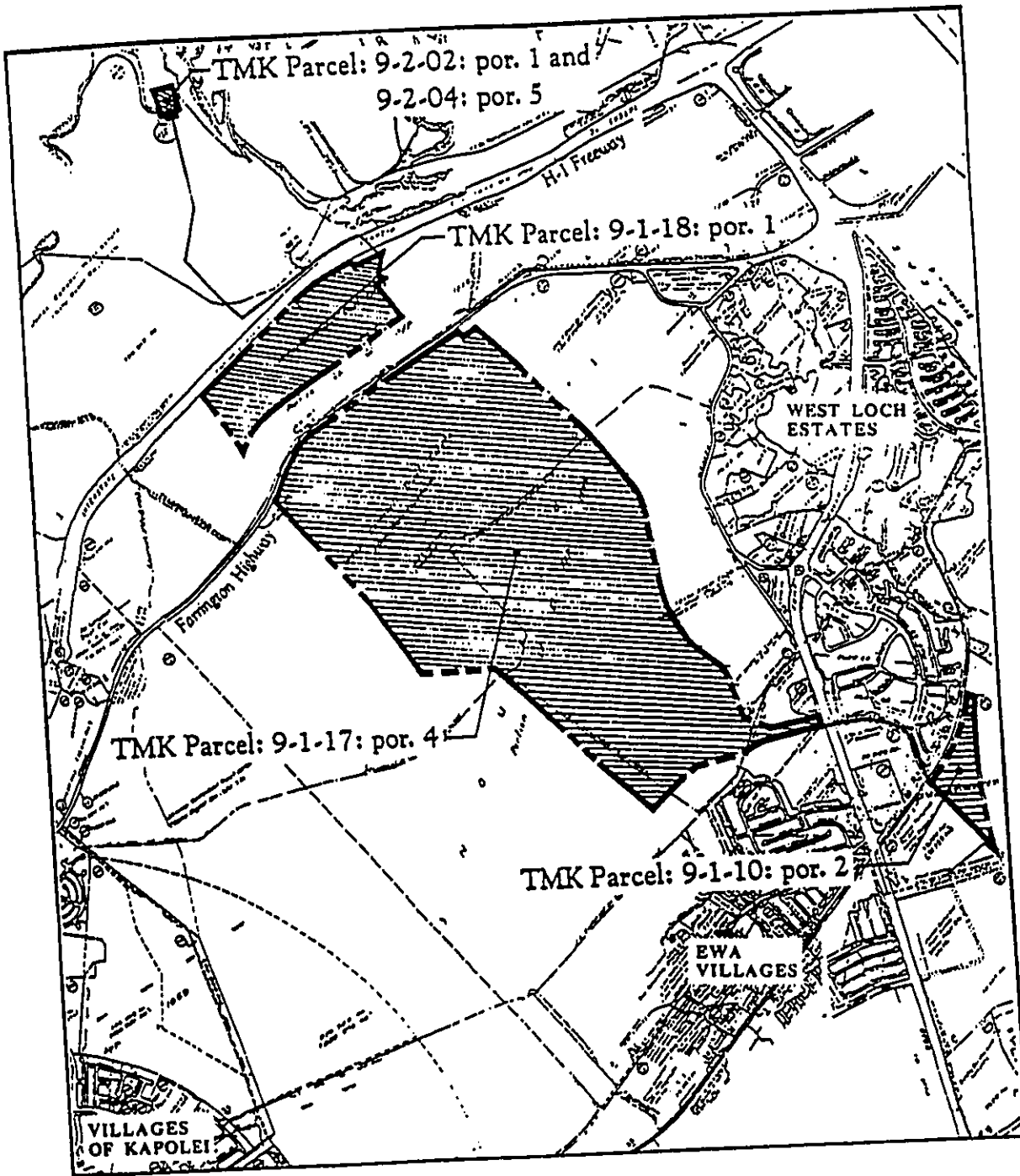
(4) HT = Heavy Truck

TABLE 3  
ESTIMATED MINIMUM SETBACK DISTANCES<sup>(1)</sup> (IN FEET) FOR  
MULTI-STORY, NATURALLY VENTILATED RESIDENCES  
AS REQUIRED BY HUD TRAFFIC NOISE CRITERIA

Location <sup>(2)</sup> & Roadway	"Acceptable" L <sub>dn</sub> <65	"Normally Unacceptable"		"Unacceptable" L <sub>dn</sub> >75
		L <sub>dn</sub> 65-70	L <sub>dn</sub> 70-75	
1 H-1 Freeway	>2235	2235 to 717	717 to 239	239 to ROW
2 Farrington Hwy	> 291	291 to 100	100 to ROW	n/a
3 Farrington Hwy	> 210	210 to 73	73 to ROW	n/a
4 North-South Rd	> 210	207 to 74	74 to ROW	n/a
5 Interior Arterial	> 39	39 to ROW	n/a	n/a
6 Interior Arterial	> 62	62 to ROW	n/a	n/a
7 Interior Arterial	> 57	57 to ROW	n/a	n/a

(1) Based on the distance from the roadway centerline and the 6.5 feet HUD requirement between noise level prediction location and the building footprint.

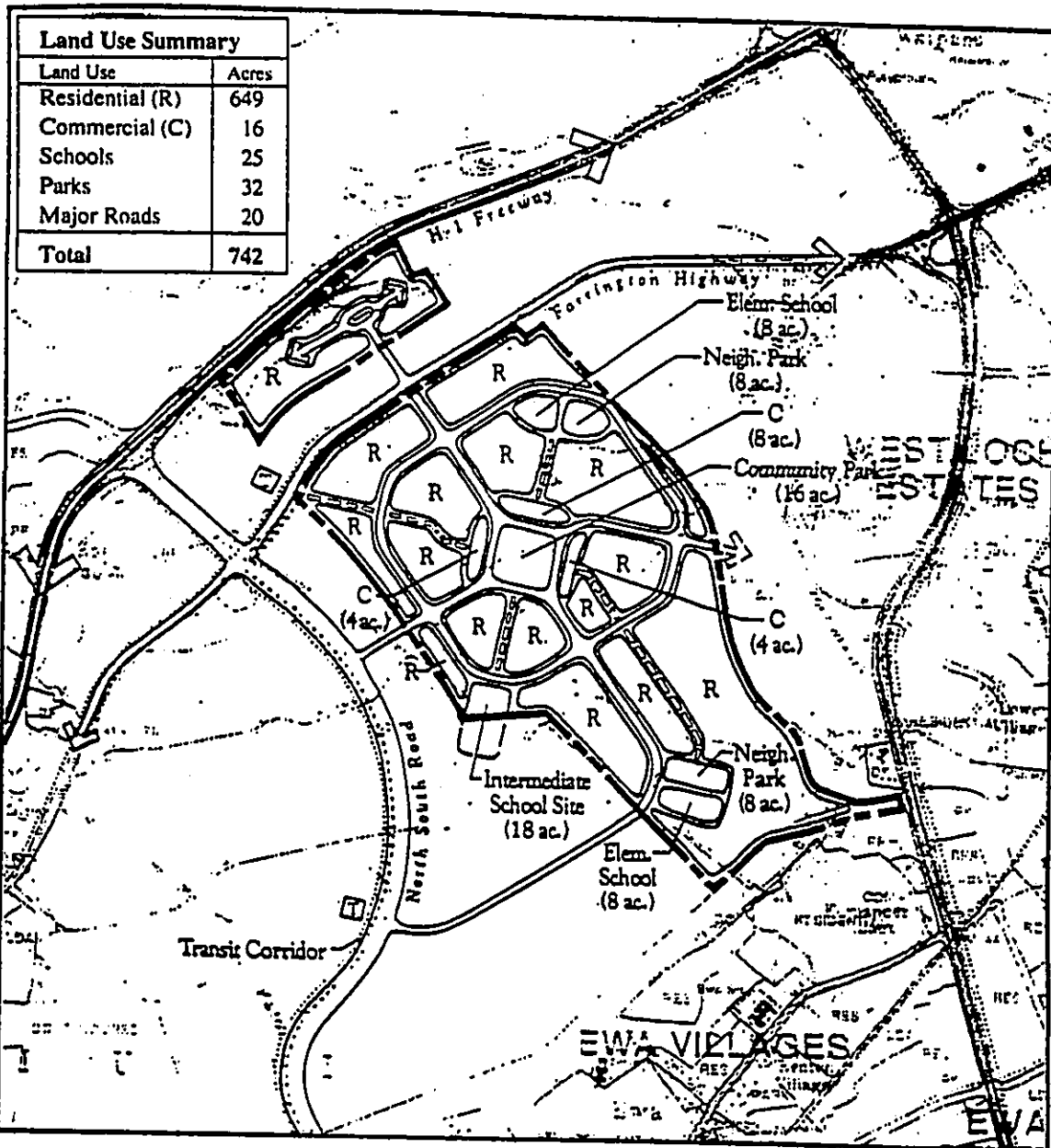
(2) See Figure 6



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FIGURE 1 - PROJECT SITE AND VICINITY

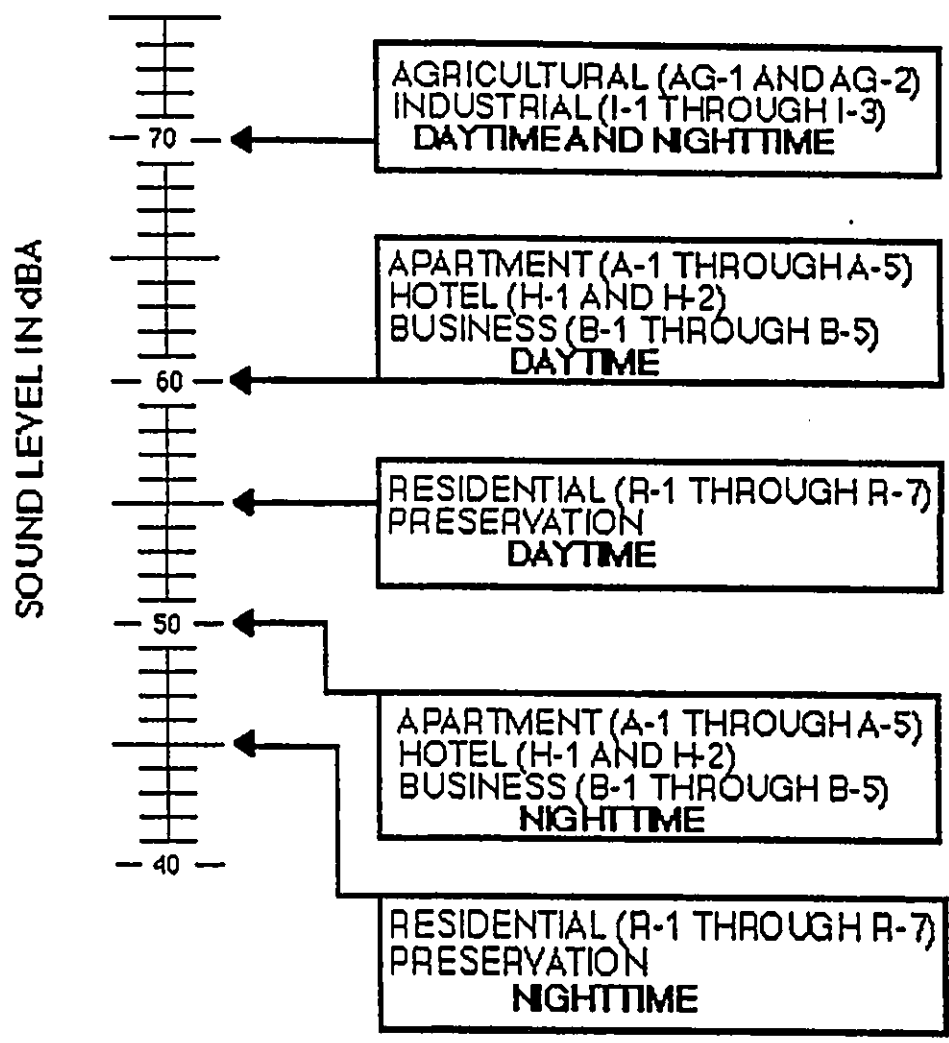


↑ N  
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FIGURE 2 - DEVELOPMENT PLAN OF THE EAST KAPOLEI "APPLICATION AREA"



NOTE: LEVELS INDICATED BY ZONING DISTRICT ARE THE "ALLOWABLE" LEVELS THAT SHALL NOT BE EXCEEDED FOR MORE THAN TEN PERCENT OF THE TIME WITHIN ANY TWENTY MINUTE PERIOD DURING THE TIME PERIOD SHOWN (DAYTIME: 7:00 A.M. TO 10:00 P.M., NIGHTTIME: 10:00 P.M. TO 7:00 A.M.)

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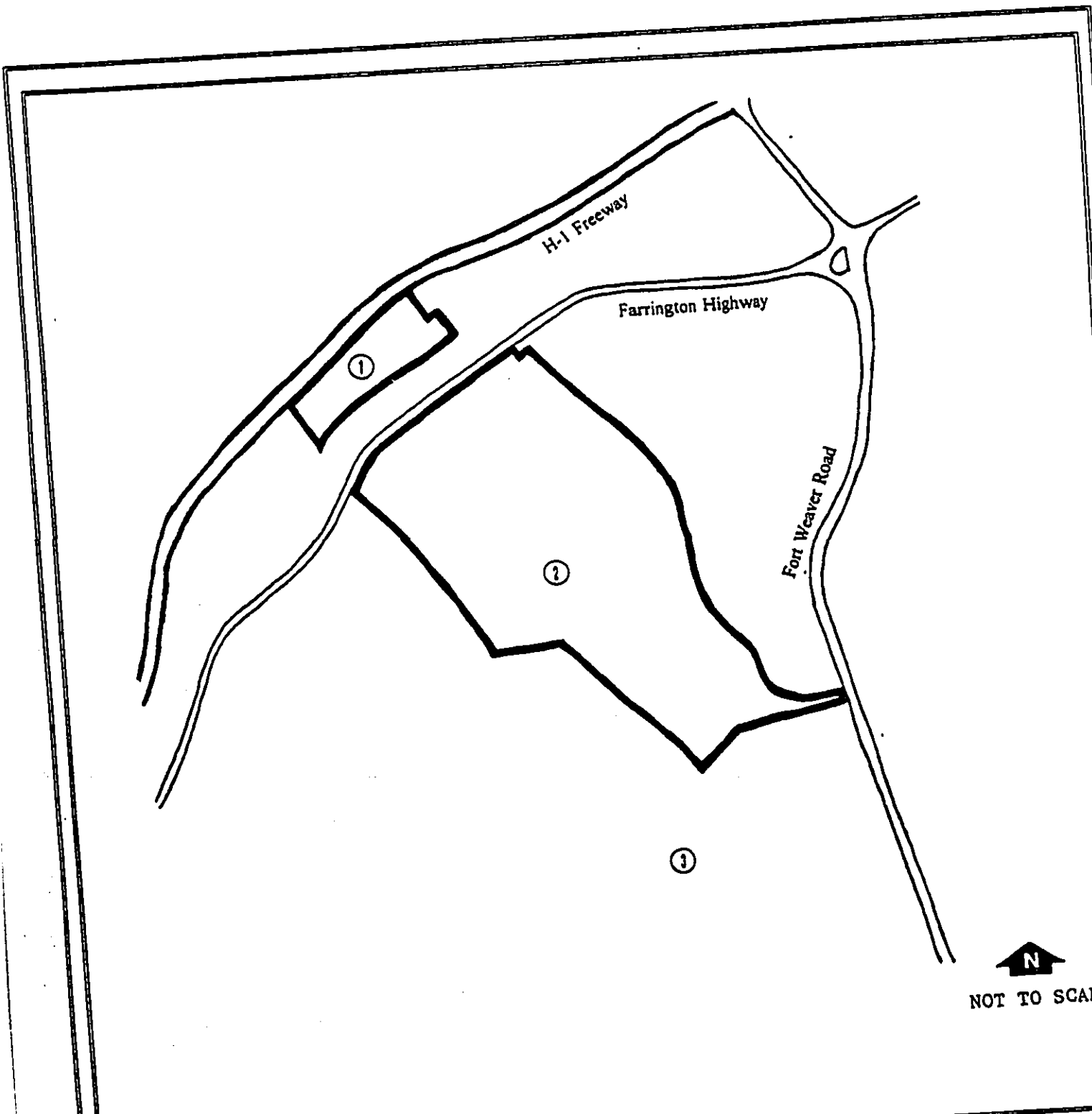
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FIGURE 3 - ALLOWABLE NOISE LEVELS FOR VARIOUS ZONING DISTRICTS

SOURCE: Reference 2



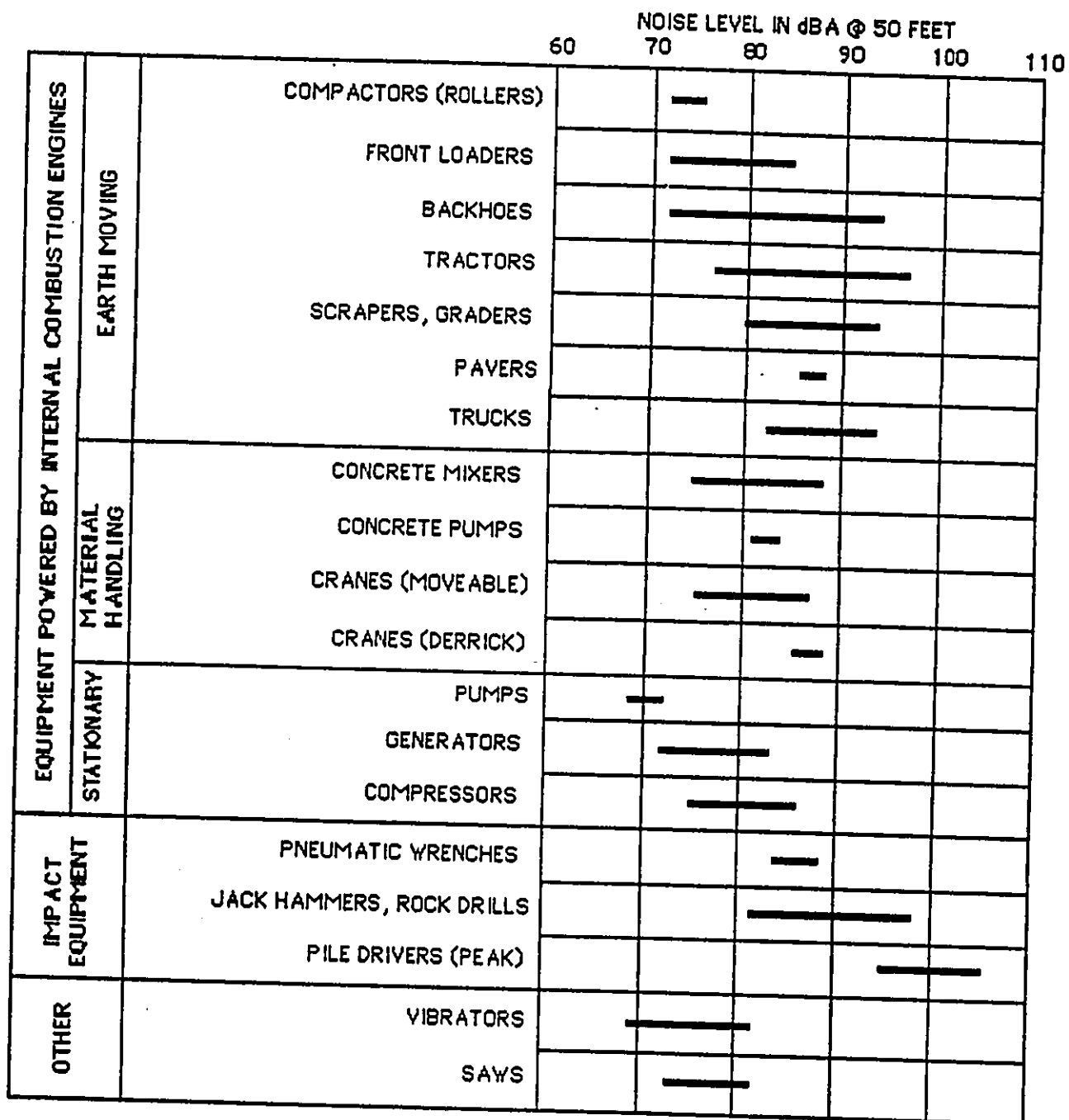


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FIGURE 4 - AMBIENT NOISE MEASUREMENT LOCATIONS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



NOTE: BASED ON AVAILABLE DATA SAMPLES

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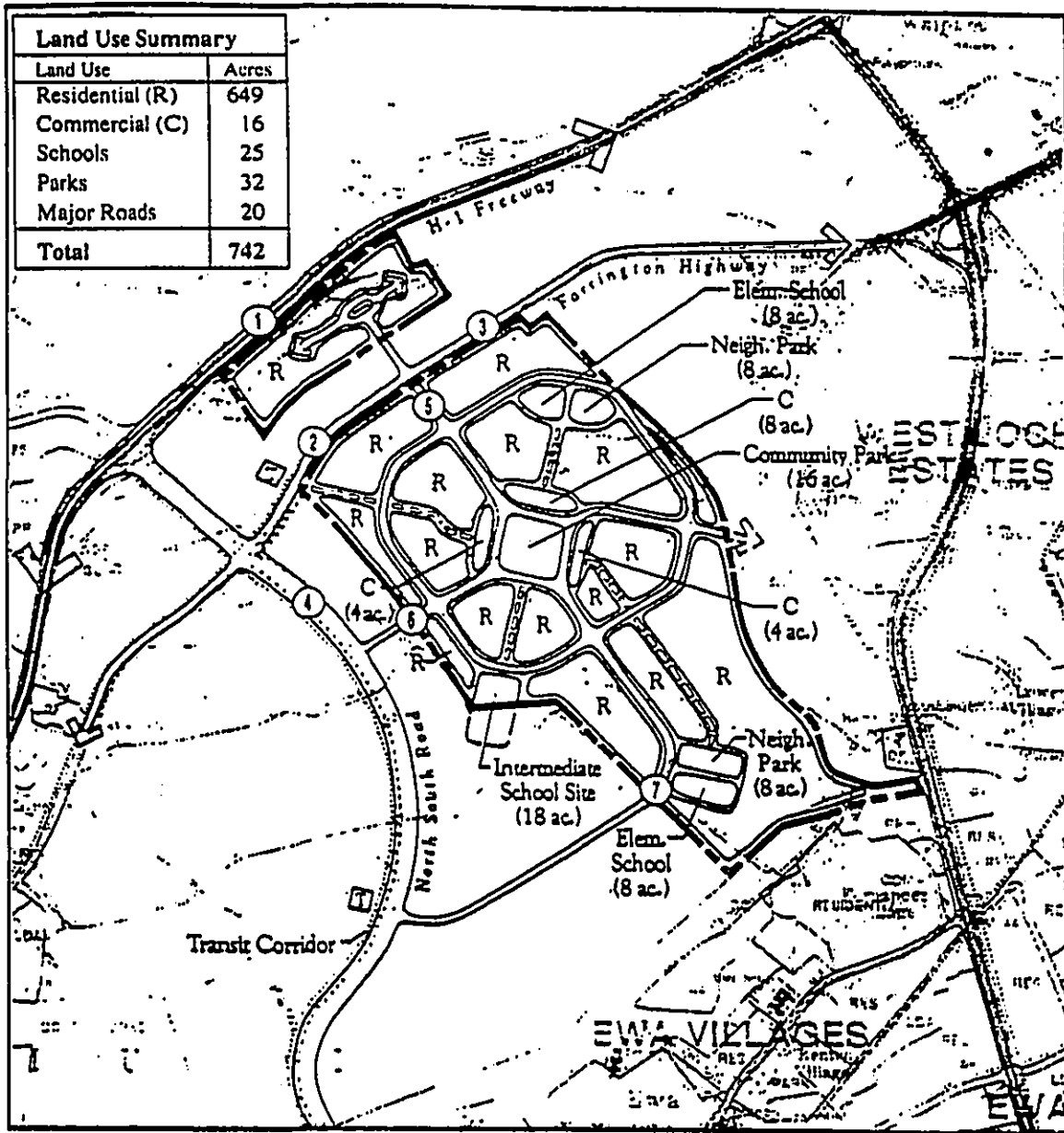


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FIGURE 5 - TYPICAL SOUND PRESSURE LEVELS FROM CONSTRUCTION EQUIPMENT

SOURCE: U.S. Environmental Protection Agency 1972

Land Use Summary	
Land Use	Acres
Residential (R)	649
Commercial (C)	16
Schools	25
Parks	32
Major Roads	20
<b>Total</b>	<b>742</b>



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FIGURE 6 - TRAFFIC NOISE ASSESSMENT LOCATIONS

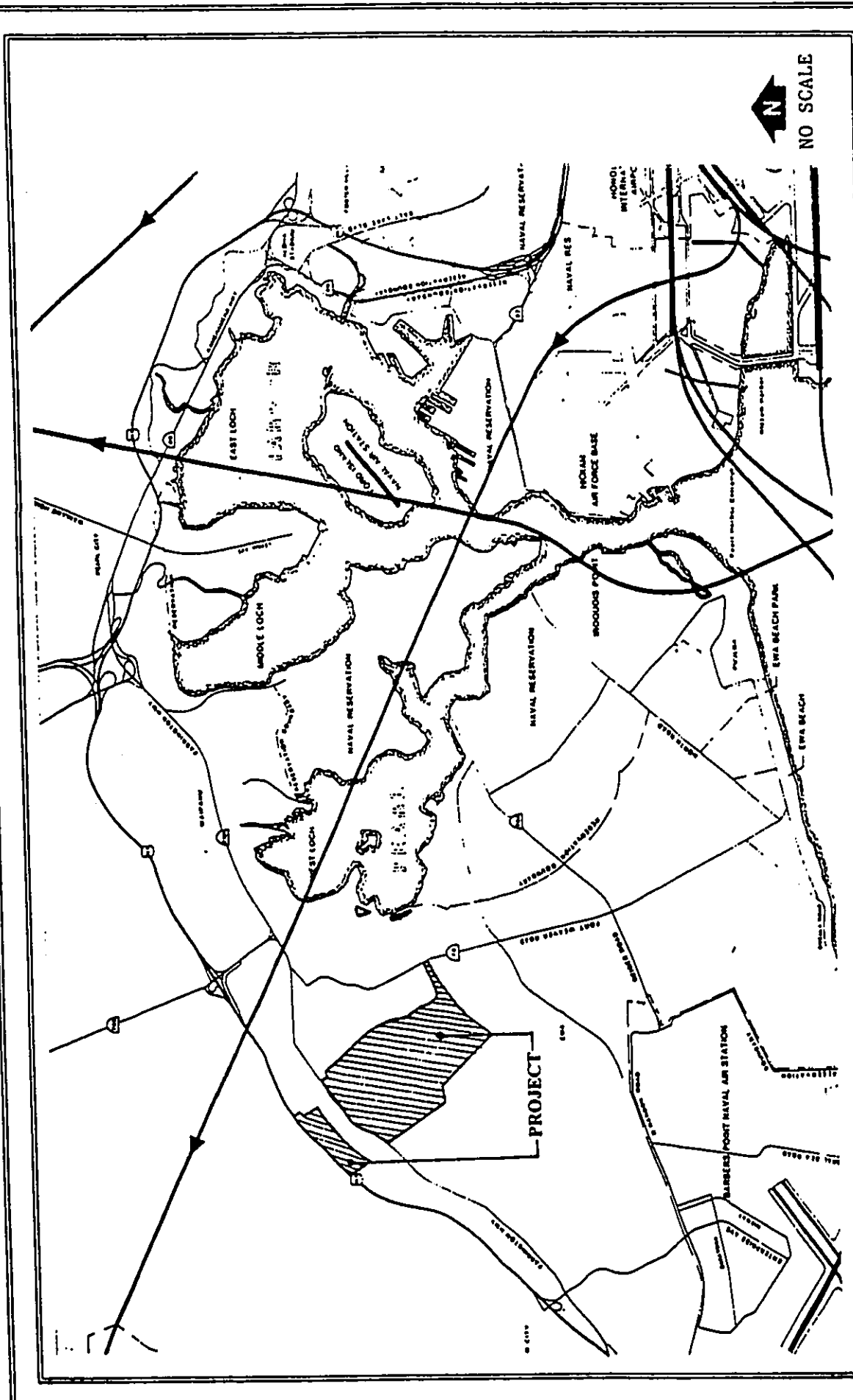


FIGURE 7 - VICINITY OF HONOLULU INTERNATIONAL AIRPORT DEPARTURE FLIGHT TRACKS TO THE PROPOSED RESIDENTIAL AREA OF THE EAST KAPOLEI PROJECT

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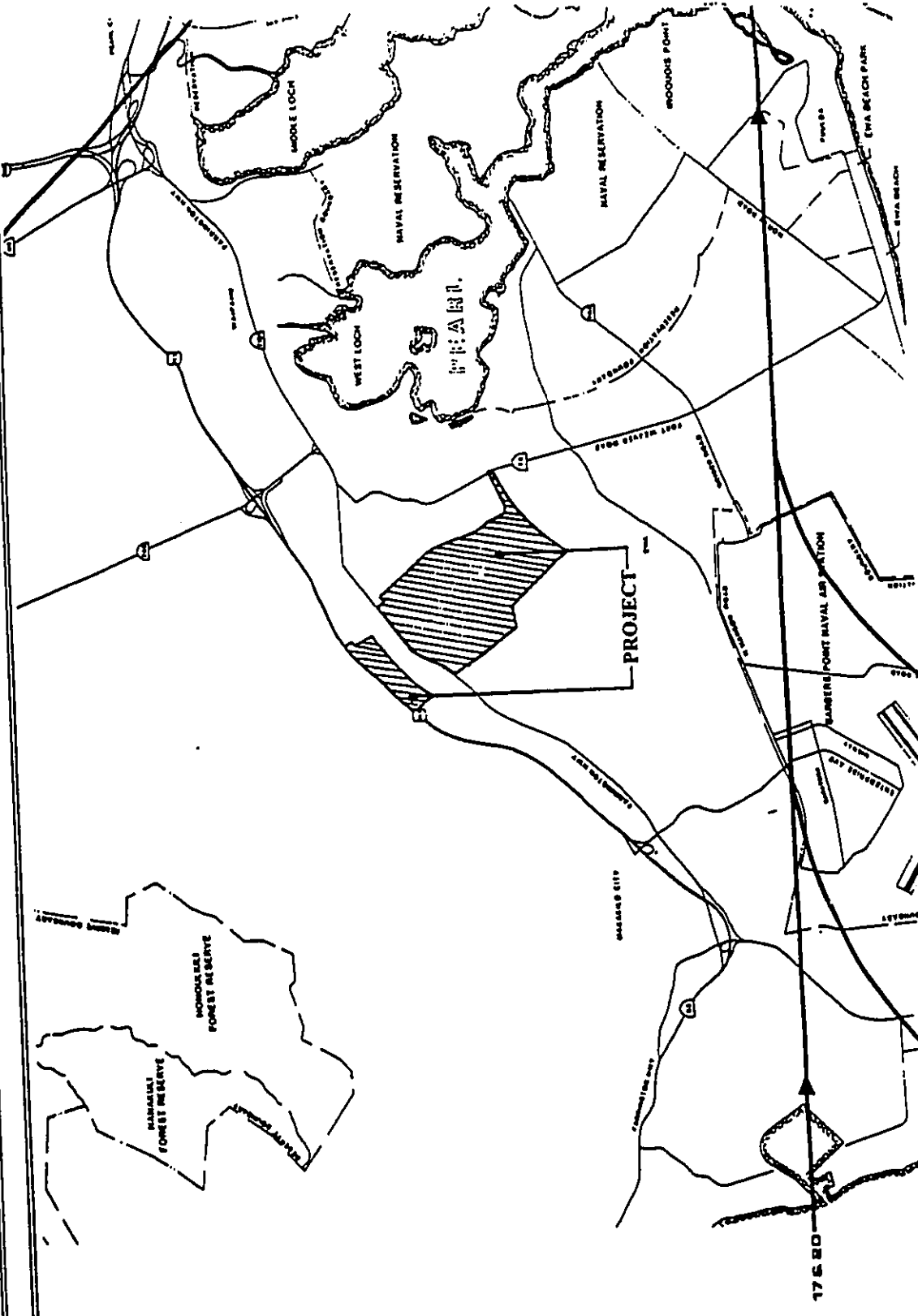


FIGURE 8 - VICINITY OF HONOLULU INTERNATIONAL AIRPORT ARRIVAL FLIGHT TRACKS TO THE PROPOSED RESIDENTIAL AREA OF THE EAST KAPOLEI PROJECT

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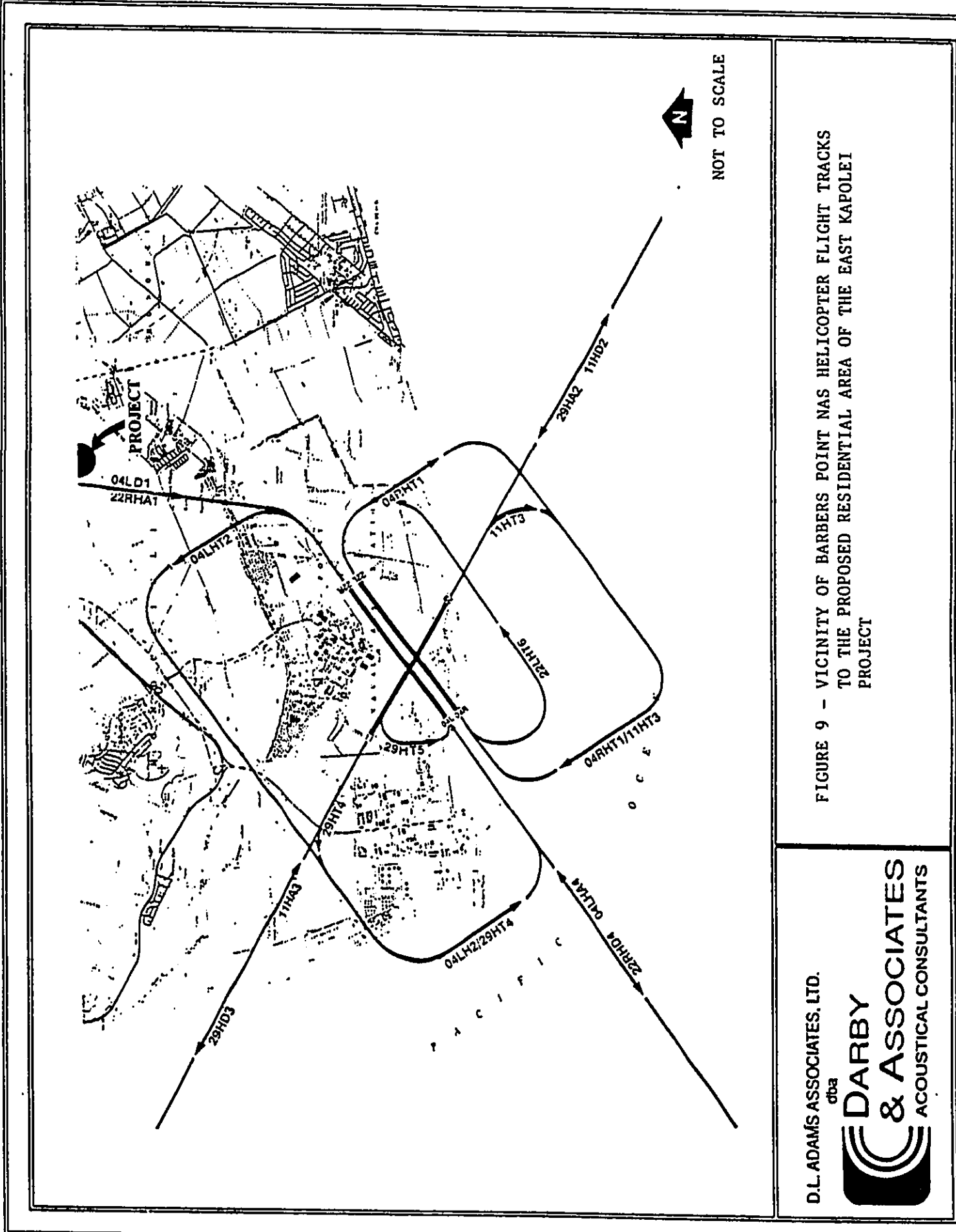


FIGURE 9 - VICINITY OF BARBERS POINT NAS HELICOPTER FLIGHT TRACKS TO THE PROPOSED RESIDENTIAL AREA OF THE EAST KAPOLEI PROJECT

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EAST KAPOLEI PROJECT: IMPACT ON AGRICULTURE  
SEPTEMBER 1994  
EAST KAPOLEI PROJECT: IMPACT ON AGRICULTURE (UPDATE)  
DECEMBER 13, 1995

DECISION ANALYSTS HAWAII, INC.

**EAST KAPOLEI PROJECT:**  
*Impact on Agriculture*

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PREPARED FOR:  
Schuler Homes, Inc.

PREPARED BY:  
Decision Analysts Hawaii, Inc.

September 1994



## CONTENTS

	<u>Page</u>
<b>TABLES</b> .....	iv
<b>FIGURES</b> .....	v
<b>EXECUTIVE SUMMARY</b> .....	vi
<b>INTRODUCTION</b> .....	1
<b>AGRONOMIC CONDITIONS</b> .....	1
Soil Types .....	1
Soil Characteristics .....	2
Soil Ratings .....	3
Soil Uses .....	6
Elevation and Terrain .....	6
Climatic Conditions .....	6
Irrigation Water .....	6
Improvements .....	6
Locational Advantages .....	6
Summary .....	7
<b>IMPACT ON SUGARCANE OPERATIONS</b> .....	7
<b>IMPACT ON PINEAPPLE OPERATIONS</b> .....	7
The Ewa/Poamoho Land Exchange .....	7
Agricultural Quality of the Poamoho Lands .....	8
Del Monte Fresh Produce (Hawaii) Inc. ....	8
Proposed Poamoho Development .....	10
Impact of the Proposed Project on Pineapple Operations .....	10

---

	<u>Page</u>
<b>INTERIM DIVERSIFIED-AGRICULTURE USE.....</b>	<b>10</b>
Short-Term Agricultural Plans for the Project Lands.....	10
Impact of the Short-Term Agricultural Plans on Agriculture.....	11
<b>IMPACT ON THE GROWTH OF DIVERSIFIED AGRICULTURE.....</b>	<b>11</b>
Potential Crops.....	11
Land Requirements for Diversified Agriculture.....	13
Supply of Land for Diversified Agriculture—Statewide.....	13
Supply of Land for Diversified Agriculture—Oahu.....	14
Outlook for Diversified Agriculture.....	16
Impact of the East Kapolei Project on the Growth of Diversified Agriculture... ..	17
<b>CONSISTENCY WITH STATE AND COUNTY PLANS.....</b>	<b>17</b>
<b>REFERENCES.....</b>	<b>22</b>

## TABLES

<u>Table</u>	<u>Page</u>
1. East Kapolei Project: Soil Types, Acreages, Agricultural Uses, and Soil Ratings.....	2
2. Selected State and County Objectives, Policies, and Guidelines Related to Agricultural Lands .....	19

FIGURE

<u>Figure</u>	<u>Page</u>
1. East Kapolei Project: Soil Ratings.....	4

## EXECUTIVE SUMMARY

The East Kapolei Project (the "Project") is a proposed 1,022-acre residential community that will be developed in the central portion of the Ewa Plain by Schuler Homes, Inc. Summarized below are the impacts on agriculture that will result from developing the Project.

### AGRONOMIC CONDITIONS

Assuming typical land rents for agriculture, nearly the entire Project area would be good for crop production. In fact, the lands would be among the best in the State for growing a variety of crops inasmuch as the area offers excellent agronomic conditions and is in a highly desirable location.

### IMPACT ON SUGARCANE OPERATIONS

The property is leased to Oahu Sugar Co., Ltd. (OSCo) until mid-1995, specifically for the cultivation of sugarcane. However, Amfac/JMB Hawaii (Amfac) has announced that it will close this unprofitable plantation in 1995 after the final harvest.

Inasmuch as OSCo is closing for reasons unrelated to the proposed development, and will close before development is scheduled to begin, the Project will have no impact on sugar operations.

### IMPACT ON PINEAPPLE OPERATIONS

The Project will be developed in two phases of 500 acres and 522 acres. The land for Phase I was obtained through an exchange with the State of Hawaii; for its part, the State received about 2,000 acres of land north of Wahiawa in the Poamoho area.

Poamoho has high-quality pineapple fields cultivated by Del Monte Fresh Produce (Hawaii) Inc. ("Del Monte"). In 1993, a residential community was proposed on nearly 900 acres of Poamoho land. This project would have required Del Monte to secure replacement fields, most likely on lands in Kunia that are being released from sugarcane cultivation by OSCo. Furthermore, Del Monte would have had to expend about \$700,000 to reconfigure the fields and modify the irrigation system for pineapple cultivation, and would have had to change its planting schedule throughout its plantation to adjust to the fact that Poamoho fields produce summer fruit while Kunia lands produce winter fruit.

The Ewa/Poamoho land exchange was made in order to retain the Poamoho lands in agriculture while using other lands for much-needed housing. Consequently, the proposed Project and the underlying land exchange avoids the adverse impact that would have occurred had the original development proceeded at Poamoho. Del Monte will be able to continue to grow pineapple on the excellent Poamoho fields, thereby avoiding the cost and disruption of relocating a major portion of its farm operation from Poamoho to Kunia.

#### **INTERIM DIVERSIFIED-AGRICULTURE USE**

As mentioned above, Phase I consists of 500 acres of land which was obtained from the State. Until construction begins, the State will make this land, or remaining undeveloped portions of it, available to farmers under short-term leases to grow seed corn and other diversified crops.

As noted below, however, an excess supply of agricultural land exists Statewide and on Oahu. Consequently, the temporary availability of the Project land for diversified crops is not expected to significantly affect the amount of agricultural activity Statewide or on Oahu. However, it may temporarily affect the location of some operations.

#### **IMPACT ON THE GROWTH OF DIVERSIFIED AGRICULTURE**

Ample prime agricultural land will be available to easily accommodate requirements of diversified agriculture Statewide and on Oahu. This conclusion derives from

the following: (1) a vast amount of prime agricultural land and water is available, having been freed from sugar and pineapple production in recent years; (2) additional sugarcane acreage and water will be freed within the next few years; (3) some, if not most, of the sugar companies are willing to make their lands available for profitable replacement crops to the extent that such crops exist; and, in contrast, (4) land requirements for diversified agriculture are surprisingly modest.

As the above indicates, the limiting factor to the growth of diversified agriculture will *not* be the *land supply*, but rather the *size of the market* for those crops that can be grown profitably in Hawaii. The proposed East Kapolei Project involves far too little land to affect this conclusion, and will therefore not affect adversely the Statewide or Oahu growth of diversified agriculture.

# EAST KAPOLEI PROJECT: Impact on Agriculture

## INTRODUCTION

The East Kapolei Project (referred to as "the Project" in this report) is a proposed 1,022-acre residential community to be located in the middle of the Ewa Plain, south of both the H-1 Freeway and Farrington Highway, west of Fort Weaver Road, north of Ewa Villages, and east of the Village of Kapolei. The Project is to be developed by Schuler Homes, Inc. in two phases: Phase I, consisting of 500 acres obtained through a land exchange with the State of Hawaii, and Phase II, consisting of 522 acres purchased from The Estate of James Campbell. Sales are scheduled to begin in 1997 and continue through 2011.

This report addresses the impacts on agriculture that will result from developing the Project.

## AGRONOMIC CONDITIONS

### Soil Types<sup>(1)</sup>

The land within the Project area consists of seven soil types:

EaB	Ewa silty clay loam, 3 to 6% slopes;
HxA	Honouliuli clay, 0 to 2% slopes;
HxB	Honouliuli clay, 2 to 6% slopes;
KyA	Kunia silty clay, 0 to 3% slopes;
WkA	Waialua silty clay, 0 to 3% slopes;
WzA	Waipahu silty clay, 0 to 2% slopes; and
WzB	Waipahu silty clay, 2 to 6% slopes.



For each soil type, Table 1 shows the approximate acreage in both phases, the possible agricultural uses, and two soil ratings (explained below). The predominate soil types are HxA (616 acres, or 60% of the Project area), KyA (216 acres, or 21%), WzA (98 acres, or 10%), and WzB (73 acres, or 7%).

### Soil Characteristics

The Project area has soils which have moderate-to-good machine tillability, are not stony, are more than 30 inches deep, are level or gently sloping, and are either moderately well-drained or well-drained.<sup>[2]</sup>

Table 1.— EAST KAPOLEI PROJECT: SOIL TYPES, ACREAGES, AGRICULTURAL USES, AND SOIL RATINGS

Soil Type	Acres		Agricultural Uses	SCS Rating <sup>1</sup>	LESA Rating
	Phase I	Phase II			
EaB	0	1	Sugarcane, truck crops, pasture	IIe	85
HxA	446	170	Sugarcane, truck crops, pasture	I	87
HxB	0	4	Sugarcane, truck crops, pasture	IIe	85
KyA	5	211	Sugarcane, pineapple <sup>2</sup>	I	95
WkA	0	3	Truck crops, pasture	I	93
WzA	30	68	Sugarcane	I	92
WzB	17	56	Sugarcane	IIe	90
Reservoirs	<u>2</u>	<u>9</u>		—	—
TOTAL	500	522			

1. Assuming irrigation.

2. As discussed in the text, the Project is at too low of an elevation and temperatures are too warm for pineapple production.

### Soil Ratings

The soils within the Project area have been rated in terms of four classification systems commonly used in Hawaii: (1) Land Capability Grouping, (2) Agricultural Lands of Importance to the State of Hawaii, (3) Overall Productivity Rating, and (4) Proposed Land Evaluation and Site Assessment. These classification systems are discussed below and summarized in Figure 1.

- (1) *Land Capability Grouping by the United States Department of Agriculture Soil Conservation Service (SCS).*<sup>[1]</sup>

This classification system rates soils according to eight levels, ranging from the highest classification level, I, to the lowest level, VIII. Assuming irrigation, the SCS Rating for each soil type is shown in Table 1.

For each classification, the acreage, percentage of the Project area, and limitations are as follows:

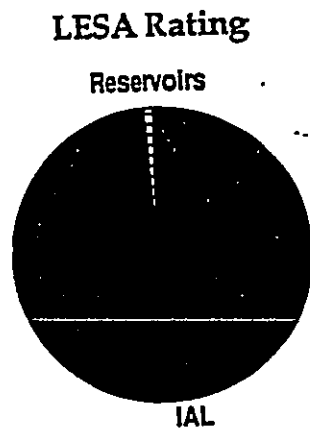
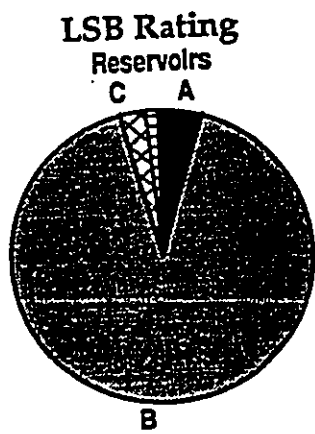
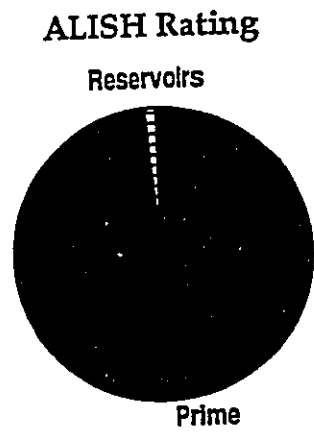
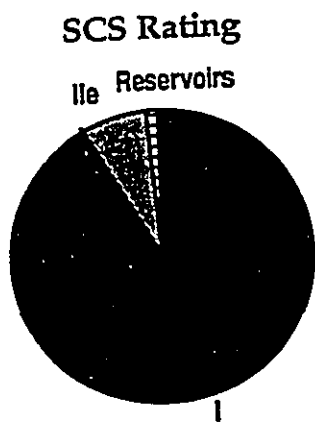
**Class I:** Class I soils amount to about 481 acres in Phase I and 452 acres in Phase II, for a total of 933 acres. This is about 91% of the entire Project area. Class I soils have few limitations that restrict their use.

**Class IIe:** Class IIe soils amount to about 17 acres in Phase I and 61 acres in Phase II, for a total of 78 acres. This is about 8% of the entire Project area. Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. The subclassification "e" indicates that the limitation is due to the risk of erosion.

- (2) *Agricultural Lands of Importance in the State of Hawaii (ALISH), by the SCS, University of Hawaii (UH) College of Tropical Agriculture and Human Resources, and the State of Hawaii, Department of Agriculture.*<sup>[3]</sup>

This system classifies lands into three categories: (a) "prime" agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment; (b) "unique" agricultural land which is non-prime agricultural land that is currently used for the production of specific high-value crops; and (c) "other" agricultural land

Figure 1.— EAST KAPOLEI PROJECT: SOIL RATINGS



which is non-prime and non-unique agricultural land that is of importance to the production of crops.

All of the acreage in Phases I and II are rated "prime" except for the approximately 11 acres of reservoirs, which are unrated.

(3) *Overall Productivity Rating, by the UH Land Study Bureau (LSB).*<sup>[2]</sup>

This classification rates soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest. For each rating and phase, acreages are:

<u>LSB Rating</u>	<u>Phase I</u>	<u>Phase II</u>	<u>TOTAL</u>
A	0	49	49 (5%)
B	471	464	935 (91%)
C	27	0	27 (3%)
Reservoirs	2	9	11 (1%)

The "B" rating reflects moderate rather than good drainage, while the "C" rating reflects both moderate drainage and slopes in excess of 10%.

(4) *Proposed Land Evaluation and Site Assessment (LESA) System, by the State of Hawaii Land Evaluation and Site Assessment Commission.*<sup>[4]</sup>

Based on soil quality, locational attributes, improvements, nearby activities, and land-use plans, this proposed classification system would designate a sufficient amount of the better agricultural lands in order that projected agricultural goals can be met. If the LESA classification approach were applied, the designated lands would be termed "important agricultural lands" (IAL), and would include all lands having a rating of 66 or above, out of a possible total of 100. The LESA rating for each soil type is shown in Table 1.

Based on the proposed ratings, all of the Project area would be designated as IAL.

Taking all four of the above soil-rating systems into consideration, all of the property is comprised of good soils.

### Soil Uses

Suitable agricultural activities associated with the affected soil types include sugarcane, pineapple and pasture (see Table 1). However, the fields are at too low of an elevation and temperatures are too warm for pineapple production; if grown at this location, the fruit would burn.

### Elevation and Terrain

Most of the terrain is nearly level or moderately sloped, and ranges in elevation from 50 feet to 170 feet altitude.<sup>[2]</sup> However, about 27 acres in Phase I has slopes between 11 and 20%.

### Climatic Conditions

The Project area is one of the sunniest areas on Oahu, having an average daily insolation of over 500 calories per square centimeter.<sup>[5]</sup> Rainfall averages just slightly over 20 inches per year.<sup>[6]</sup>

The average low temperature ranges from about 60° Fahrenheit in the winter to about 70° in the summer, while the average high temperature ranges from just under 80° in the winter to just under 90° in the summer.<sup>[6]</sup>

### Irrigation Water

The area has been irrigated with groundwater. Pumping costs are relatively low given the short lift.

### Improvements

The property is serviced with high-quality dirt roads, a drip irrigation system, and electrical power to drive large-volume pumps.

### Locational Advantages

The subject fields are a short trucking distance to:

- the large Honolulu consumer market,
- Honolulu supply markets,

- the airport for air-freighting produce to overseas markets,
- Honolulu Harbor and Barbers Point Harbor for surface shipping of produce to overseas markets, and
- research support from the Hawaiian Sugar Planters' Association and the University of Hawaii.

### Summary

Assuming typical land rents for agriculture, nearly the entire Project area would be good for crop production. In fact, the lands would be among the best in the State for growing a variety of crops inasmuch as the area offers excellent agronomic conditions and is in a highly desirable location. The major disadvantage is that labor costs for farming activities on Oahu are higher than those in some rural areas on the Neighbor Islands.

Because of relatively high sugarcane yields and low farming costs, the central portion of the Ewa plain was referred to as the "golden triangle."

### IMPACT ON SUGARCANE OPERATIONS

The property is leased to Oahu Sugar Co., Ltd. (OSCo) until mid-1995, specifically for the cultivation of sugarcane. However, Amfac/JMB Hawaii (Amfac), which owns OSCo, has announced that it will close this unprofitable plantation in 1995 after the final harvest.

Inasmuch as OSCo is closing for reasons unrelated to the proposed development, and will close before development is scheduled to begin, the Project will have no impact on sugar operations.

### IMPACT ON PINEAPPLE OPERATIONS

#### The Ewa/Poamoho Land Exchange

The 500 acres of land in Ewa for Phase I of the Project were obtained through a land exchange with the State of Hawaii. For its part, the State received from the George Galbraith Trust about 2,000 acres of land north of Wahiawa in the Poamoho area. The exchange was made in order to retain these lands in agriculture while using other lands for much-needed housing.

Since the Poamoho lands are being cultivated in pineapple, the proposed Project indirectly affects pineapple operations; this is addressed below.

#### Agricultural Quality of the Poamoho Lands

The Poamoho lands are well-suited for pineapple cultivation: soils are deep, well drained, and easy to work; large expanses of flat fields favor use of mechanized equipment; moderate rainfall eliminates the need for installing expensive drip irrigation and also reduces pumping costs for overhead spraying; and temperatures favor summer crops.<sup>[7]</sup>

However, the Poamoho fields are not favored for cultivating most other crops because of relatively low sunshine in the area and expensive irrigation water, particularly since most crops require far more water than does pineapple.<sup>[7]</sup>

#### Del Monte Fresh Produce (Hawaii) Inc.

Del Monte Fresh Produce (Hawaii) Inc. ("Del Monte") traces its Hawaii roots back to 1898.<sup>[7]</sup> Currently, its plantation covers about 7,400 acres of leased land, including the Poamoho lands mentioned above and lands in upper Kunia. Nearly 4,800 acres in upper Kunia are leased from the Estate of James Campbell under a 14-year lease that was signed in May 1994.<sup>[8]</sup> Most of the remaining lands are leased from the State, including the Poamoho lands recently obtained from the George Galbraith Trust, and an additional 580 acres in upper Kunia.

Del Monte farms about 4,400 acres, including fields that are temporarily fallowed as part of the normal crop cycle.<sup>[8]</sup> Remaining lands include those which are used for its Kunia headquarters, plantation villages, and roads; gullies; and other lands that are unsuitable or uneconomical for mechanized farming.

Pineapple grown in Hawaii by Del Monte is destined for four markets: fresh whole pineapple, "fresh-chilled" pineapple (which is cut), frozen pineapple, and juice concentrate.<sup>[7]</sup> Del Monte no longer grows pineapple in Hawaii for the canned market because of the low cost of production in Asia and elsewhere.

The fresh-whole and fresh-chilled pineapple are marketed primarily on the U.S. mainland.<sup>[7]</sup> Nearly two-thirds of it is shipped by air and arrives at market within 48

hours of the time it leaves the fields, with the remainder being shipped in refrigerated cargo ships which arrive at west coast markets 6 to 10 days after harvesting. Juice concentrate and frozen pineapple are marketed on the mainland and in Asia, and are transported by cargo ship.

Fresh-pineapple production remains economically viable on Oahu because of the excellent air transportation to the mainland, thanks largely to Hawaii's visitor industry.<sup>[7]</sup> Flights to a number of major cities are frequent and reliable, and "back-haul" rates are favorable. In contrast, it is not practical to deliver a large volume of fresh pineapple within 48 hours to many U.S. markets from Maui, Mexico, Central America, the Caribbean, or Asia.

In 1993, Del Monte's Hawaii operation harvested nearly 100,000 tons of pineapple, and generated sales exceeding \$54 million.<sup>[8]</sup> Del Monte has been only marginally profitable in recent years, but the company anticipates profitable operations based on its ability to produce high-value fresh-whole and fresh-chilled pineapple, and the potential with regard to production of other crops.

Del Monte is field testing potatoes, dry-land taro, onions, tomatoes, melons, green peppers, sweet corn, and eggplant. It is also field testing pineapple cultivation in lower Kunia on former OSCo lands.<sup>[9]</sup>

Del Monte's employment ranges from a low of about 630 workers during the winter months when planting is curtailed due to weather, to a high of about 690 workers in the summer at peak harvest, with an average over the year of about 650 jobs.<sup>[8]</sup> Current employment totals 690 workers including: 338 field workers; 313 workers in the packing plants; and 39 workers in engineering, operations, research, and sales.

The skills required vary from highly skilled workers (managers, agronomists, engineers, researchers), to skilled (supervisors, technicians, mechanics, equipment operators, journeymen, secretaries, etc.), to semi-skilled (field workers, fruit packers, clerical help, etc.). Hourly wage rates for laborers range from about \$6 to over \$11, depending on grade level. Salaries are higher for the skilled jobs.

In addition to the direct employment provided by Del Monte, the company indirectly supports about 750 jobs because Del Monte and its employees purchase goods and services.<sup>[9]</sup> Thus, total employment supported by the company amounts to about 1,400 direct and indirect jobs.



### Proposed Poamoho Development

In 1993, a residential community was proposed on nearly 900 acres of Poamoho land.<sup>[7]</sup> This project would have required Del Monte to secure replacement fields, most likely on lands in Kunia which are being released from sugarcane cultivation by OSCo.

Assuming replacement lands in this location, Del Monte would have had to expend about \$700,000 to convert the Kunia lands from sugarcane to pineapple.<sup>[7]</sup> The fields would have had to have been laid out with proper spacing for Del Monte's harvesting equipment, and the existing drip irrigation system would have had to have been modified.

In addition, the planting schedule of fields throughout the Del Monte plantation would have had to have been modified, since Poamoho fields produce summer fruit while Kunia lands produce winter fruit.

### Impact of the Proposed Project on Pineapple Operations

The proposed Project, and the underlying Ewa/Poamoho land exchange between the State of Hawaii and the George Galbraith Trust, avoids the adverse impact that would have occurred had the original development proceeded at Poamoho. Del Monte will be able to continue to grow pineapple on the excellent Poamoho fields, thereby avoiding the cost and disruption of relocating a major portion of its farm operation from Poamoho to Kunia.

### INTERIM DIVERSIFIED-AGRICULTURE USE

#### Short-Term Agricultural Plans for the Project Lands

Current plans call for Phase I of the Project to be developed in seven sections, with home sales starting as early as 1997 and continuing to about 2004. As mentioned previously, Phase I consists of 500 acres of land which was obtained from the State. Until construction begins on a given section, the State will make the land available to farmers under short-term leases to grow seed corn and other diversified crops. An additional 800 acres of State land planned for a new University of Hawaii campus and other projects will also be made available to farmers under short-term leases.

Although discussions have taken place with potential farmers, land rents, water rates and other lease terms have yet to be negotiated. Also, water delivery and other infrastructure problems are not resolved. Finally, the demand for the subject land has yet to be determined,

#### Impact of the Short-Term Agricultural Plans on Agriculture.

Regarding the potential demand for this land, it should be noted that, because of the very substantial contraction of plantation agriculture in Hawaii, the supply of agricultural land available for diversified crops, both Statewide and on Oahu, *far* exceeds projected demand (see next section). Consequently, the temporary availability of the Project land for diversified crops will result in a comparatively small and temporary increase in what is already an excess supply of land for diversified agriculture, both Statewide and on Oahu.

In view of this excess supply, the temporary availability of the Project land for diversified crops is not expected to significantly affect the amount of agricultural activity Statewide or on Oahu. However, it may temporarily affect the location of some operations.

#### IMPACT ON THE GROWTH OF DIVERSIFIED AGRICULTURE

The development of the Project area constitutes a commitment of 1,022 acres of agricultural land to a non-agricultural use. This land commitment raises the question of whether the Project area will affect adversely the growth of diversified agriculture—either immediately or over the long term. Before addressing this question, *potential crops, land requirements, and the availability of land* for diversified agriculture are discussed below.

##### Potential Crops

Depending on lease rents and water costs, crops which could be grown profitably in the area for the Honolulu market include bananas, green beans, bittermelon, mustard cabbage, pak choy cabbage, sweet corn, cucumbers, daikon, dasheen, long eggplant, round eggplant, Manoa lettuce, lotus root, luau leaf, lychee, mango, dry onions,

green onions, parsley, Chinese peas, green peppers, pomelos, pumpkins, hechima squash, hyotan squash, Italian squash, sweet potatoes, tomatoes, watercress, watermelons, feed corn for green chop, flowers, potted foliage, and plants for landscaping.

Potential export crops would include flowers, potted foliage, seed crops, ginger root, and a few other crops.

A great many additional crops can be grown in Hawaii's year-round subtropical climate, but few can be grown profitably on a commercial scale. The primary reasons for this unprofitability are:

- Hawaii's subtropical climate is not well-suited to the commercial production of certain crops which grow better in the temperate mainland climates;
- for certain crops, special hybrids have not been developed that are adapted to Hawaii's subtropical climate;
- crop pests are more prevalent and more expensive to control in Hawaii than they are on the mainland, where the cold winters kill many pests;
- fruit-fly infestations prevent exports of many crops;
- Hawaii suffers from high farm-labor costs, largely because agriculture must compete for its labor against the visitor and related industries;
- high overseas transportation costs increase the cost of importing agricultural supplies and equipment;
- Hawaii's soils generally have low nutrient levels and therefore require high expenditures for fertilizer;
- Hawaii markets are easily glutted due to the comparatively small population (if just a few farmers grow the same crop, an oversupply to the market causes prices to fall, resulting in all of these farmers losing money);
- consumption volumes are too small to support large, efficient farms (i.e., Hawaii's population is too small to support farms that require economies of scale); and
- Hawaii farmers must compete against large mainland farms that can deliver produce to Hawaii more cheaply than it costs to produce the crop locally because these mainland farms (1) incur lower costs for land, labor, supplies, fertilizer, equipment, etc., and (2) produce high volumes that allow economies of scale.

### Land Requirements for Diversified Agriculture

Based on projections made in 1991 by the State Department of Agriculture (DOA), additional Statewide land requirements to accommodate the growth of diversified agriculture to the year 2010 will amount to approximately 41,000 acres.<sup>[10]</sup> The projections suggest that about 83% of this new acreage will be required for macadamia nut and coffee orchards, while about 7,000 acres will be required to accommodate the growth of other diversified-agriculture crops.

The projections indicate that most of this growth in diversified agriculture will occur on the Neighbor Islands, while Oahu will require only about 1,000 acres, of which about half would be for bananas.

### Supply of Land for Diversified Agriculture—Statewide

With regard to the Statewide supply of agricultural land, an enormous and growing supply of this land is available for diversified agriculture. Since 1968, about 190,000 acres of Hawaii's higher-quality agricultural land have been or will soon be released from sugar and pineapple production, including land that is being released from sugar plantations which are closing.<sup>[11-13]</sup> Including the acreage being released by OSCo, this is over five times the amount of sugar and pineapple land on Oahu—about 35,000 acres of plantation land which covers most of the Ewa Plain, Central Oahu, and the North Shore.

The amount of land released from sugar production will probably increase given that additional sugar plantations are struggling. Although a collapse of the sugar industry is not anticipated, further contraction of the industry will occur.

In addition, a portion of the existing sugarcane land is on hold awaiting the discovery of profitable replacement activities. This land also forms part of the supply of agricultural land available for profitable diversified-agriculture crops. Moreover, the greater the success of diversified agriculture, the greater the amount of land that will be released for diversified agriculture. Examples of sugarcane land being released for other crops include: macadamia nut orchards on land released from Mauna Kea Agribusiness Co., Inc.; macadamia nut and citrus orchards on land released from Ka'u Agribusiness Co., Inc.; macadamia nut orchards and pineapple operations on land re-

leased from Wailuku Agribusiness Co., Inc.; coffee orchards on land released by McBryde; seed corn and nursery operations on land released from HC&S; and seed corn operations on land released from Kekaha Sugar Co., Ltd.

Some of the land that has been—or soon will be—freed from plantation agriculture has been or is scheduled to be converted to urban, diversified-agriculture, and other uses. After making allowances for these conversions, uncommitted acreage which remains available for diversified agriculture amounts to over 150,000 acres.<sup>[14]</sup> Much of this land is or will soon be fallow, or used for grazing, or is in some other low-value land-holding operation. For perspective, this is over four times the amount of sugar and pineapple land on Oahu. Also, this acreage figure is expected to increase as more land is released from sugar production.

Many of the lands freed, to be freed, or which can be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well-suited for a variety of crops. Also, water is available for most of these lands, particularly those which have been freed from sugar production.

Additional lands which have been made available for diversified agriculture are in government-sponsored agricultural parks throughout the State. Lands for agricultural activities which do not require prime agricultural land include pasture land, land for livestock operations, and "unique" lands as classified by ALISH (see page 3). Unique lands are not prime agricultural lands, but are important lands for certain crops, the principal examples are the coffee lands in Kona, and certain lava lands in Puna which are particularly well-suited for growing papaya. The supply of unique lands is quite large and is distinct from the supply of prime agricultural lands.

### Supply of Land for Diversified Agriculture—Oahu

#### *Lands Available for Diversified Agriculture*

Truck farms on Oahu are located in Waimanalo (on former Waimanalo Sugar Co. lands), Waiahole and Waikane Valleys, Kahuku (on former Kahuku Plantation Co. lands), Waianae (some of which are on former Waianae Co. lands), and various other areas. These agricultural lands have yet to be fully utilized.

Existing and planned State agricultural parks located on Oahu include three existing projects and three planned ones:

	<u>Acres</u>	<u>Lots</u>	<u>Lot Size (Acres)</u>	<u>Use</u>
<b>Existing Ag Parks:</b>				
Waimanalo	196	20	5 to 10	Diversified crops
Waianae	150	17	5 to 10	Livestock, shade crops
Kahuku	220 233	24	5 to 10	Diversified crops, dairy
<b>Planned Ag Parks:</b>				
Kunia	150	20	5 to 15	Truck crops
Waiahole	379	45	—	Diversified crops
Kahuku	750 to 900	—	—	Livestock

#### *Lands Being Released by OSCo*

Because of the closure of OSCo, a dramatic increase in the supply of land available on Oahu for diversified agriculture is scheduled to occur. Approximately 10,500 acres will be released from sugar production over the 2 years from 1993 to 1995. However, over the next 20 years, as many as 3,500 acres of the OSCo lands may be urbanized, including the subject lands as well as lands to the west of Kapolei, to the south of Ewa Villages, and to the north of Royal Kunia up to the high-voltage power lines which cross Central Oahu.

This will leave approximately 7,000 acres available for agriculture. About 4,800 acres in Kunia and central Ewa are among the best agricultural lands in the State: agronomic conditions are excellent, water is inexpensive, and the location is excellent. The Navy lands in Ewa and on Waipio Peninsula, which total about 2,200 acres, share many of these same characteristics, although the soils are not as good.

In addition to the above, over 1,000 acres of fallowed land are in the foothills west of Kunia Road. OSCo stopped farming these fields in the early 1980s because of the high cost of pumping water to them.

Nearly all of the privately-owned Kunia and central Ewa lands are likely to remain available for agriculture far into the future because:

- landowners intend to keep this land in agriculture;
- development plans, for the most part, favor urbanizing lower-quality agricultural lands rather than the remaining Kunia and central Ewa lands;
- housing needs can be accommodated far into the future by the existing, planned and potential developments (assuming continued and new development approvals for the East Kapolei Project, Kapolei, West Loch, Ewa Gentry, Waiawa Gentry, Ewa Marina, Laulani/Fairways, Ko Olina, Makakilo, Makaiwa, Royal Kunia Phases I and II, Waikele, Mililani Mauka, etc.); and
- use of Waiahole Ditch water on crops in Kunia would enable valuable water systems to be maintained, and a portion of the water would continue to seep down and recharge the groundwater supply.

#### *Potential Release of Additional Land for Diversified Agriculture*

Waialua Sugar Co., Inc. (WSCo), which has been unprofitable for a number of years, has also announced that it may close. Such a closure would release additional land for diversified agriculture; in 1991, WSCo farmed slightly more than 12,000 acres.<sup>[12]</sup>

#### **Outlook for Diversified Agriculture**

Based on the above assessment, ample prime agricultural land will be available to easily accommodate the Statewide and Oahu requirements of diversified agriculture. This conclusion derives from the following: (1) a vast amount of prime agricultural land and water is available, having been freed from sugar and pineapple production in recent years; (2) additional sugarcane acreage and water will be freed within the next few years; (3) some, if not most, of the sugar companies are willing to make their lands available for profitable replacement crops to the extent that such crops exist; and, in contrast, (4) land requirements for diversified agriculture are surprisingly modest.

### Impact of the East Kapolei Project on the Growth of Diversified Agriculture

As the discussion above indicates, the limiting factor to the growth of diversified agriculture will *not* be the *land supply*, but rather the *size of the market* for those crops that can be grown profitably in Hawaii. The proposed East Kapolei Project involves far too little land to affect this conclusion, and will therefore not affect adversely the growth of diversified agriculture, Statewide or on Oahu.

### CONSISTENCY WITH STATE AND COUNTY PLANS

The *Hawaii State Constitution*, the *Hawaii State Plan*, the *State Agriculture Functional Plan*, and the *General Plan of the City and County of Honolulu* call for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture (see Table 2). To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to *plantation agriculture*, development of the Project will have no impact on the sugar industry since sugar operations in the area are closing for reasons unrelated to the Project. However, the Project and the underlying Ewa/Poamoho land exchange will indirectly benefit the pineapple industry. Because the original project at Poamoho will not proceed and the Poamoho lands have been transferred to the State, Del Monte will be able to continue to grow pineapple on these excellent fields, thereby avoiding the cost and disruption of relocating a major portion of its farm operation from Poamoho to Kunia.

With regard to *diversified agriculture*, there will be a temporary benefit in that the 500 acres in Phase I will be made available for diversified crops until the land is needed for development. Over the longer term, development of the Project will not limit the growth of diversified agriculture since far more agricultural land has been released from plantation agriculture than has been absorbed by other activities; growth of diversified agriculture will be limited by the size of the market, not the land supply.

In view of these findings, the Project will not conflict with the major thrust of the diversified-agriculture portion of State and County Plans.

The Project is consistent with population-growth and housing policies which call for "non-essential agricultural lands" to be made available for "low- and moderate-income and gap group housing" and "appropriate urban uses."



Regarding policies "...to preserve and protect agricultural lands," discussions in the Agriculture portion of the *State Functional Plan* recognize that redesignation of lands from Agriculture to Urban should be allowed "... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ..." agriculture; that is, when an "overriding public interest exists."<sup>(15)</sup> The enormous contraction in plantation agriculture—resulting in the supply of agricultural land, water and labor far exceeding projected demand—constitutes a major change in economic and social conditions. Furthermore, the proposed development of homes will provide significant social benefits.

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**Table 2.—SELECTED STATE AND COUNTY OBJECTIVES,  
POLICIES, AND GUIDELINES RELATED  
TO AGRICULTURAL LANDS**

**HAWAII STATE CONSTITUTION (Article XI, Section 3):**

...to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands...

**HAWAII STATE PLAN (Chapter 226, Hawaii Revised Statutes, as amended):<sup>[16,17]</sup>**

**Section 226-7 Objectives and policies for the economy--agriculture.**

- (a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:
  - (1) Viability in Hawaii's sugar and pineapple industries.
  - (2) Growth and development of diversified agriculture throughout the State.
  - (3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.
- (b) To achieve the agricultural objectives, it shall be the policy of the State to:
  - (2) Encourage agriculture by making best use of natural resources.
  - (10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.
  - (16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.

Table 2.—SELECTED STATE AND COUNTY OBJECTIVES,  
POLICIES, AND GUIDELINES RELATED  
TO AGRICULTURAL LANDS  
(continued)

**Section 226-103 Economic priority guidelines.**

- (c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:
  - (1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.
- (d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:
  - (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.
  - (10) Support the continuation of land currently in use for diversified agriculture.

**Section 226-104 Population growth and land resources priority guidelines.**

- (b) Priority guidelines for regional growth distribution and land resource utilization:
  - (2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

**Section 226-106 Affordable Housing**

Priority guidelines for the provision of affordable housing:

- (1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.

Table 2.—SELECTED STATE AND COUNTY OBJECTIVES,  
POLICIES, AND GUIDELINES RELATED  
TO AGRICULTURAL LANDS  
(continued)

**AGRICULTURE STATE FUNCTIONAL PLAN (1991)<sup>[15]</sup>**  
(Functional plans are guidelines for implementing the State Plan. They are approved by the Governor, but not adopted by the State Legislature.)

**Objective H:** Achievement of Productive Agricultural Use of Lands Most Suitable and Needed for Agriculture.

**Policy H(2):** Conserve and protect important agricultural lands in accordance with the Hawaii State Constitution.

**Action H(2)(a):** Propose enactment of standards and criteria to identify, conserve, and protect important agricultural lands and lands in agricultural use.

**Action H(2)(c):** Administer land use district boundary amendments, permitted land uses, infrastructure standards, and other planning and regulatory functions on important agricultural lands and lands in agricultural use, so as to ensure the availability of agriculturally suitable lands and promote diversified agriculture.

**CITY AND COUNTY OF HONOLULU  
GENERAL PLAN, Objectives and Policies (Resolution No. 87-211)<sup>[18]</sup>**

**Economic Activity**

**Objective C.** To maintain the viability of agriculture on Oahu.

**Policy 4.** Provide sufficient agricultural land in Ewa, Central Oahu, and the North Shore to encourage the continuation of sugar and pineapple as viable industries.

**Policy 5.** Maintain agricultural land along the Windward, North Shore, and Waianae coasts for truck farming, flower growing, aquaculture, livestock production, and other types of diversified agriculture.

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**EAST KAPOLEI PROJECT:**  
*Impact on Agriculture*

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**PREPARED FOR:**  
**Schuler Homes, Inc.**

**PREPARED BY:**  
**Decision Analysts Hawaii, Inc.**

**December 1995**

## CONTENTS

	<u>Page</u>
<b>TABLES</b> .....	iii
<b>FIGURES</b> .....	iii
<b>EXECUTIVE SUMMARY</b> .....	iv
<b>INTRODUCTION</b> .....	1
<b>AGRONOMIC CONDITIONS</b> .....	1
Soil Types.....	1
Soil Ratings.....	2
Soil Uses.....	6
Soil Characteristics.....	6
Elevation and Terrain.....	6
Climatic Conditions.....	6
Irrigation Water.....	7
Improvements.....	7
Locational Advantages.....	7
Summary.....	7
<b>AGRICULTURAL HISTORY</b> .....	7
<b>IMPACT ON EXISTING AND NEARBY AGRICULTURAL OPERATIONS</b> .....	7
<b>IMPACT ON THE AGRICULTURAL-LAND RESOURCE</b> .....	8
<b>IMPACT ON THE GROWTH OF DIVERSIFIED AGRICULTURE</b> .....	8
Potential Crops.....	8
Land Requirements for Diversified Agriculture.....	9
Supply of Land for Diversified Agriculture—Statewide.....	10
Supply of Land for Diversified Agriculture—Oahu.....	11
Outlook for Diversified Agriculture.....	12
Impact of the East Kapolei Project on the Growth of Diversified Agriculture... ..	12
<b>CONSISTENCY WITH STATE AND COUNTY PLANS</b> .....	12
<b>REFERENCES</b> .....	14



## TABLES

<u>Table</u>	<u>Page</u>
1. East Kapolei Project: Soil Types, Acreages, Agricultural Uses, and Soil Ratings.....	3
2. Selected State and County Objectives, Policies, and Guidelines Related to Agricultural Lands.....	14

## FIGURE

<u>Figure</u>	<u>Page</u>
1. East Kapolei Project: Soil Ratings.....	4

## EXECUTIVE SUMMARY

The East Kapolei Project (the "Project") is a proposed 794-acre residential community that will be developed in the central portion of the Ewa Plain by Schuler Homes, Inc. Summarized below are the impacts on agriculture that will result from developing the Project.

### AGRICULTURAL CONDITIONS

Nearly all of the Project area would be good for cultivating crops inasmuch as the area offers favorable agronomic conditions and is in a desirable location.

### IMPACT ON EXISTING AND NEARBY AGRICULTURAL OPERATIONS

The Project would have no impact on existing or nearby agricultural operations because the fields on the property, as well as the surrounding fields, are fallow.

### IMPACT ON THE AGRICULTURAL-LAND RESOURCE

The Project may precipitate the development of approximately 63 additional acres of land which separates the two sections of the Project. Eventually this land, which fronts Farrington Highway on the north side, would be suitable for commercial development. The affected acreage has favorable conditions for cultivating crops.

### IMPACT ON THE GROWTH OF DIVERSIFIED AGRICULTURE

Ample prime agricultural land will be available to easily accommodate the projected growth of diversified agriculture Statewide and on Oahu. This conclusion derives from the following: (1) a vast amount of prime agricultural land and water currently is available, having been freed from sugar and pineapple production in

recent years; (2) additional sugarcane acreage and water will be freed in coming years; (3) some of the sugar companies, if not most of them, are willing to make their lands available for profitable replacement crops to the extent that such crops exist; and, in contrast, (4) projected land requirements for diversified agriculture are surprisingly modest.

As the above indicates, the limiting factor to the growth of diversified agriculture will *not* be the *land supply*, but rather the *size of the market* for those crops that can be grown profitably in Hawaii. The proposed East Kapolei Project involves far too little land to affect this conclusion, and will therefore not affect adversely the growth of diversified agriculture, Statewide or on Oahu.

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# EAST KAPOLEI PROJECT: Impact on Agriculture

## INTRODUCTION

The East Kapolei Project (referred to as "the Project" in this report) is a 794-acre residential community proposed for development by Schuler Homes, Inc. It will be located in the middle of the Ewa Plain, south of the H-1 Freeway, west of Fort Weaver Road, north of Ewa Villages, and east of the Villages of Kapolei. The Project contains two areas which are separated by Farrington Highway and a strip of land fronting the highway on the north side. Also, a drainage basin for the project lies below Renton Road on the East side of Fort Weaver Road.

This report addresses the impacts on agriculture that will result from developing the Project. The analysis covers the 779-acre portion (referred to as "the Project area") which will contain the planned community and the nearby drainage basin. The remaining 15 acres which are not included in this analysis involve land for a water tank that will be north of the Project, an easement for a water pipe to the Project, an easement for a drainage pipe, and access roads to the Project.

## AGRICULTURAL CONDITIONS

### Soil Types<sup>[1]</sup>

The land within the Project area consists of nine soil types:

EaB	Ewa silty clay loam, 3 to 6% slopes;
EmA	Ewa silty clay loam, 0 to 2% slopes;
HxA	Honouliuli clay, 0 to 2% slopes;
HxB	Honouliuli clay, 2 to 6% slopes;
KyA	Kunia silty clay, 0 to 3% slopes;
MnC	Mamala stony silty clay loam, 0 to 12% slopes;

WzA	Waipahu silty clay, 0 to 2% slopes;
WzB	Waipahu silty clay, 2 to 6% slopes; an
WzC	Waipahu silty clay, 6 to 12% slopes.

For each soil type, Table 1 shows the approximate acreage, the possible agricultural uses, and two soil ratings (explained below). The predominate soil types are HxA, KyA and WzA which, collectively, cover 642 acres, or 82% of the Project area.

### Soil Ratings

The soils within the Project area have been rated in terms of four classification systems commonly used in Hawaii: (1) Land Capability Grouping, (2) Agricultural Lands of Importance to the State of Hawaii, (3) Overall Productivity Rating, and (4) Proposed Land Evaluation and Site Assessment. These classification systems are discussed below and summarized in Figure 1.

(1) *Land Capability Grouping by the United States Department of Agriculture Soil Conservation Service (SCS).*<sup>[2]</sup>

This classification system rates soils according to eight levels, ranging from the highest classification level; I, to the lowest level, VIII. Assuming irrigation, the SCS Rating for each soil type is shown in Table 1.

For each classification, the acreage, percentage of the Project area, and limitations are as follows:

**Class I:** Class I soils amount to about 642 acres, or about 82% of the Project area. Class I soils have few limitations that restrict their use.

**Class IIe:** Class IIe soils amount to about 120 acres, or about 15% of the Project area. Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. The subclassification "e" indicates that the limitation is due to the risk of erosion.

**Class IIs:** Class IIs soils amount to about 5 acres, or about 0.6% of the Project area. The subclassification "s" indicates that the limitation is due to stoniness, unfavorable texture, shallowness, or low water-holding capacity.

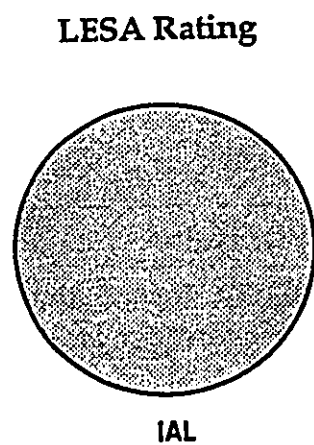
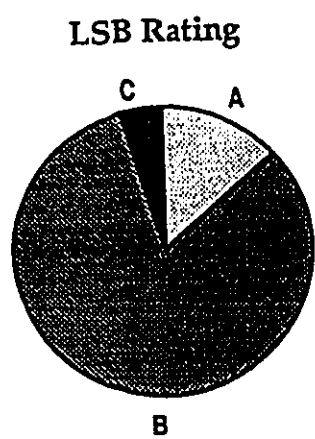
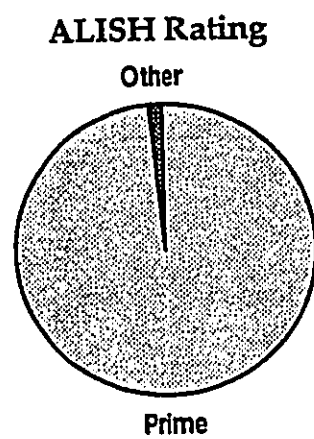
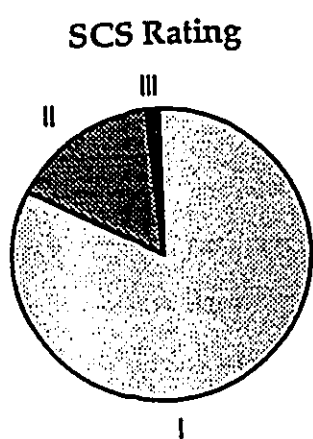
Table 1.— EAST KAPOLEI PROJECT: SOIL TYPES, ACREAGES,  
AGRICULTURAL USES, AND SOIL RATINGS

Soil Type	Acres	Agricultural Uses	SCS Rating <sup>1</sup>	LESA Rating
EaB	36	Sugarcane, truck crops, pasture	IIe	85
EmA	5	Sugarcane, truck crops, pasture	IIs	74
HxA	251	Sugarcane, truck crops, pasture	I	87
HxB	1	Sugarcane, truck crops, pasture	IIe	85
KyA	253	Sugarcane, pineapple <sup>2</sup>	I	95
MnC	1	Sugarcane, truck crops, pasture	III <sub>s</sub>	66
WzA	138	Sugarcane	I	92
WzB	84	Sugarcane	IIe	90
WzC	10	Sugarcane	IIIe	74
TOTAL	779			

1. Assuming irrigation.

2. As discussed in the text, the Project is at too low of an elevation and temperatures are too warm for pineapple production.

Figure 1.— EAST KAPOLEI PROJECT: SOIL RATINGS





Class IIIe: Class IIIe soils amount to about 10 acres, or about 1% of the Project area. Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both. The subclassification "e" indicates that the soils are subject to severe erosion if they are cultivated and not protected.

Class IIIs: Class IIIs soils amount to about 1 acre, or about 0.1% of the Project area. The subclassification "s" indicates that the limitation is due to stoniness, unfavorable texture, shallowness, or low water-holding capacity.

- (2) *Agricultural Lands of Importance in the State of Hawaii (ALISH), by the SCS, University of Hawaii (UH) College of Tropical Agriculture and Human Resources, and the State of Hawaii, Department of Agriculture.*<sup>[3]</sup>

This system classifies lands into three categories: (a) "prime" agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment; (b) "unique" agricultural land which is non-prime agricultural land that is currently used for the production of specific high-value crops; and (c) "other" agricultural land which is non-prime and non-unique agricultural land that is of importance to the production of crops.

Approximately 768 acres (99%) of the Project area are rated "prime," while 11 acres (1%) are rated "other."

- (3) *Overall Productivity Rating, by the UH Land Study Bureau (LSB).*<sup>[4]</sup>

This classification rates soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest.

Approximately 109 acres (14%) of the Project area are rated "A," 635 acres (81%) are rated "B," and 35 acres (5%) are rated "C."

- (4) *Proposed Land Evaluation and Site Assessment (LESA) System, by the State of Hawaii Land Evaluation and Site Assessment Commission.*<sup>[5]</sup>

Based on soil quality, locational attributes, improvements, nearby activities, and land-use plans, this proposed classification system would designate a sufficient amount of the better agricultural lands in order that pro-

jected agricultural goals can be met. If the LESA classification approach were applied, the designated lands would be termed "important agricultural lands" (IAL), and would include all lands having a rating of 66 or above, out of a possible total of 100. The LESA rating for each soil type is shown in Table 1.

Based on the proposed ratings, all of the Project area would be designated as IAL.

Taking all four of the above soil-rating systems into consideration, all of the property is comprised of good soils.

#### Soil Uses

Suitable agricultural activities associated with the affected soil types include sugarcane, pineapple, truck crops and pasture (see Table 1). In the case of pineapple, however, the fields are at too low of an elevation and temperatures are too warm for producing this crop; if grown at this location, the fruit would burn.

#### Soil Characteristics

Most of the Project area has soils which have moderate-to-good machine tillability, are not stony, are more than 30 inches deep, are level or gently sloping, and are either moderately well-drained or well-drained.<sup>[4]</sup>

#### Elevation and Terrain

Most of the terrain is nearly level or moderately sloped, and ranges in elevation from 30 feet to 230 feet altitude.<sup>[4]</sup> However, about 10 acres have slopes between 6 and 12%.

#### Climatic Conditions

The Project area is one of the sunniest areas on Oahu, having an average daily insolation of about 500 calories per square centimeter.<sup>[6]</sup> Rainfall averages just slightly over 20 inches per year.<sup>[7]</sup>

The average low temperature ranges from about 60° Fahrenheit in the winter to about 70° in the summer, while the average high temperature ranges from just under 80° in the winter to just under 90° in the summer.<sup>[7]</sup>

### **Irrigation Water**

The area has been irrigated with groundwater. Pumping costs are relatively low given the short lift.

### **Improvements**

The property is serviced with high-quality dirt roads, a drip irrigation system, and electrical power to drive large-volume pumps.

### **Locational Advantages**

The subject fields are a short trucking distance to:

- the large Honolulu consumer market,
- Honolulu supply markets,
- the airport for air-freighting produce to overseas markets,
- Honolulu Harbor and Barbers Point Harbor for surface shipping of produce to overseas markets, and
- research support from the Hawaiian Sugar Planters' Association and the University of Hawaii.

### **Summary**

Nearly all of the Project area would be good for cultivating crops inasmuch as the area offers favorable agronomic conditions and is in a desirable location.

### **AGRICULTURAL HISTORY**

For the better part of a century until the 1995 closure of Oahu Sugar Co., Ltd., the Project area was cultivated in sugarcane.

### **IMPACT ON EXISTING AND NEARBY AGRICULTURAL OPERATIONS**

The Project would have no impact on existing or nearby agricultural operations because the fields on the property, as well as the surrounding fields, are fallow.

### IMPACT ON THE AGRICULTURAL-LAND RESOURCE

The Project may precipitate the development of approximately 63 additional acres of agricultural land which separates the two sections of the Project. Eventually this land, which fronts Farrington Highway on the north side, would be suitable for commercial development. The affected acreage has high-quality soils, nearly level terrain, favorable climatic conditions for crops, and a good location for serving the Honolulu market.

Thus, the Project may result in the eventual loss of a total of about 842 acres of good agricultural land: 779 acres for the Project area, plus the additional 63 acres which may be developed for commercial use.

### IMPACT ON THE GROWTH OF DIVERSIFIED AGRICULTURE

The development of the Project constitutes a commitment of approximately 842 acres of good agricultural land to a non-agricultural use. This land commitment raises the question of whether the Project area will affect adversely the growth of diversified agriculture—either immediately or over the long term. Before addressing this question, *potential crops, land requirements, and the availability of land* for diversified agriculture are discussed below.

#### Potential Crops

Crops grown for the *Hawaii market* which are climatically suited to low-elevation areas in Hawaii and which have been profitable for some Hawaii farmers, include: bananas, green beans, bittermelon, mustard cabbage, pak choy cabbage, sweet corn, cucumbers, daikon, dasheen, long eggplant, round eggplant, Manoa lettuce, lotus root, luau leaf, lychee, mango, dry onions, green onions, parsley, Chinese peas, green peppers, pomelos, pumpkins, hechima squash, hyotan squash, Italian squash, sweet potatoes, tomatoes, watercress, watermelons, feed corn for green chop, flowers, potted foliage, and plants for landscaping.

Potential low-elevation crops grown for the *export market* include: tropical fruits (if no fruit-fly infestation exists), a few vegetables grown for the winter market, flowers, potted foliage, seed crops, ginger root, and a few other crops.

A great many additional crops can be grown in Hawaii's year-round subtropical climate, but few can be grown profitably on a commercial scale. The primary reasons for this unprofitability are:

- Hawaii markets are easily glutted due to its comparatively small population (if just a few farmers grow the same crop, an oversupply to the market causes prices to fall, resulting in all of these farmers losing money).
- Consumption levels are too small to support large, efficient farms (i.e., Hawaii's population is too small to support farms that require economies of scale).
- Hawaii farmers must compete against large mainland farms that can deliver produce to Hawaii more cheaply than it costs to produce the crop locally because these mainland farms (1) incur lower costs for land, labor, supplies, fertilizer, equipment, etc., and (2) produce high volumes that allow economies of scale.
- Hawaii's subtropical climate is not well-suited to the commercial production of certain crops which grow better in the temperate mainland climates.
- For certain crops, special hybrids have not been developed that are adapted to Hawaii's subtropical climate.
- Crop pests are more prevalent and more expensive to control in Hawaii than they are on the mainland, where the cold winters kill many pests.
- Fruit-fly infestations prevent exports of many crops.
- Hawaii suffers from high farm-labor costs, largely because agriculture must compete for its labor against the visitor industry and related industries.
- Hawaii's soils generally have low nutrient levels and therefore require high expenditures for fertilizer.
- High overseas transportation costs increase the cost of importing agricultural supplies and equipment and, for export crops, shipping produce to market.

#### Land Requirements for Diversified Agriculture

Based on projections made in 1991 by the State Department of Agriculture (DOA), additional Statewide land requirements to accommodate the growth of diversified agriculture to the year 2010 will amount to approximately 41,000 acres.<sup>[8]</sup> The projections

suggest that about 83% of this new acreage will be required for macadamia nut and coffee orchards, while about 7,000 acres will be required to accommodate the growth of other diversified-agriculture crops.

The projections indicate that most of this growth in diversified agriculture will occur on the Neighbor Islands, while Oahu will require only about 1,000 acres, of which about half would be for bananas.

Although it is not addressed in the DOA projections, the relocation of farm operations to Oahu from Molokai and other Neighbor Islands may add to the demand for agricultural land on Oahu by as much as 2,000 acres.

#### Supply of Land for Diversified Agriculture—Statewide

With regard to the Statewide supply of agricultural land, an enormous and growing supply of this land is available for diversified agriculture. Since 1968, about 215,000 acres of Hawaii's higher-quality agricultural land have been or will soon be released from sugar and pineapple production, including land that is being released from sugar plantations which are closing.<sup>(9-11)</sup>

The amount of land released from sugar production will probably increase given that additional sugar plantations are struggling.

In addition, a portion of the existing sugarcane land is on hold awaiting the discovery of profitable replacement activities. This land also forms part of the supply of agricultural land available for profitable diversified-agriculture crops. Moreover, the greater the success of diversified agriculture, the greater the amount of land that will be released for diversified agriculture. In the past, operating plantations released some of their lands for such crops as macadamia nuts, coffee, citrus, seed corn, truck crops, and nursery products.

Some of the land that has been—or soon will be—freed from plantation agriculture has been converted or is scheduled to be converted to urban, diversified-agriculture, and other uses. After making allowances for these conversions, uncommitted acreage which remains available for diversified agriculture amounts to about 177,000 acres.<sup>(12)</sup> Much of this land is fallow, used for grazing, or is in some other low-value land-holding operation. Also, this acreage figure is expected to increase as more land is released from sugar production.

Many of the lands freed, to be freed, or which can be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well-suited for a variety of crops. Also, water is available for most of these lands—particularly those which have been freed from sugar production.

Additional lands which have been made available for diversified agriculture are in government-sponsored agricultural parks throughout the State. Also, lava lands in Puna are particularly well-suited for growing papaya.

#### Supply of Land for Diversified Agriculture—Oahu

Because of the closure of sugar operations on Oahu, a dramatic increase in the supply of land available for diversified agriculture has occurred.

##### *Lands Released by Oahu Sugar Co., Ltd.*

Some of the best lands in the State for diversified agriculture are the 10,500 acres recently released by Oahu Sugar Co., Ltd.<sup>[10]</sup> Most of these fields have good soils, the areas is sunny, and irrigation costs are low.<sup>[13]</sup> Furthermore, the lands are a short trucking distance to the large Honolulu market and, for export markets, to the Honolulu International Airport and Honolulu Harbor. However, over the next 20 years, as many as 3,500 acres of the OSCo lands may be urbanized.<sup>[12]</sup>

##### *Lands Released by Waialua Sugar Co., Inc.*

Most of the 12,000 acres being released by the closure of Waialua Sugar Co., Inc. are also of high quality.<sup>[10]</sup> However, these lands are a longer trucking distance to the Honolulu markets.

##### *Other Lands Available for Diversified Agriculture*

Agricultural lands have yet to be fully utilized in Waimanalo, Waiahole Valley, Waikane Valley, Kahuku, Waianae and at the three existing State agricultural parks on Oahu.

In addition, the State plans to develop three more agricultural parks on Oahu: Kunia Ag Park for truck crops (150 acres, 20 lots of 5 to 15 acres); Waiahole Ag Park for diversified crops (379 acres, 45 lots); and Kahuku Ag Park for livestock (750 to 900 acres).

### Outlook for the Diversified Agriculture Land Market

Based on the above assessment, ample prime agricultural land will be available to easily accommodate the projected growth of diversified agriculture Statewide and on Oahu. This conclusion derives from the following: (1) a vast amount of prime agricultural land and water currently is available, having been freed from sugar and pineapple production in recent years; (2) additional sugarcane acreage and water will be freed in coming years; (3) some of the sugar companies, if not most of them, are willing to make their lands available for profitable replacement crops to the extent that such crops exist; and, in contrast, (4) projected land requirements for diversified agriculture are surprisingly modest.

### Impact of the East Kapolei Project on the Growth of Diversified Agriculture

As the discussion above indicates, the limiting factor to the growth of diversified agriculture will *not* be the *land supply*, but rather the *size of the market* for those crops that can be grown profitably in Hawaii. The proposed East Kapolei Project involves far too little land to affect this conclusion, and will therefore not affect adversely the growth of diversified agriculture, Statewide or on Oahu.

### CONSISTENCY WITH STATE AND COUNTY PLANS

The *Hawaii State Constitution*, the *Hawaii State Plan*, the *State Agriculture Functional Plan*, and the *General Plan of the City and County of Honolulu* call for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture (see Table 2). To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to *plantation agriculture*, development of the Project will have no impact on the sugar industry since sugar operations in the area were closed for reasons that are unrelated to the Project.

With regard to *diversified agriculture*, development of the Project will not limit the growth of diversified agriculture since far more agricultural land has been released from plantation agriculture than has been absorbed by other activities; growth of diversified agriculture will be limited by the size of the market, not the land supply.



In view of these findings, the Project will not conflict with the major thrust of the diversified-agriculture portion of State and County Plans.

The Project is consistent with population-growth and housing policies which call for "non-essential agricultural lands" to be made available for "low- and moderate-income and gap group housing" and "appropriate urban uses."

Regarding policies "...to preserve and protect agricultural lands," discussions in the Agriculture portion of the *State Functional Plan* recognize that redesignation of lands from Agriculture to Urban should be allowed "... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ..." agriculture; that is, when an "overriding public interest exists."<sup>(14)</sup> The enormous contraction in plantation agriculture—resulting in the supply of agricultural land, water and labor far exceeding projected demand—constitutes a major change in economic and social conditions. Furthermore, the proposed development of homes will provide significant social benefits.

**Table 2.—SELECTED STATE AND COUNTY OBJECTIVES,  
POLICIES, AND GUIDELINES RELATED  
TO AGRICULTURAL LANDS**

**HAWAII STATE CONSTITUTION (Article XI, Section 3):**

...to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands...

**HAWAII STATE PLAN (Chapter 226, Hawaii Revised Statutes, as amended):<sup>[15,16]</sup>**

**Section 226-7 Objectives and policies for the economy--agriculture.**

- (a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:
  - (1) Viability in Hawaii's sugar and pineapple industries.
  - (2) Growth and development of diversified agriculture throughout the State.
  - (3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.
- (b) To achieve the agricultural objectives, it shall be the policy of the State to:
  - (2) Encourage agriculture by making best use of natural resources.
  - (10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.
  - (16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.

**Table 2.—SELECTED STATE AND COUNTY OBJECTIVES,  
POLICIES, AND GUIDELINES RELATED  
TO AGRICULTURAL LANDS  
(continued)**

**Section 226-103 Economic priority guidelines.**

- (c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:
  - (1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.
- (d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:
  - (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.
  - (10) Support the continuation of land currently in use for diversified agriculture.

**Section 226-104 Population growth and land resources priority guidelines.**

- (b) Priority guidelines for regional growth distribution and land resource utilization:
  - (2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

**Section 226-106 Affordable Housing**

Priority guidelines for the provision of affordable housing:

- (1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.

Table 2.—SELECTED STATE AND COUNTY OBJECTIVES,  
POLICIES, AND GUIDELINES RELATED  
TO AGRICULTURAL LANDS  
(continued)

**AGRICULTURE STATE FUNCTIONAL PLAN (1991)<sup>[14]</sup>**

(Functional plans are guidelines for implementing the State Plan. They are approved by the Governor, but not adopted by the State Legislature.)

Objective H: Achievement of Productive Agricultural Use of Lands Most Suitable and Needed for Agriculture.

Policy H(2): Conserve and protect important agricultural lands in accordance with the Hawaii State Constitution.

Action H(2)(a): Propose enactment of standards and criteria to identify, conserve, and protect important agricultural lands and lands in agricultural use.

Action H(2)(c): Administer land use district boundary amendments, permitted land uses, infrastructure standards, and other planning and regulatory functions on important agricultural lands and lands in agricultural use, so as to ensure the availability of agriculturally suitable lands and promote diversified agriculture.

**CITY AND COUNTY OF HONOLULU**

**GENERAL PLAN, Objectives and Policies (Resolution No. 87-211)<sup>[17]</sup>**

**Economic Activity**

Objective C. To maintain the viability of agriculture on Oahu.

Policy 4. Provide sufficient agricultural land in Ewa, Central Oahu, and the North Shore to encourage the continuation of sugar and pineapple as viable industries.

Policy 5. Maintain agricultural land along the Windward, North Shore, and Waianae coasts for truck farming, flower growing, aquaculture, livestock production, and other types of diversified agriculture.

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OAHU BIOLOGICAL RESOURCES SURVEY REPORT  
JULY 1994  
ADDENDUM, 1995

EVANGELINE FUNK, PH.D.

BIOLOGICAL RESOURCES SURVEY REPORT FOR SCHULER HOMES  
EAST KAPOLEI PROJECT, EAST KAPOLEI, OAHU  
HAWAII

FOR  
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1994

## TABLE OF CONTENTS

	page
INTRODUCTION.....	1
METHODS.....	1
BOTANICAL HISTORY.....	1
ENDANGERED SPECIES.....	2
RESULTS.....	2
VEGETATION TYPES.....	2
A. RUDERAL OR WAYSIDE.....	2
B. KOA HAOLE/GRASS.....	3
C. SUGAR CANE FIELDS.....	3
CONCLUSIONS.....	4
LITERATURE CITED.....	5
SPECIES LIST.....	6
FAUNA SURVEY REPORT.....	11
INTRODUCTION AND METHODS.....	11
RESULTS.....	11
SPECIES LIST.....	12
BIBLIOGRAPHY.....	15



## BOTANICAL SURVEY REPORT FOR SCHULER HOMES EAST KAPOLEI PROJECT SITE

### INTRODUCTION

A botanical survey of the proposed Schuler Homes East Kapolei Project Site, East Kapolei, Oahu, Hawaii was undertaken in July, 1994. The purpose for the survey of this 1000 acre site was to collect data for the preparation of a species list; to describe the vegetation of the site; and to ascertain if any proposed or listed, threatened or endangered plants are growing in the area (USFWS 1993).

### METHODS

The walk-through method was used during the data collection phase of the survey. All parts of the site were examined except the interior portions of the producing sugar cane and corn fields.

### BOTANICAL HISTORY

In 1971 the first environmental impact statement for a site in the Ewa District was submitted to the Planning Commission by the Hawaii Housing Authority (HHA 1971), for a project known as Ewalani Village. It appears that, at that time, information on either the flora or fauna of the study site was not required because none was included. It wasn't until 1976 that an environmental impact statement for a project in the Ewa area included the reports and observations of environmental specialists who had been engaged especially to inventory the natural resources of project sites. The pioneer work was commissioned by the U. S. Army Corps of Engineers and carried out by Derral Herbst (Herbst 1976). Dr. Herbst's report alerted the community to the presence of endangered plant species in the area. This pioneer work is still consulted by naturalists interested in the flora of the Ewa Plains.

Since 1976, more than twenty-eight environmental impact statements for projects in the area have been prepared and are on file at the Environmental Center of the University of Hawaii. In spite of this large body of biological information, nothing has been published on either the botany or the avifauna of the area considered herein.

#### ENDANGERED SPECIES

The endangered species found by Herbst in 1976 were *Achyranthes splendens* var. *rotundata* HBD and *Euphorbia skottsbergii* var. *kalaekoana* Sherff (USFWS 1989). These are listed endangered species. They have been reported from Barber's Point Naval Air Station and near the Deep Draft Harbor (Herbst 1976, Funk 1984). During this survey no proposed or listed, threatened or endangered species were found on the proposed Schuler Homes East Kapolei Project Site (USFWS 1993).

#### RESULTS

Three vegetation types can be found in the study area. They are Ruderal or Wayside Vegetation, Koa Haole/Grass, and Agricultural Fields. None of these vegetation types contained endemic (native only to Hawaii), or indigenous (native to Hawaii and other places) plant species in great numbers. In fact, the only indigenous taxa found are 'Ilima (*Sida fallax* L.), Popolo (*Solanum americanum* Mill.) and 'Akulikuli (*Sesuvium portulacastrum* (L.) L.). These plants appear most commonly in the Ruderal or Wayside Vegetation along the cane haul roads and irrigation ditches.

A. Ruderal or Wayside Vegetation Community. This vegetation type is found along all the major and minor roadways and along the flumes and irrigation ditches of the site. It is composed almost entirely of introduced forbs (herbs) and grasses, except for the species mentioned above. The

plants which make up the Ruderal or Wayside Vegetation Community are almost all annuals, that is, they come up, flower, and produce seeds in a single, short growing season. The plants of this vegetation community are important because considerable time and money is spent by sugar growers in an effort to control them. In many parts of the study site the Ruderal or Wayside Community had been treated with herbicide and dead skeletons of the plants remain.

B. Koa Haole/Grass. The second vegetation type, Koa Haole/Guinea Grass is found along the western boundary of the study site where it abuts Kaloi Gulch. The berms on either side of the gulch are two to three meters above the level of the cane fields and the gulch varies from three to four meters across. Both berms are lined with small koa haole trees (*Leucaena leucocephala* (Lam.) deWit) which average three to five meters in height. The understory is a dense growth of guinea grass. In the few openings in the guinea grass, large castor bean (*Ricinus communis* L.) and cocklebur (*Xanthium saccharatum* Wallr.) bushes thrive. This vegetation type is noteworthy only because of the high number and variety of common bird species which inhabit the koa haole trees and feed on the grass seeds.

C. Sugar Cane Fields. The Sugar Cane fields are single species monocultures of *Saccharum officinarum* L. Some of the cane fields of the study site are in production and support a thriving crop. These areas are currently being watered. Other fields appear to support a volunteer crop of cane and still others are fallow. In one field near Kaloi Gulch a large, experimental crop of several varieties of sweet corn (*Zea maize* L.) is being cultivated.

At the edges of the cultivated fields, where water is available, the

grasses and weeds are thriving. Common among them are stargrass (*Chloris divaricata* R. Br.), goose grass (*Elusine indica* (L.) Gaertn., sprangletop (*Leptochloa uninervia* (K.Presl) Hitchc.), spiny amaranth (*Amaranthus spinosus* L.), balsam apple (*Momordica charantia* Crantz Urban), and ivory gourd (*Coccinia grandis* (V.) Voight).

In fallow fields and in those in which a volunteer crop has been allowed to grow up, weedy plants, the seeds of which are spread about by the bulbuls and by the wind are the most common. Balsam apple and ivory gourd vines produce fruits which are eaten by bulbuls and these plants are found in all parts of the site. The wind distributed African tulip tree (*Spathodea campanulata* Beauv.), is also thriving.

This land has been under cultivation for a long, long time and the native plant community has completely disappeared.

#### CONCLUSIONS

The flora of the proposed Schuler Homes East Kapolei Project site is composed almost entirely of introduced species. There are no endemic plant species in the area. The three indigenous plants, 'Ilima, Popolo, and 'Akulikuli found on the site are still very common in the coastal lowlands of most of the Hawaiian Islands. The remaining botanical resources of this site are introduced plants, most of which are considered to be weeds. Therefore, future development of the site will not have a significant impact on the flora of the area. Vegetation similar to that found on this site is common throughout the islands.

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## SPECIES LIST OF ALL PLANTS

### FOUND ON THE SCHULER HOMES EAST KAPOLEI PROJECT SITE

The plant families in the following species list have been alphabetically arranged within two groups, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of St. John (1973) and Wagner, Herbst and Sohmer (1990). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant introduced to The Hawaiian Islands since Cook or by the aborigines.
2. The scientific name.
3. The Hawaiian name and or the most widely used common name.
4. Abundance ratings are for this site only and they have the following

meanings:

Uncommon = a plant that was found less than five times.

Occasional = a plant that was found between five to ten times.

Common = a plant considered an important part of the vegetation

Locally abundant = plants found in large numbers over a limited area. For example the plants found in grassy patches.

This species list is the result of an extensive survey of this site during the hot, dry summer season (July 1994) and it reflects the vegetative composition of the flora during a single season. Minor changes in the vegetation will occur due to introductions and losses and a slightly different species list would result from a survey conducted during a different growing season.

CHECKLIST

Scientific Name	Common Name	Abundance
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MONOCOTYLEDONES

AGAVACEAE - Agave Family

* <i>Cordyline fruticosa</i> (L.) A. Chev.	Ti	Uncommon
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CYPERACEAE - Sedge Family

* <i>Cyperus rotundus</i> L.	Nut grass	Common
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POACEAE - Grass Family

* <i>Cenchrus ciliaris</i> L.	Buffel grass	Locally abundant
* <i>Cenchrus echinatus</i> L.	Sandbur grass	Locally abundant
* <i>Chloris barbata</i> Swartz	Swollen fingergrass	Locally abundant
* <i>Chloris divaricata</i> R. Br.	Occasional	Common
* <i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	Common
* <i>Digitaria adscendens</i> (HBK) Henr.	Henry's crabgrass	Occasional
* <i>Digitaria insularis</i> (L.) Mez	Sourgrass	Occasional
* <i>Eleusine indica</i> (L.) Gaertn.	Wiregrass	Common
* <i>Eragrostis cilianensis</i> (All.) Link	Stinkgrass	Occasional
* <i>Eragrostis tenella</i> (L.) Beauv. R. & S.	Japanese lovegrass	Locally abundant
* <i>Leptochloa uninervis</i> (K. Presl) Hitchc.		Uncommon
* <i>Panicum maximum</i> Jacq.	Guinea grass	Common
* <i>Rhynchelytrum repens</i> C.E. Hubb	Natal redtop	Common
* <i>Saccharum officinarum</i> L.	Ko or sugar cane	Common
* <i>Setaria gracilis</i> Kunth	Yellow Foxtail	Locally abundant
* <i>Setaria verticillata</i> (L.) P. Beauv	Bristly Foxtail	Locally abundant
* <i>Sorghum halpense</i> (L.) Pers.	Johnson grass	Occasional
* <i>Zea maize</i> L.	Sweet Corn	Locally abundant

DICOTYLEDONES

ACANTHACEAE - Acanthus Family

* <i>Asystasia gangetica</i> (L.) T. Anders	Chinese violet	Common
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AIZOACEAE - Fig-marigold Family

<i>Sesuvium portulacastrum</i> (L.) L.	'Akulikuli	Occasional
* <i>Trianthema portulacastrum</i> L.		Common

Scientific Name	Common Name	Abundance
<b>AMARANTHACEAE - Amaranth Family</b>		
* <i>Alternanthera pungens</i> Kunth	Khahi	Locally abundant
* <i>Amaranthus spinosus</i> L.	Spiny amaranth	Common
* <i>Amaranthus viridis</i> L.	Slender amaranth	Occasional
* <i>Gomphrena celosioides</i> Mart.	Globe amaranth	Uncommon
<b>ANACARDIACEAE - Mango Family</b>		
* <i>Mangifera indica</i> L.	Mango	Uncommon
* <i>Schinus terebinthifolius</i> Raddi	Christmas berry	Uncommon
<b>APIACEAE - Parsley Family</b>		
* <i>Daucus pusillus</i> Michx.	American carrot	Locally abundant
<b>ASTERACEAE - Sunflower Family</b>		
* <i>Bidens pilosa</i> L.	Spanish needle	Common
* <i>Calyptocarpus vialis</i> Less.		Occasional
* <i>Coryza canadensis</i> Cronq.	Canadian fleabane	Occasional
* <i>Echinachloa colona</i> (L.) Link	Jungle-rice	Locally abundant
* <i>Emilia sonchifolia</i> (L.) DC	Flora's paintbrush	Common
* <i>Emilia fosbergii</i> Nicolson	Pualele	Common
* <i>Lactuca scariola</i> L.	Wild lettuce	Common
* <i>Pluchea indica</i> (L.) Less.	Indian pluchea	Common
* <i>Pluchea symphytifolia</i> (L.) Cass.	Sourbush	Occasional
* <i>Sonchus oleraceus</i> L.	Pualele	Occasional
* <i>Synedrella nodiflora</i> (L.) Gaertn.	Synedrella	Locally abundant
* <i>Tridax procumbens</i> L.	Coat buttons	Locally abundant
* <i>Verbesina encelioides</i> Cav.	Golden crown-beard	Occasional
* <i>Vernonia cinerea</i> (L.) Less.	Little ironweed	Occasional
* <i>Xanthium saccharatum</i> Wallr.	Cocklebur	Uncommon
<b>BIGNONIACEAE - Bignonia Family</b>		
* <i>Spathodea campanulata</i> Beauv.	African tulip tree	Occasional
<b>BORAGINACEAE - Heliotrope Family</b>		
* <i>Heliotropium procumbens</i> Mill		Occasional
<b>CAPPARIS - Caper Bush Family</b>		
* <i>Cleome gynandra</i> L.	Wild spider flower	Locally abundant
<b>CHENOPODIACEAE - Goosefoot Family</b>		
* <i>Atriplex semibaccata</i> R. Br.	Australian saltbush	Occasional
* <i>Chenopodium ambrosioides</i> L.	Mexican tea	Occasional
* <i>Chenopodium murale</i> L.	Lambs quarters	Uncommon



Scientific Name	Common Name	Abundance
<b>CONVOLVULACEAE - Morningglory Family</b>		
* <i>Ipomoea obscura</i> (L.) Ker-Gawl		Occasional
* <i>Ipomoea triloba</i> L.	Little Bell	Occasional
* <i>Merremia aegyptia</i> Urban	Hairy merremia	Common
<b>CUCURBITACEAE - Cucumber Family</b>		
* <i>Coccinia grandis</i> (L.) Voight	Ivory gourd	Common
* <i>Cucumis dipsaceus</i> Ehranb. ex Spach	Hedgehog Gourd	Abundant
* <i>Momordica charantia</i> Crantz	Balsam apple	Common
<b>EUPHORBIACEAE - Spurge Family</b>		
* <i>Euphorbia cyathophora</i> Murr.	Mexican fire plant	Locally abundant
* <i>Chamaesyce glomerifera</i> L. Wheeler	Graceful spurge	Locally abundant
* <i>Chamaesyce hirta</i> L.	Hairy spurge	Common
* <i>Chamaesyce prostrata</i> (Ait) Millsp.	Prostrate spurge	Occasional
* <i>Ricinus communis</i> L.	Castor bean	Locally abundant
<b>FABACEAE - Bean Family</b>		
* <i>Chamaecrista nictitans</i> (L.) Moench	Japanese tea	Occasional
* <i>Crotalaria incana</i> L.	Fuzzy rattle-pod	Occasional
* <i>Crotalaria mucronata</i> L.	Smooth rattle-pod	Common
* <i>Desmanthus virgatus</i> Willd.	Virgate mimosa	Occasional
* <i>Indigofera spicata</i> Frosk.	Indigo	Occasional
* <i>Indigofera suffruticosa</i> Mill.	Indigo	Occasional
* <i>Leucaena leucocephala</i> Lam deWit	Koa-haole	Common
* <i>Macroptilium atropurpureum</i> (DC) Urb.		Locally abundant
* <i>Macroptilium coccineus</i> L.	Scarlet runner	Common
* <i>Pithecellobium dulce</i> Benth.	Madras thorn	Occasional
* <i>Prosopis pallida</i> HBK	Kiawe, algaroba	Occasional
* <i>Vigna sesquipedalis</i> Wight	Long beans	Uncommon
<b>LABIATAE - Mint Family</b>		
* <i>Leonotis nepetaefolia</i> Ait	Lion's-ear	Uncommon
<b>MALVACEAE - Hibiscus Family</b>		
* <i>Abutilon grandifolium</i> Sweet	Hairy abutilon	Uncommon
* <i>Malvastrum coromandelianum</i> Garcke	False marrow	Common
* <i>Sida fallax</i> Walp.	'Ilima	Common
* <i>Sida rhombifolia</i> L.	Cuba jute	Occasional
* <i>Sida spinosa</i> L.	Prickly sida	Occasional

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>
NYCTAGINACEAE - Four o'clock Family		
* <i>Boerhavia coccinea</i> Mill.		Common
PASSIFLORACEAE - Passion Flower Family		
* <i>Passiflora foetida</i> L.	Love-in-a-mist	Occasional
PORTULACACEAE - Portulaca Family		
* <i>Portulaca oleracea</i> L.	Pigweed	Common
SOLANACEAE - Tomato Family		
* <i>Datura stramonium</i> L.	Jimson weed	Occasional
* <i>Lycopersicon esculentum</i> Mill	Tomato	Locally abundant
* <i>Lycopersicon pimppinellifolium</i> (Jusl.) Mill	Currant tomato	Common
* <i>Nicandra physalodes</i> (L.) Gaertn.	Apple of Peru	Common
* <i>Nicotiana glauca</i> R.C. Graham	Tree tobacco	Occasional
<i>Solanum americanum</i> Mill.	Popolo	Occasional
STERCULIACEAE - Stink tree Family		
* <i>Waltheria indica</i> L.	Hi'aloa, uha-loa	Locally abundant
ZYGOPHYLLACEAE - Tribulus Family		
* <i>Tribulus terrestris</i> L.	Puncture vine	Common

FAUNA SURVEY REPORT FOR THE PROPOSED SCHULER HOMES  
EAST KAPOLEI PROJECT

Introduction and Methods

This report summarizes the results of a fauna survey of the 1000 acre proposed Schuler Homes East Kapolei Project Site which was conducted in July, 1994. Since 1971 more than twenty-eight environmental impact statements have been written for projects proposed for the Ewa area. All of these reports have contained faunal reports of one sort or another, yet virtually nothing has been published on either the birds or the mammals of the region. The standard references for birds of Hawaii (Munro 1944, Berger 1981, Hawaii Audubon Society 1984) do not specify the area in their distribution of species.

Two circular plot censuses and eight fixed station observation points (20 minutes at each station) were carried out during early and late daylight hours in order to take advantage of the higher activity levels of both birds and mammals during cooler parts of the day.

Results

Mammals - Only one species of mammal was found during the survey. That was a Mongoose (*Herpestes auro-punctatus*) seen at the junction of Kalo Gulch and Farrington Highway. The mongoose was introduced to Hawaii and is not considered to be endangered or threatened in any way.

Birds - Because the entire site has been extensively modified from its original state, it has almost no value as native bird habitat. However, it does support a variety of non-native species. The two most important bird observation areas in the study site were along the flumes and water ways and in the Koa haole/Grass vegetation type found along Kalo Gulch.

The flumes and ditches are favored because they provide a source of water

in this otherwise parched area. The Koa haole/grass vegetation type provides a rich source of food for seed eating birds. Two of the bird species reported here were only seen overflying the site, cattle egrets and pigeons.

#### SPECIES LIST

Fourteen species of birds were found on and around the study site. No threatened or endangered species were found. The annotated checklist follows the nomenclature of Pratt, Bruner and Berrett (1987).

##### Family Zosteropidae: White-eyes

###### *Zosterops japonicus*

White-eyes are one of the most widespread introduced bird species in Hawaii. Although their preferred habitats are wetter than the study area, they were found in the Bluffs vegetation in low numbers.

##### Family Passeridae: Old World Sparrows

###### *Passer domesticus* (House sparrow)

House sparrows are sometimes called feathered mice. These streaky brown and gray birds are a familiar commensal species and were found near the flumes and pump stations in the weedy scrub.

##### Family Estrildidae: Waxbills, Mannikins and Parrotfinches

###### *Estrilda astrild* (Common Waxbill)

The common waxbill is a small, red-billed finch with a prominent red streak from its bill to its eye. Waxbills have a long tail and brown rump. They feed on grass seeds. Several large coveys of waxbills were seen feeding on the grass heads.

###### *Lonchura malacca* (Chestnut Mannikin)

These are tiny, small, dark birds with large, light colored bills.

Chestnut mannikins are one of most common bird on this site. The coats of the males appear red in the early morning light. Chestnut mannikins were seen in large numbers along the cane haul roads and on grass heads near drainage ditches.

*Lonchura punctlata* (Nutmeg Mannikin)

These nervous, little birds have dark bills and heads. Their alternate black and white breast feathers appear gray. On the Schuler Site, Nutmeg Mannikins were often seen in company with the Waxbills feeding in grassy thickets.

Family Emberizidae: Emberizine Finches

*Paroaria coronata* (Brazilian or red crested cardinal)

Several adult pairs, and many juvenile brazilian cardinals were seen in the big trees of the Bluff vegetation. The bright red heads of this species make them very easy to recognize.

*Cardinalis cardinalis* (Northern cardinal)

A pair of northern cardinals inhabit the opiuma trees near the north east corner of the site. The bright red coloring of the male bird make him easily recognizeable. The call of these birds is very distinctive.

Family Pycnonotidae: Bulbuls

*Pycnonotus cafer* (Red-vented bulbul)

Many of these large, raucous birds inhabit the study site. They were common along the roads, in the sugar cane, on power lines and in the large trees. Bulbuls are conspicuous for their noisy call and the bright red feathers beneath their tails. They are fruit eaters and they may be responsible for the spread of ivory gourd (*Coccinia grandis* (L.) Voigt), the large, dark green cucurbit vine which bears bright red fruits, and is common throughout the site.

Family Ardeidae: Herons, Egrets and Bitterns

*Bubulcus ibis* (Cattle egret)

Several of these large, white birds were seen flying above the sugar fields.

Introduced in 1957 to help control cattle insect pests, cattle egrets have proliferated and are now pests themselves.

Family Fringillidae: Cardueline Finches

*Carpodacus mexicanus* (House finch)

The house finch is a small, sparrowlike bird with a streaked appearance. The head, throat and breast of male birds may vary from dull yellow to bright red. The females and the bodies of males are similar with gray to black streaks of color.

Introduced into Hawaii during the last century, the house finch has adapted and is now widespread throughout the islands. Many pairs of birds were seen around the pumping stations, in the mango tree and along Kaloi Gulch.

Family Columbidae: Pigeons and Doves

*Streptopelia chinensis* (Spotted Dove)

The spotted dove is a large bird which is grayish brown with rosy blushed breast feathers. At the sides and back of the neck is a patch of black with white spots. The low, repetitive cooing of the spotted dove was heard throughout the site. Many pairs and individuals were seen in the young cane fields.

*Geopelia striata* (Zebra Dove)

This ground dwelling, seed eating dove is smaller and even more abundant than the spotted dove. Zebra doves were found in similar densities

as the spotted dove in the open weedy places, but were most common along the roads.

*Columba livia* (Rock Dove)

A large flock of mixed plumage rock doves over fly the study sight during the early morning hours on week-ends. They approach the site from the Honouliuli area and disappear into the same area.

Family Sturnidae: Starlings and Mynas

*Acridotheres tristis* (Common Myna)

The ubiquitous myna is a plump brown bird with a black head and tail. It has a white belly, tail tip and wing patches, and bright yellow legs, feet, bill, and eye liners. Only two mynas were seen near Fernandes Village.

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ADDENDUM TO THE BIOLOGICAL RESOURCES SURVEY REPORT FOR  
SCHULER HOMES EAST KAPOLEI PROJECT,  
EAST KAPOLEI, OAHU HAWAII

FOR  
SCHULER HOMES, INC.  
828 FORT STREET MALL, 4TH FLOOR  
HONOLULU, HAWAII 96813

BY  
EVANGELINE J. FUNK, PH.D.  
BOTANICAL CONSULTANTS  
1995



TABLE OF CONTENTS

	Page
BOTANICAL SURVEY REPORT.....	A1
INTRODUCTION.....	A1
VEGETATION OF SITE A.....	A1
LIST OF ALL PLANT TAXA FOUND ON SITE A.....	A3
FAUNA OF SITE A.....	A5
VEGETATION OF SITE B.....	A6
LIST OF ALL PLANT TAXA FOUND ON SITE B.....	A6
FAUNA OF SITE B.....	A8
FIGURE 1.....	A2

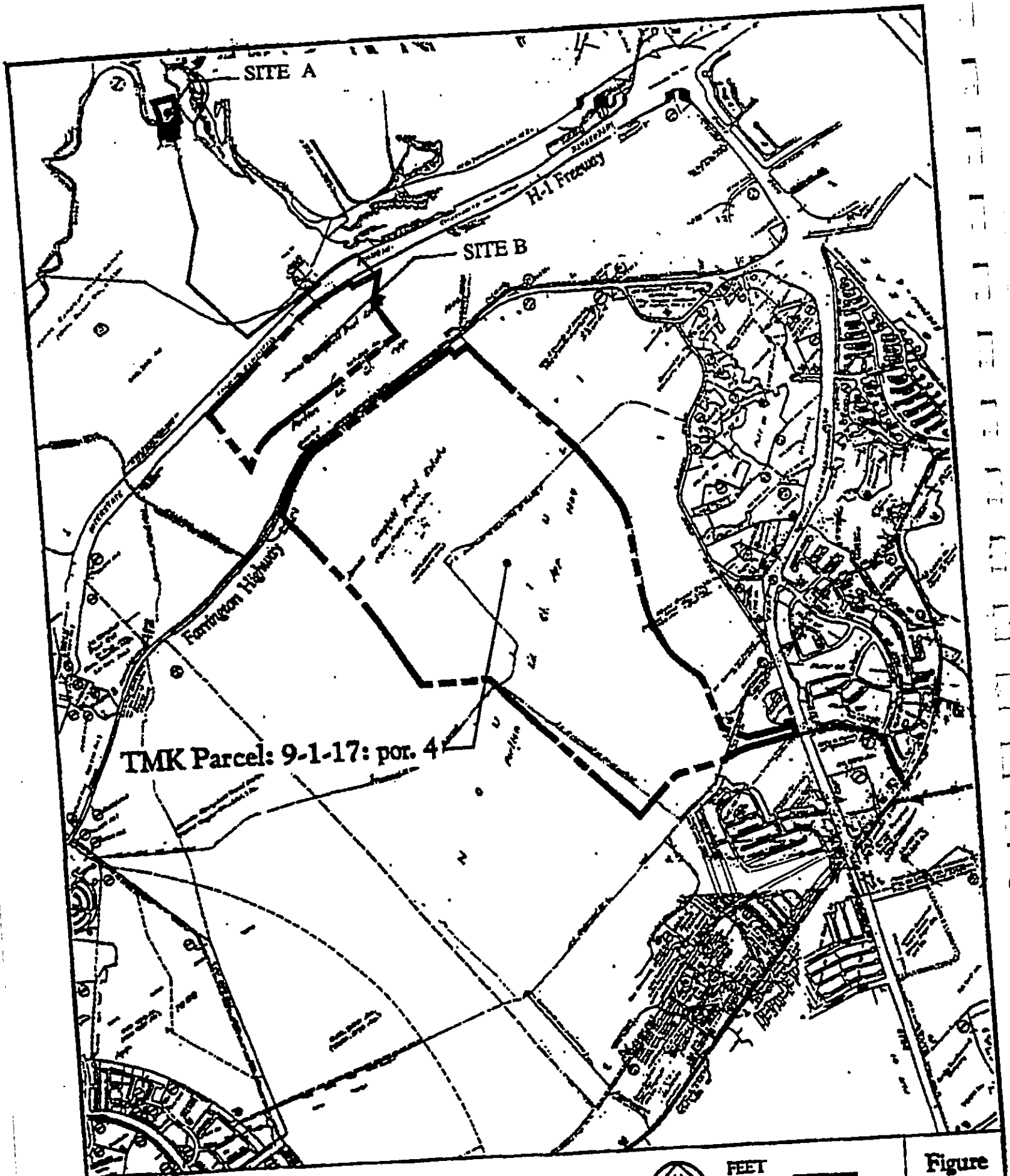
## INTRODUCTION

The original Biological Resources Survey Report for the Schuler Homes East Kapolei Project dealt with the flora and fauna of a single, one thousand acre site in East Kapolei, Oahu, Hawaii. Currently two additional areas are to be made part of this project (Figure 1). Area A in Figure 1 is a proposed reservoir site and Area B consists of eighty-two acres which are proposed for further residential development. Brief Biological Survey Reports for each of these sites are herewith submitted. A biological history of the area, a description of the data collection methods, and an explanation of the species list symbolism and caveates can be found in the original survey report.

### VEGETATION OF SITE A

Site A is the location of the proposed reservoir. It is located on the eastern flank of Pu'u Kapuai at approximately four hundred forty feet elevation at the western edge of Honouliuli Gulch. This general area was formerly used for the cultivation of sugar cane and is presently being used as pastureland. The steep sides of Honouliuli Gulch consist of frequent rock outcrops and a scant cover of Koa haole scrub (*Leucaena leucocephala* Lam deWit). The Koa haole scrub is from one to fifteen feet in height. At this time many of the shrubs were festooned with dead Love-in-a-mist (*Passiflora foetida* L.), and morning glory vines (*Ipomoea* spp.) and living Ivory gourd vines (*Coccinia grandis* (L.) Voight). The ground cover consists of hummocks of dry buffel grass (*Cenchrus ciliaris* L.), and Guinea grass (*Panicum maximum* Jacq.).

The most common vegetation on the rolling slopes is abandoned Ko or sugar cane (*Saccharum officinarum* L.). Since the recent rains, a variety of weed species have begun to emerge. A list of all plant species found in this area is provided.



**Biological Survey Sites**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.

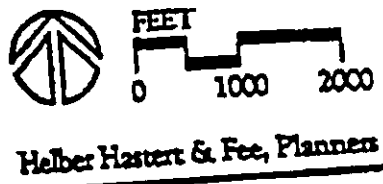


Figure  
**1**

LIST OF ALL PLANT TAXA FOUND ON SITE A

Scientific Name	Common Name	Abundance
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MONOCOTYLEDONES

CYPERACEAE - Sedge Family

* <i>Cyperus rotundus</i> L.	Nut grass	Common
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POACEAE - Grass Family

* <i>Cenchrus ciliaris</i> L.	Buffel grass	Locally abundant
* <i>Chloris divaricata</i> R.Br.	Stargrass	Occasional
* <i>Digitaria adscendens</i> (HBK) Henr.	Henry's crabgrass	Occasional
* <i>Panicum maximum</i> Jacq.	Guinea grass	Common
* <i>Rhynchelytrum repens</i> C.E.Hubb	Natal redtop	Common
* <i>Saccharum officinarum</i> L.	Ko or sugar cane	Common
* <i>Setaria gracilis</i> Kunth	Yellow Foxtail	Locally abundant

DICOTYLEDONES

AMARANTHACEAE - Amaranth Family

* <i>Amaranthus spinosus</i> L.	Spiny amaranth	Common
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ASTERACEAE - Sunflower Family

* <i>Bidens pilosa</i> L.	Spanish needle	Common
* <i>Coryza canadensis</i> Cronq.	Canadian fleabane	Occasional

ASTERACEAE - Sunflower Family con't

* <i>Pluchea symphytifolia</i> (L.) Cass.	Sourbush	Occasional
* <i>Tridax procumbens</i> L.	Coat buttons	Locally abundant

BIGNONIACEAE - Bignonia Family

* <i>Spathodea campanulata</i> Beauv.	African tulip tree	Occasional
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BUDDLEIACEAE - Butterfly Family

* <i>Buddleia asiatica</i> Lour.	Dog tail	Occasional
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CONVOLVULACEAE - Morningglory Family

* <i>Ipomoea triloba</i> L.	Little Bell	Occasional
* <i>Merremia aegyptia</i> Urban	Hairy merremia	Common

CUCURBITACEAE - Cucumber Family

* <i>Coccinia grandis</i> (L.) Voight	Ivory gourd	Common
* <i>Momordica charantia</i> Crantz	Balsam apple	Common

Scientific Name	Common Name	Abundance
<b>EUPHORBIACEAE - Spurge Family</b>		
* <i>Ricinus communis</i> L.	Castor bean	Locally abundant
<b>FABACEAE - Bean Family</b>		
* <i>Crotalaria incana</i> L.	Fuzzy rattle-pod	Occasional
* <i>Desmanthus virgatus</i> Willd.	Virgate mimosa	Occasional
* <i>Leucaena leucocephala</i> Lam deWit	Koa-haole	Common
<b>LABIATAE - Mint Family</b>		
* <i>Leonotis nepetaefolia</i> Ait.	Lion's-ear	Uncommon
<b>NYCTAGINACEAE - Four o'clock Family</b>		
* <i>Boerhavia coccinea</i> Mill.		Common
<b>PASSIFLORACEAE - Passion Flower Family</b>		
* <i>Passiflora foetida</i> L.	Love-in-a-mist	Occasional
<b>SOLANACEAE - Tomato Family</b>		
* <i>Lycopersicon pimpinellifolium</i> (Jusl.) Mill	Currant tomato	Common
<b>STERCULIACEAE - Cacao Family</b>		
* <i>Waltheria indica</i> L.	'Uhaloa	Occasional

## FAUNA OF SITE A

The Fauna survey of Site A was carried out just after the first fall rains when most of the vegetation was still in the seedling stage. In addition, Site A is more than one mile from the nearest habitation. Both of these factors contribute to the dearth of food sources utilized by the seed eating commensal birds species common to this part of the island. As a result, only two species of doves were found in low numbers.

### Family Columbidae: Pigeons and Doves

#### *Streptopelia chinensis* (Spotted Dove)

The spotted dove is a large bird which is grayish brown with rosy blushed breast feathers. At the sides and back of the neck is a patch of black with white spots. The low, repetitive cooing of the spotted dove was heard only occasionally in this area. Only three individual spotted doves were seen in the abandoned cane fields.

#### *Geopelia striata* (Zebra Dove)

This ground dwelling, seed eating dove is smaller and more abundant than the spotted dove. Zebra doves were seen in low densities along the dirt track that passes through Site A and in the pastureland.

Because seedlings of the ivory gourd vine are very common on this site and seeds of this plant are known to be spread about by both red-vented and red-whiskered bulbuls, it is assumed these species must frequent this area although they were not seen during this survey.

### VEGETATION OF SITE B

Site B consists of eighty-two acres of abandoned sugarcane land. It is north of the original study site and abuts the H-1 Freeway (Figure 1). The site is fairly flat and has recently been plowed. At present the land is lying fallow and a dense crop of weed seedlings is beginning to emerge. The most prominent vegetation is scattered individuals of 'uhaloa (*Waltheria indica* L.) which are not more than thirty inches in height. At the northern edge of the study site where it abuts H-1 Freeway, there is a narrow band of land between the cane haul road and the freeway where there are a few 'opiuma trees (*Pithecellobium dulce* (Roxb.) Benth.) and koa haole shrubs which reach a height of fifteen to twenty feet. The understory in this area is either buffel grass or guinea grass. No outstanding vegetative features were found on this site.

#### CHECKLIST OF ALL PLANT TAXA FOUND ON SITE B

Scientific Name	Common Name	Abundance
<b>MONOCOTYLEDONES</b>		
<b>CYPERACEAE - Sedge Family</b>		
* <i>Cyperus rotundus</i> L.	Nut grass	Common
<b>POACEAE - Grass Family</b>		
* <i>Cenchrus ciliaris</i> L.	Buffel grass	Locally abundant
* <i>Chloris barbata</i> Swartz	Swollen fingergrass	Locally abundant
* <i>Chloris divaricata</i> R. Br.	Star grass	Occasional
* <i>Panicum maximum</i> Jacq.	Guinea grass	Common
* <i>Rhynchelytrum repens</i> C.E.Hubb	Natal redtop	Common
* <i>Saccharum officinarum</i> L.	Ko or sugar cane	Common
<b>DICOTYLEDONES</b>		
<b>ACANTHACEAE - Acanthus Family</b>		
* <i>Asystasia gangetica</i> (L.) T. Anders	Chinese violet	Occasional
<b>AMARANTHACEAE - Amaranth Family</b>		
* <i>Amaranthus spinosus</i> L.	Spiny amaranth	Common
* <i>Amaranthus viridis</i> L.	Slender amaranth	Occasional

Scientific Name	Common Name	Abundance
<b>ANACARDIACEAE - Mango Family</b>		
* <i>Schinus terebinthifolius</i> Raddi	Christmas berry	Uncommon
<b>ASTERACEAE - Sunflower Family</b>		
* <i>Bidens pilosa</i> L.	Spanish needle	Common
* <i>Calyptracarpus vialis</i> Less.		Occasional
* <i>Coryza canadensis</i> Cronq.	Canadian fleabane	Occasional
* <i>Lactuca scariola</i> L.	Wild lettuce	Occasional
* <i>Pluchea indica</i> (L.) Less.	Indian pluchea	Occasional
* <i>Pluchea symphytifolia</i> (L.) Cass.	Sourbush	Occasional
* <i>Tridax procumbens</i> L.	Coat buttons	Locally abundant
* <i>Verbesina encelioides</i> Cav.	Golden crown-beard	Occasional
<b>CHENOPODIACEAE - Goosefoot Family</b>		
* <i>Atriplex semibaccata</i> R. Br.	Australian saltbush	Occasional
<b>CONVOLVULACEAE - Morningglory Family</b>		
* <i>Ipomoea cairica</i> (L.) Sweet	Koali 'ai	Common
* <i>Ipomoea obscura</i> (L.) Ker-Gawl		Occasional
* <i>Ipomoea triloba</i> L.	Little Bell	Occasional
* <i>Merremia aegyptia</i> Urban	Hairy merremia	Common
<b>CUCURBITACEAE - Cucumber Family</b>		
* <i>Coccinia grandis</i> (L.) Voight	Ivory gourd	Common
* <i>Momordica charantia</i> Crantz	Balsam apple	Common
<b>EUPHORBIACEAE - Spurge Family</b>		
* <i>Chamaesyce glomerifera</i> L. Wheeler	Graceful spurge	Locally abundant
* <i>Ricinus communis</i> L.	Castor bean	Locally abundant
<b>FABACEAE - Bean Family</b>		
* <i>Crotalaria incana</i> L.	Fuzzy rattle-pod	Common
* <i>Desmanthus virgatus</i> Willd.	Virgate mimosa	Occasional
* <i>Leucaena leucocephala</i> Lam deWit	Koa-haole	Common
* <i>Pithecellobium dulce</i> Benth.	Madras thorn	Occasional
* <i>Prosopis pallida</i> HBK	Kiawe, algaroba	Occasional
<b>MALVACEAE - Hibiscus Family</b>		
* <i>Malvastrum coromandelianum</i> Garcke	False marrow	Occasional
* <i>Sida fallax</i> Walp.	'Ilima	Occasional
* <i>Sida rhombifolia</i> L.	Cuba jute	Occasional



<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>
NYCTAGINACEAE - Four o'clock Family		
* <i>Boerhavia coccinea</i> Mill.		Common
PASSIFLORACEAE - Passion Flower Family		
* <i>Passiflora foetida</i> L.	Love-in-a-mist	Occasional
STERCULIACEAE - Stink tree Family		
* <i>Waltheria indica</i> L.	Hi'aloa, uha-loa	Occasional
ZYGOPHYLLACEAE - Tribulus Family		
* <i>Tribulus terrestris</i> L.	Puncture vine	Common

#### FAUNA OF SITE B

The Fauna survey of Site B was carried out just after the first fall rains when most of the vegetation was still in the seedling stage. In addition, Site B had recently been plowed which had destroyed the mature, seed bearing weed crop upon which the many species of seed eating birds depend. The small water storage reservoir that had occupied the north-eastern corner of this site has been filled and the flume water has been discontinued so there is no longer an open water source on this site. As a result very few birds now utilize the area.

#### Family Columbidae: Pigeons and Doves

##### *Geopelia striata* (Zebra Dove)

This ground dwelling, seed eating dove was the most abundant bird found on this site. Individuals were common along the cane haul roads especially where small tufts of old vegetation persisted.

#### Family Passeridae: Old World Sparrows

##### *Passer domesticus* (House sparrow or feathered mice)

The House sparrow, a familiar commensal species is usually found in large numbers on Ewa Plains sites. On this particular site only a single pair of these

streaky brown and gray birds were seen. They were seen near the power lines at the eastern boundry foraging in the weedy scrub.

Family Charadriiformes: Plovers and Dotterels

*Pluvialis dominica* (Lesser golden plover)

A single lesser golden plover in non-breeding plumage i.e. mottled buff below and darker brown mottled with gold and buff above, appears to inhabit the central part of the study site. No other plovers were seen.

The tracks of a single, small pig (*Sus scrofa*) were seen in the central part of the site. The imprint of the small, rounded, cloven hoofs were clearly visible for fifty feet or more. No pig was seen and there is no explanation of how these tracks appear in this area.

See Bibliography in the original report.

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AIR QUALITY IMPACT REPORT, EAST KAPOLEI PROJECT, OCTOBER 4, 1994;  
AIR QUALITY IMPACT REPORT, EAST KAPOLEI PROJECT, DECEMBER 18, 1995.

J.W. MORROW

**AIR QUALITY IMPACT REPORT**

**EAST KAPOLEI PROJECT**

**4 October 1994**

**PREPARED FOR:**

**Gray, Hong, Bills & Associates**

**and**

**Schuler Homes, Inc.**

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.	INTRODUCTION.....	1
2.	AIR QUALITY STANDARDS.....	4
3.	EXISTING AIR QUALITY.....	6
3.1	General.....	6
3.2	Department of Health Monitoring.....	6
4.	CLIMATE & METEOROLOGY.....	8
4.1	Temperature and Rainfall.....	8
4.2	Surface Winds.....	8
5.	SHORT-TERM IMPACTS.....	9
5.1	Onsite Impacts.....	9
5.2	Offsite Impacts.....	13
6.	MOBILE SOURCE IMPACTS.....	13
6.1	Mobile Source Activity.....	13
6.2	Emission Factors.....	13
6.3	Modeling Methodology.....	13
6.4	Results: 1-Hour Concentrations.....	14
6.5	Results: 8-Hour Concentrations.....	19
7.	OFFSITE IMPACTS.....	19
7.1	Electrical Generation.....	19
7.2	Solid Waste Disposal.....	19
8.	DISCUSSION, CONCLUSIONS AND MITIGATION.....	21
8.1	Short-Term Impacts.....	21
8.2	Mobile Source Impacts.....	21
8.3	Electrical Generation.....	21
8.4	Solid Waste Disposal.....	21

REFERENCES

LIST OF TABLES

<u>NUMBER</u>	<u>TITLE</u>
1	Proposed Land Uses
2	Summary of State of Hawaii and Federal Ambient Air Quality Standards
3	Air Monitoring Data, Department of Health Building, 1988 - 1990
4	Annual Joint Frequency Distribution of Wind Speed and Direction, Honolulu International Airport
5	Estimates of Annual Emissions Due to Electrical Generation
6	Estimates of Annual Emissions Due to Solid Waste Combustion

LIST OF FIGURES

<u>NUMBER</u>	<u>TITLE</u>
1	Project Location
2	Existing Site Conditions, September 1994
3	Monthly PM <sub>10</sub> Averages, Pearl City and Barbers Point Monitoring Stations, 1990
4	January Wind Rose, Honolulu International Airport, 1940-1967
5	August Wind Rose, Honolulu International Airport, 1940-1967
6	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Driveway "B" at North-South Road, Peak Traffic Hours, 2005 - 2011
7	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Driveway "A" at North-South Road, Peak Traffic Hours, 2005 - 2011
8	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: North-South Road at Farrington Highway, Peak Traffic Hours, 2005 - 2011
9	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Driveway "C" at Farrington Highway, Peak Traffic Hours, 2005 - 2011

**1. INTRODUCTION**

Schuler Homes, Inc. is proposing to construct a primarily residential project on an approximately 1,000-acre parcel in the Ewa District of the island of Oahu (Figure 1). The property was formerly used for sugar cane cultivation (Figure 2).

The intent is to develop the project in two phases to be completed in 2005 and 2011, respectively. The proposed land uses are summarized in Table 1.

**TABLE 1**  
**PROPOSED LAND USES**  
**(Acres)**

LAND USE	PHASE 1	PHASE 2	TOTAL
Residential	458	490	948
Commercial	10	10	20
School	12	0	12
Parks	10	10	20
Circulation	10	12	22
TOTAL	500	522	1,022

The purpose of this report is to assess the impact of the proposed development on air quality on a local and regional scale. The overall project can be considered an "indirect source" of air pollution as defined in the federal Clean Air Act [1] since its primary association with air quality is its inherent attraction for mobile sources, i.e., motor vehicles. Much of the focus of this analysis, therefore, is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for the years 2005 and 2011 with and without the project.

A project such as this also requires electrical power and solid waste disposal, both of which involve combustion and emissions into the air at offsite locations. These have been addressed in the report.



FIGURE 1  
PROJECT LOCATION

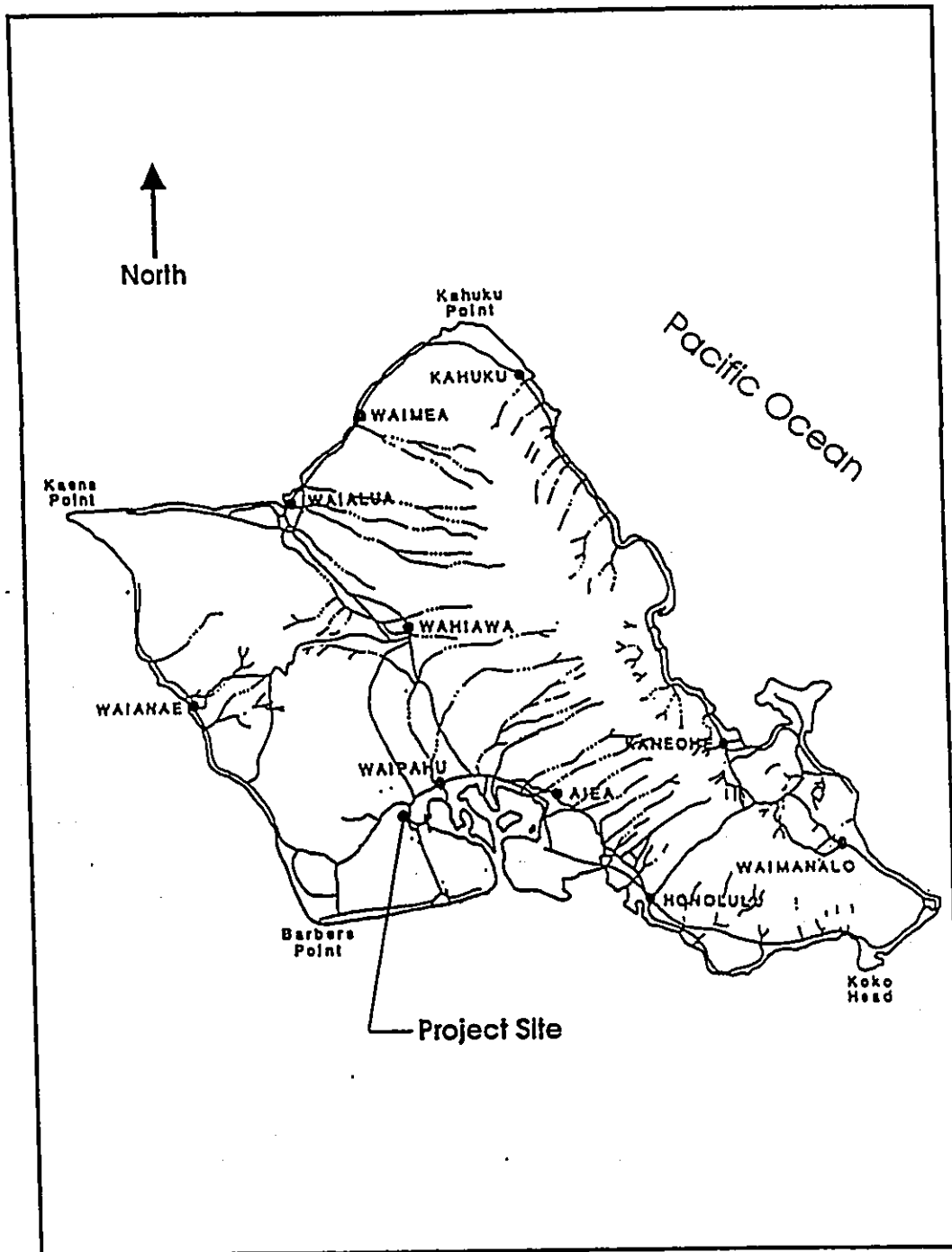
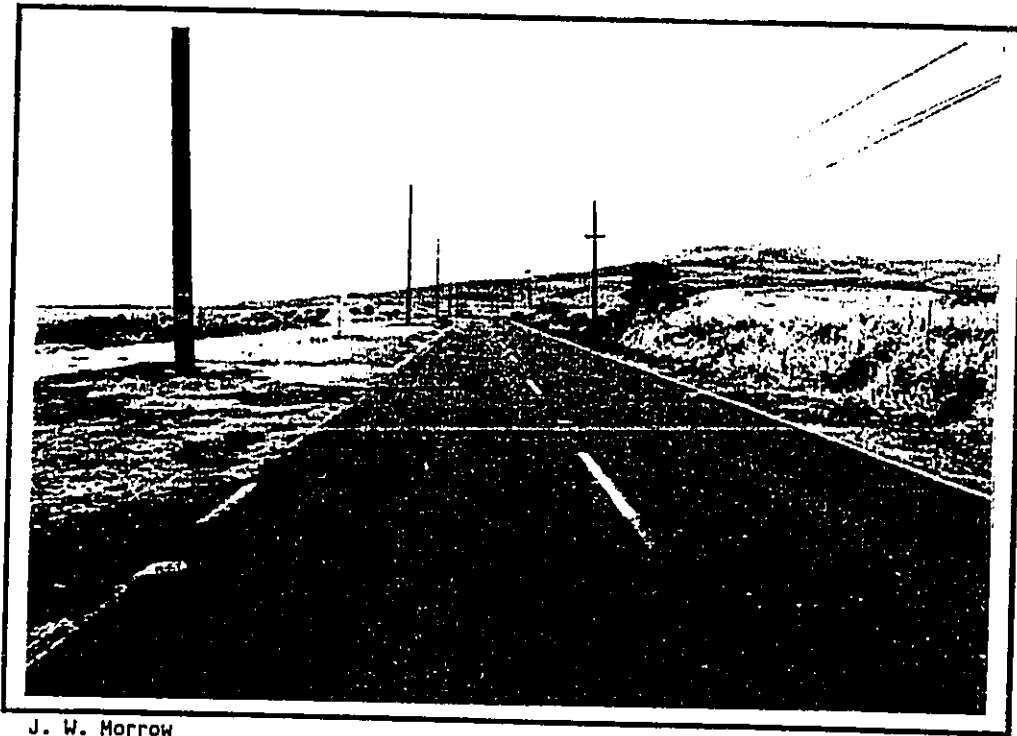
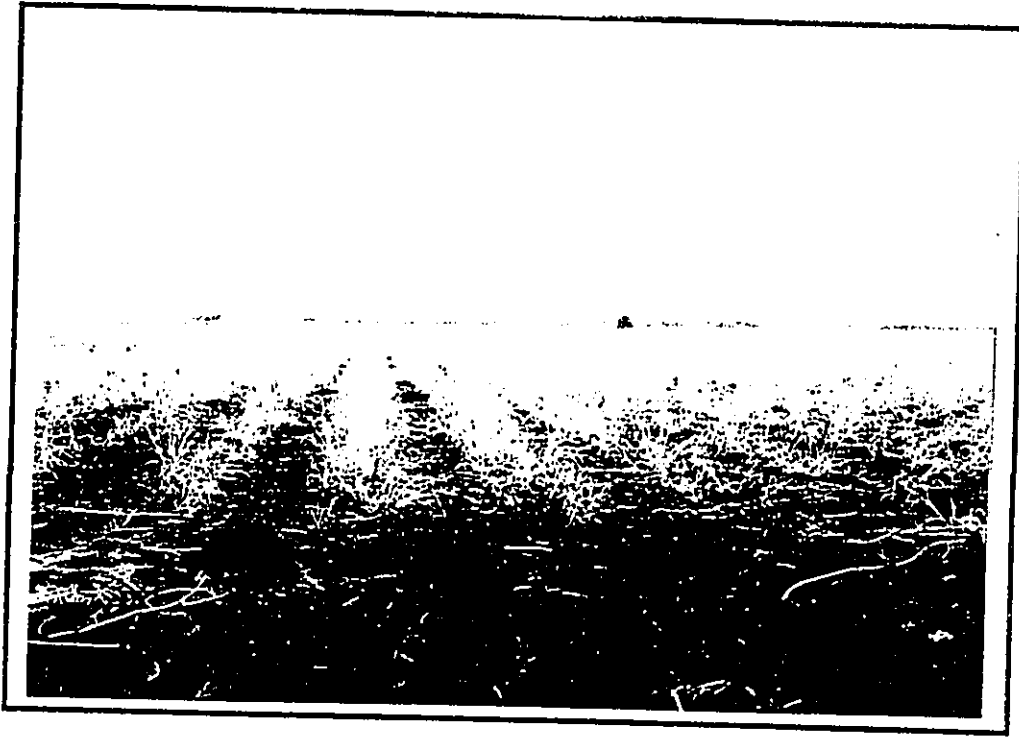


FIGURE 2  
EXISTING SITE CONDITIONS  
SEPTEMBER 1994

Cane Fields  
(facing south)



Farrington Highway  
Bordering Property  
(facing southwest)

J. W. Morrow

Finally, during construction of the various buildings and facilities air pollutant emissions will be generated onsite and offsite due to vehicular movement, grading, concrete and asphalt batching, and general dust-generating construction activities. These impacts have also been addressed.

## 2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 2 [2, 3]. Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [4].

Some of Hawaii's standards (CO, NO<sub>2</sub>, and O<sub>3</sub>) are clearly more stringent than their federal counterparts but, like their federal counterparts, may be exceeded once per year. It should also be noted that in November 1993, the Governor signed amendments to Chapter 59, Ambient Air Quality Standards [3], adopting the federal standard for particulate matter equal to or less than 10 microns in diameter (PM<sub>10</sub>). Since measurement data in Hawaii indicate that PM<sub>10</sub> comprises about 50% of total suspended particulate matter (TSP), the adoption of that federal standard with a numerical value equal to the original state TSP standard of 150 µg/m<sup>3</sup> represents a substantial relaxation of the standard (approximately doubling it).

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 [1]. The last review resulted in the relaxation of the oxidant standard from 160 to 235 micrograms/cubic meter (ug/m<sup>3</sup>) [6]. The carbon monoxide (CO), particulate matter, sulfur dioxide (SO<sub>2</sub>), and nitrogen dioxide (NO<sub>2</sub>) standards have been reviewed, but no new standards were proposed.

TABLE 2

SUMMARY OF STATE OF HAWAII AND FEDERAL  
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	NAAQS PRIMARY	NAAQS SECONDARY	STATE STANDARDS
PM <sub>10</sub>	Annual	50	50	50
	24-hr	150	150	150
SO <sub>2</sub>	Annual	80	---	80
	24-hr	365	---	365
	3-hr	---	1,300	1,300
NO <sub>2</sub>	Annual	100	---	70
CO	8-hr	10	---	5
	1-hr	40	---	10
O <sub>3</sub>	1-hr	235	---	100
H <sub>2</sub> S	1-hr	---	---	35
Pb	Calendar Quarter	1.5	---	1.5

KEY: TSP - total suspended particulate matter  
 PM<sub>10</sub> - particulate matter < 10 microns  
 SO<sub>2</sub> - sulfur dioxide  
 NO<sub>2</sub> - nitrogen dioxide  
 CO - carbon monoxide  
 O<sub>3</sub> - ozone  
 Pb - lead

All concentrations in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )  
 except CO which is in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ).

4 OCTOBER 1994

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [7]. There simply can be no visible emissions from fugitive dust sources.

### 3. EXISTING AIR QUALITY

3.1 General. The State Department of Health (DOH) maintains a limited network of air monitoring stations around the state to gather data on the following regulated pollutants:

- o particulate matter  $\leq 10$  microns ( $PM_{10}$ )
- o total suspended particulate matter (TSP)
- o sulfur dioxide ( $SO_2$ )
- o carbon monoxide (CO)
- o ozone ( $O_3$ )

In the case of  $PM_{10}$  and  $SO_2$ , measurements are made on a 24-hour basis to correspond with the averaging period specified in State and Federal standards. Samples are collected once every six days in accordance with U.S. Environmental Protection Agency (EPA) guidelines. Carbon monoxide and ozone, however, are measured on a continuous basis due to their short-term (1-hour) standards. Lead concentrations are determined from the TSP samples which are sent to an EPA laboratory for analysis. It should also be noted that the majority of these pollutants are monitored only in Honolulu.

3.2 Department of Health Monitoring. There are no air monitoring sites in the immediate vicinity of the project site. The nearest stations are at Pearl City and Barbers Point where  $PM_{10}$  is measured. A summary of the most recent published data from those sites are presented in Figure 3. Particulate matter levels are well below the  $50 \mu g/m^3$  annual and  $150 \mu g/m^3$  twenty-four hour standards.

The summary of monitoring results from the Department of Health building in downtown Honolulu presented in Table 3 also indicates compliance with standards. Air quality at the project area should be comparable or perhaps somewhat better given the site's more rural location.

FIGURE 3  
MONTHLY PM<sub>10</sub> AVERAGES  
PEARL CITY AND BARBERS POINT  
MONITORING STATIONS  
1990

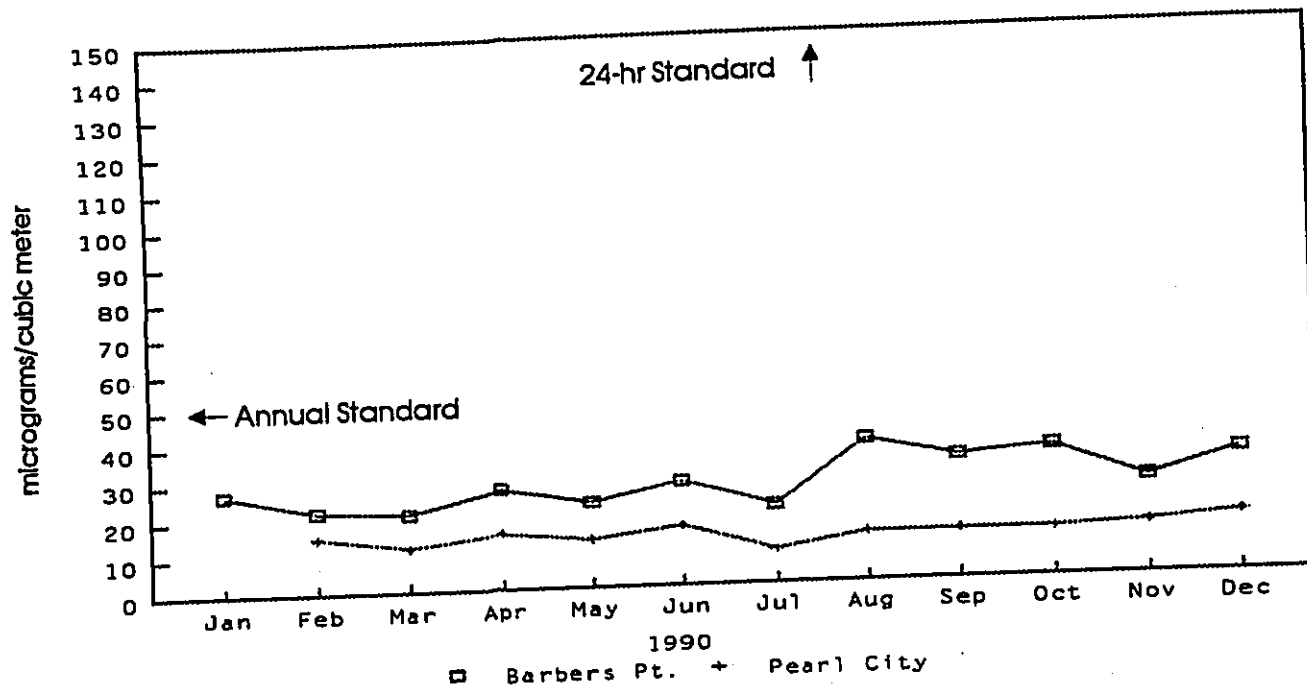


TABLE 3  
 AIR MONITORING DATA  
 DEPARTMENT OF HEALTH BUILDING<sup>1</sup>  
 1988 - 1990

POLLUTANT	Concentration ( $\mu\text{g}/\text{m}^3$ )		
	1988	1989	1990
Total suspended particulate matter (TSP)	15 - 45 26	16 - 48 29	13 - 47 30
Particulate matter < 10 microns ( $\text{PM}_{10}$ )	9 - 25 17	10 - 33 16	8 - 36 15
Sulfur dioxide ( $\text{SO}_2$ )	<5 - <5 <5	<5 - 8 <5	<5 - <5 <5
Carbon monoxide (CO)	0.2 - 10.3 1.7	0.3 - 9.7 1.9	0.1 - 7.1 1.5
Ozone ( $\text{O}_3$ )	0 - 92 14	0 - 94 15	4 - 116 36
Lead (Pb)	0 - 0.1 0	0 - 0.1 0	0 - 0 0
Notes: 1. Values indicate range and annual mean. 2. CO values are $\text{mg}/\text{m}^3$ . 3. $\text{PM}_{10}$ data are from the Liliha site. 4. $\text{O}_3$ data are from the Sand Island site.			

#### 4. CLIMATE AND METEOROLOGY

4.1 Temperature and Rainfall. Temperatures in the project area are expected to be similar to those found elsewhere in Hawaii. The nearest long-term weather station operated by the National Weather Service is located at the Honolulu International Airport. In an annual summary for that station, the National Climatic Center has summarized Honolulu's temperature regime as follows:

Hawaii's equable temperatures are associated with the small seasonal variation in the amount of energy received from the sun and the tempering effect of the surrounding ocean. The range of temperatures averages only 7 degrees between the

warmest months (August and September) and the coolest months (January and February) and about 12 degrees between day and night. Daily maximums run from the high 70's in winter to the mid-80's in summer, and daily minimums from the mid-60's to the low 70's. However, the Honolulu Airport area has recorded as high as 93 degrees and as low as 53 [9].

Historical rainfall data from the Honolulu International Airport indicate an annual average of 23 inches. Based on this average and in accordance with Thornwaite's scheme for climatic classification, the area is considered semi-arid [10].

4.2 Surface Winds. Meteorological data records were reviewed from the nearby Honolulu International Airport and Hickam Air Force Base. The annual prevalence of northeast trade winds is clearly shown in Table 4. A closer examination of the data, however, indicates that low velocities (less than 10 mph) occur frequently and that the "normal" northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring. It is during these times that Honolulu generally experiences elevated pollutant levels. This seasonal difference in wind conditions can be easily contrasted by comparing August and January wind roses (Figures 4 and 5).

Of particular interest from an air pollution standpoint were the stability wind roses prepared for Hickam Air Force Base [11]. These data indicated that stable conditions, i.e., Pasquill-Gifford stability categories E and F [12], occur about 28% of the time on an annual basis and 36% of the time during the peak winter month (January). It is under such conditions that the greatest potential for air pollutant buildup from groundlevel sources, e.g., motor vehicles, exists.

## 5. SHORT-TERM IMPACTS

5.1 Onsite Impacts. The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along the existing roadways as well as on the project site itself. The additional construction vehicle traffic should not exceed street capacities although the presence of large trucks can reduce a roadway's capacity as well as lower average travel speeds.

The site preparation and earth moving will create particulate emissions as will building and onsite road construction. Construction vehicles movement on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust

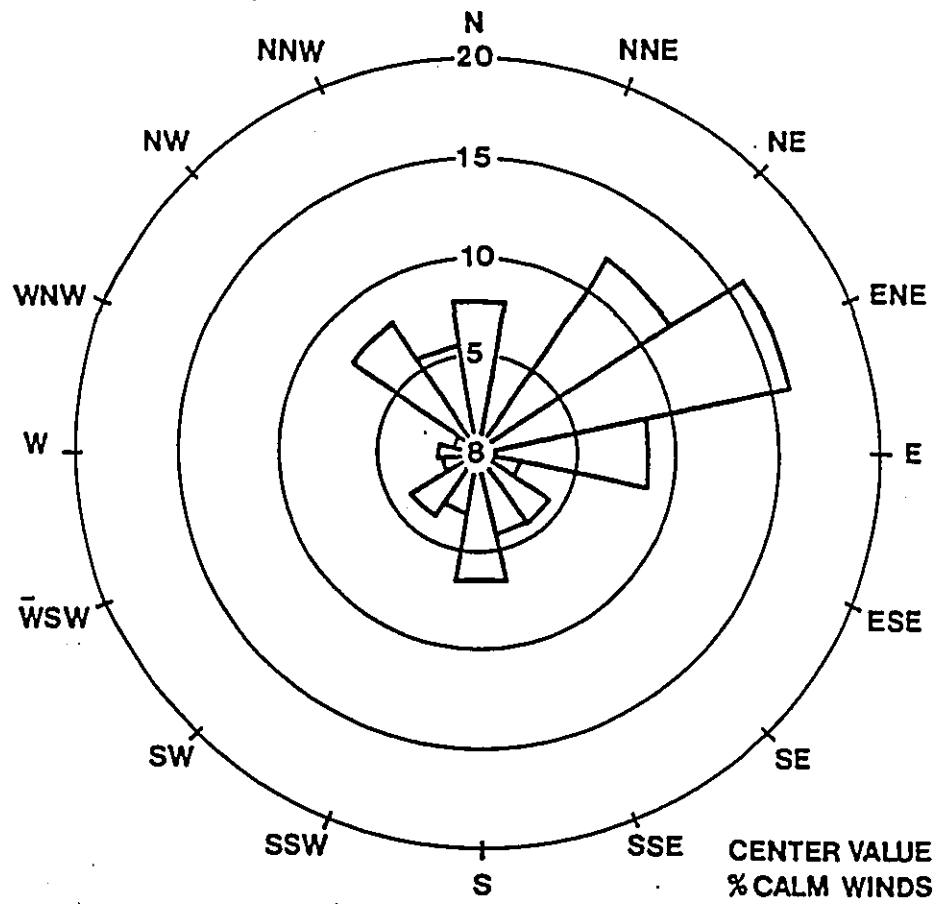


TABLE 4  
ANNUAL JOINT FREQUENCY DISTRIBUTION  
OF WIND SPEED AND DIRECTION  
HONOLULU INTERNATIONAL AIRPORT

Dir	Wind Speed (kts)						Total
	0-3	4-7	8-12	13-18	19-24	>24	
N	.0149	.0261	.0075	.0020	.0002	.0000	.0506
NNE	.0114	.0219	.0106	.0046	.0005	.0000	.0490
NE	.0114	.0449	.0829	.0853	.0204	.0018	.2466
ENE	.0088	.0637	.1559	.1209	.0224	.0014	.3731
E	.0039	.0179	.0329	.0210	.0023	.0001	.0782
ESE	.0021	.0056	.0050	.0015	.0003	.0001	.0146
SE	.0021	.0059	.0091	.0049	.0006	.0002	.0228
SSE	.0023	.0074	.0123	.0038	.0008	.0002	.0268
S	.0025	.0104	.0127	.0033	.0005	.0003	.0296
SSW	.0011	.0041	.0053	.0017	.0003	.0000	.0125
SW	.0007	.0031	.0058	.0022	.0003	.0001	.0122
WSW	.0006	.0017	.0031	.0022	.0005	.0001	.0082
W	.0019	.0030	.0021	.0009	.0002	.0001	.0082
WNW	.0027	.0051	.0012	.0003	.0001	.0000	.0094
NW	.0084	.0153	.0031	.0008	.0003	.0000	.0279
NNW	.0087	.0166	.0041	.0012	.0002	.0000	.0308
TOT	.0835	.2527	.3534	.2567	.0496	.0043	1.0002

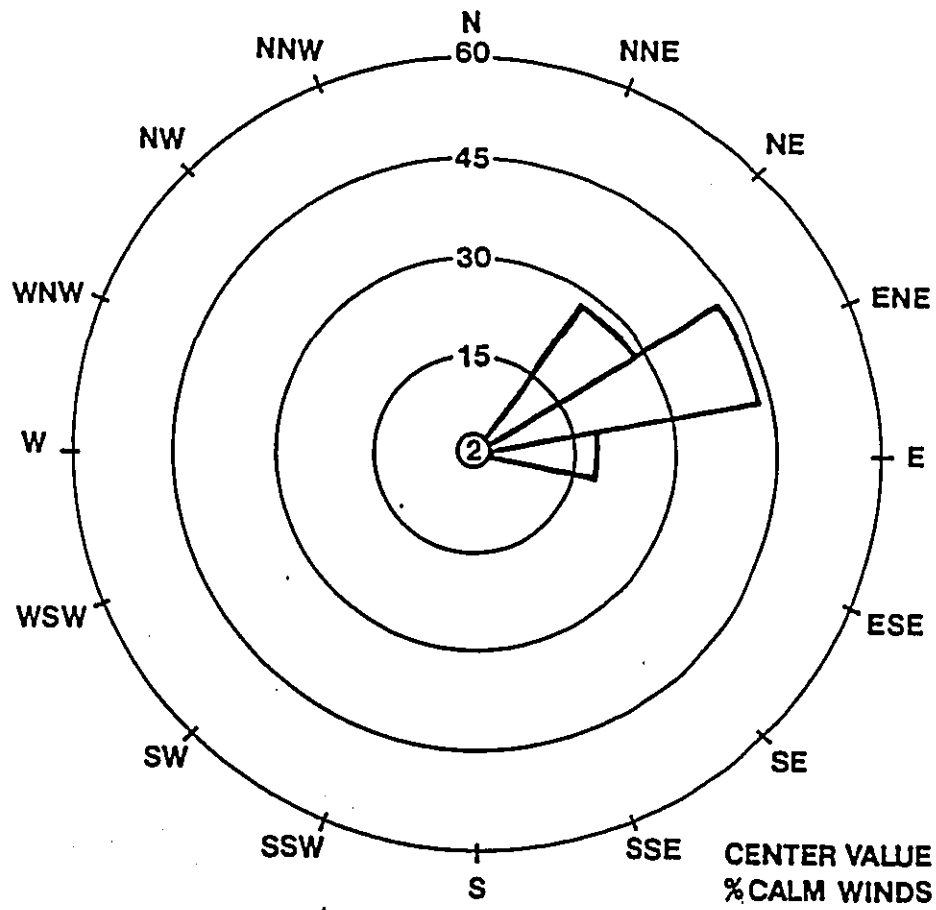
SOURCE: National Weather Service  
Historical Records, 1940-67

FIGURE 4  
JANUARY WIND ROSE  
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service  
Historical Records, 1940-67

FIGURE 5  
AUGUST WIND ROSE  
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service  
Historical Records, 1940-67

4 OCTOBER 1994

emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 [10,13].

Onsite soils are high in clay content which suggests silt content of about 30% [14], the same as cited above. In conjunction with the semi-arid local climate (P/E Index 28.9), this suggests a potential for somewhat greater fugitive dust emissions than estimated by the EPA.

5.2 Offsite Impacts. In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt batching plants needed for construction. Such plants routinely emit particulate matter and other gaseous pollutants. It is too early, however, to identify the specific facilities that will be providing these materials and thus the discussion of air quality impacts is necessarily generic. The batch plants which will be producing the concrete for foundations, curbing, etc. and the asphalt for roadways must be permitted by the Department of Health Clean Air Branch pursuant to state regulations [7]. In order to obtain these permits they must demonstrate their ability to continuously comply with both emission [7] and ambient air quality [3] standards. Under the recently promulgated federal Title V operating permit requirements [15], now incorporated in Hawaii's rules [7], air pollution sources must regularly attest to their compliance with all applicable requirements.

## 6. MOBILE SOURCE IMPACTS

6.1 Mobile Source Activity. The traffic assessment prepared for the proposed project served as the basis for this mobile source impact analysis [8]. Traffic projections for 2005 and 2011 with and without the project were provided for the major intersections serving the project area.

6.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar years 2005 and 2011 using the Mobile Source Emissions Model (MOBILE-5A) [16]. To localize the emission factors as much as possible, the September 1988 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.

6.3 Modeling Methodology. Due to the present state-of-the-art in air quality modeling, analyses such as this generally focus on

4 OCTOBER 1994

estimating concentrations of non-reactive pollutants. For projects involving mobile sources as the principal 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.

Using the available traffic data, modeling was performed for the following intersections:

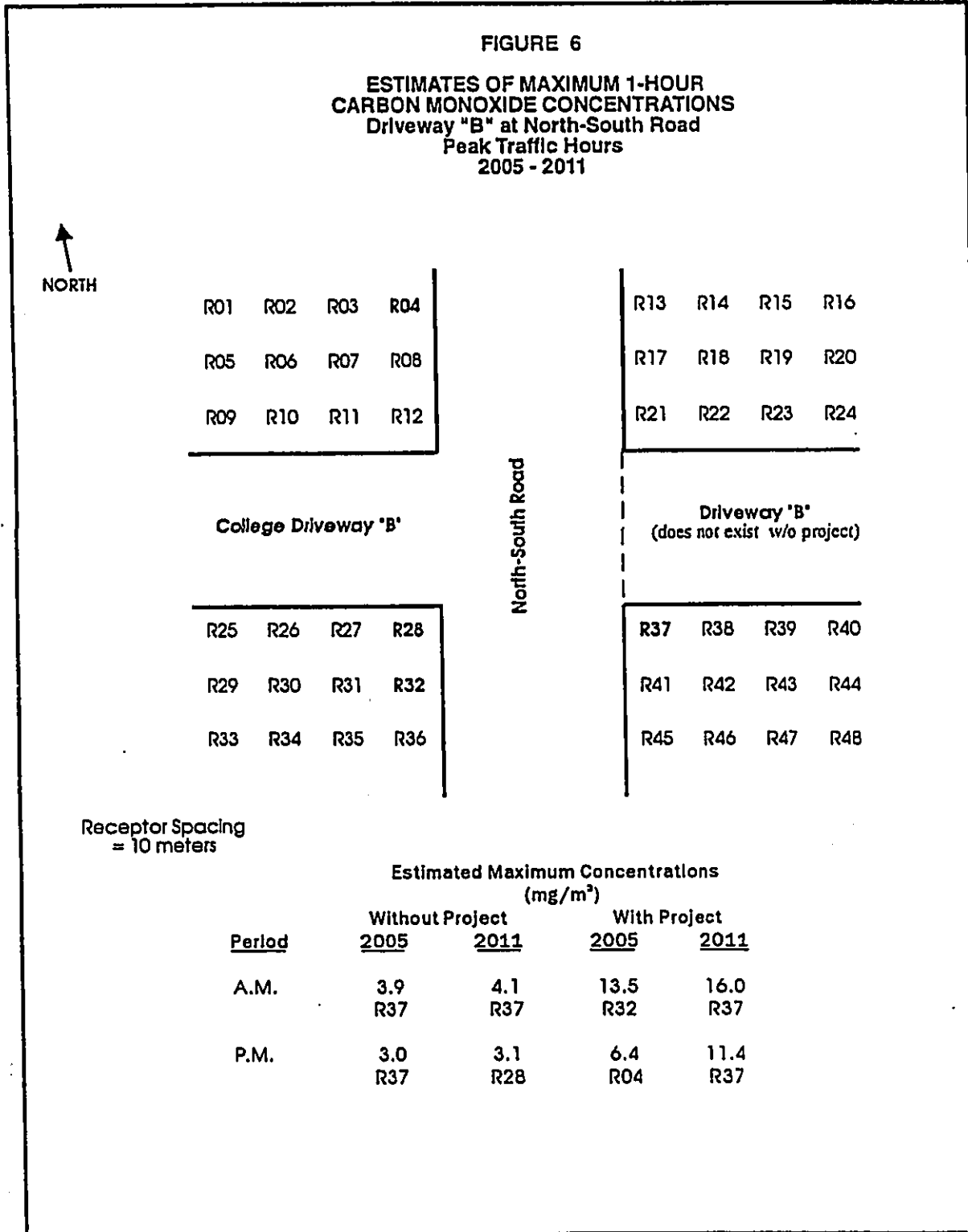
- Driveway "B" @ North-South Road
- Driveway "A" @ North-South Road
- North-South Road @ Farrington Highway
- Driveway "C" @ Farrington Highway

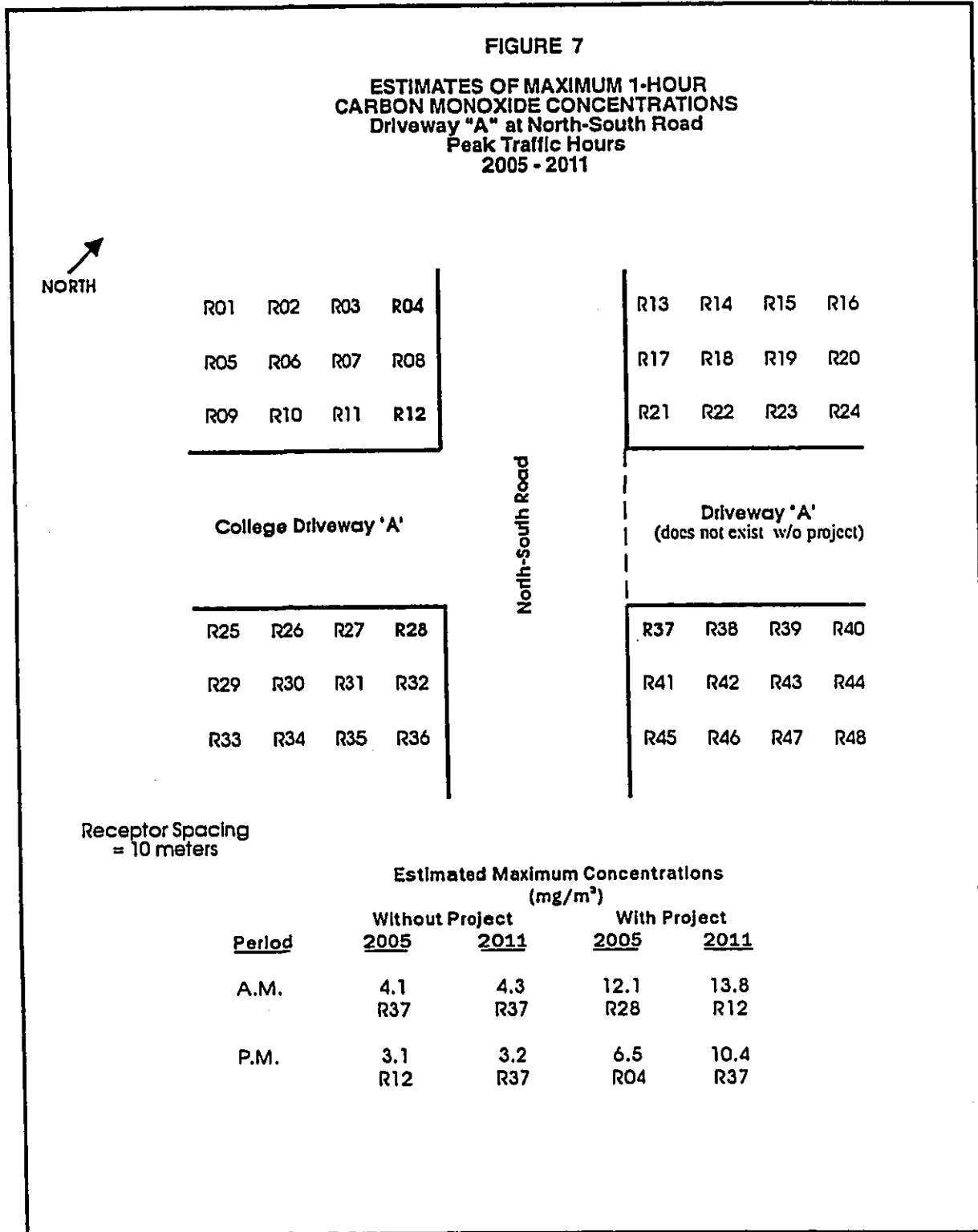
Because of the rural nature of the area, a stable atmosphere (Category "F") [19] was assumed for the morning and a neutral atmosphere (Category "D") for afternoon peak hours. A 1 meter per second (m/sec) wind speed was also assumed as worst case meteorological conditions.

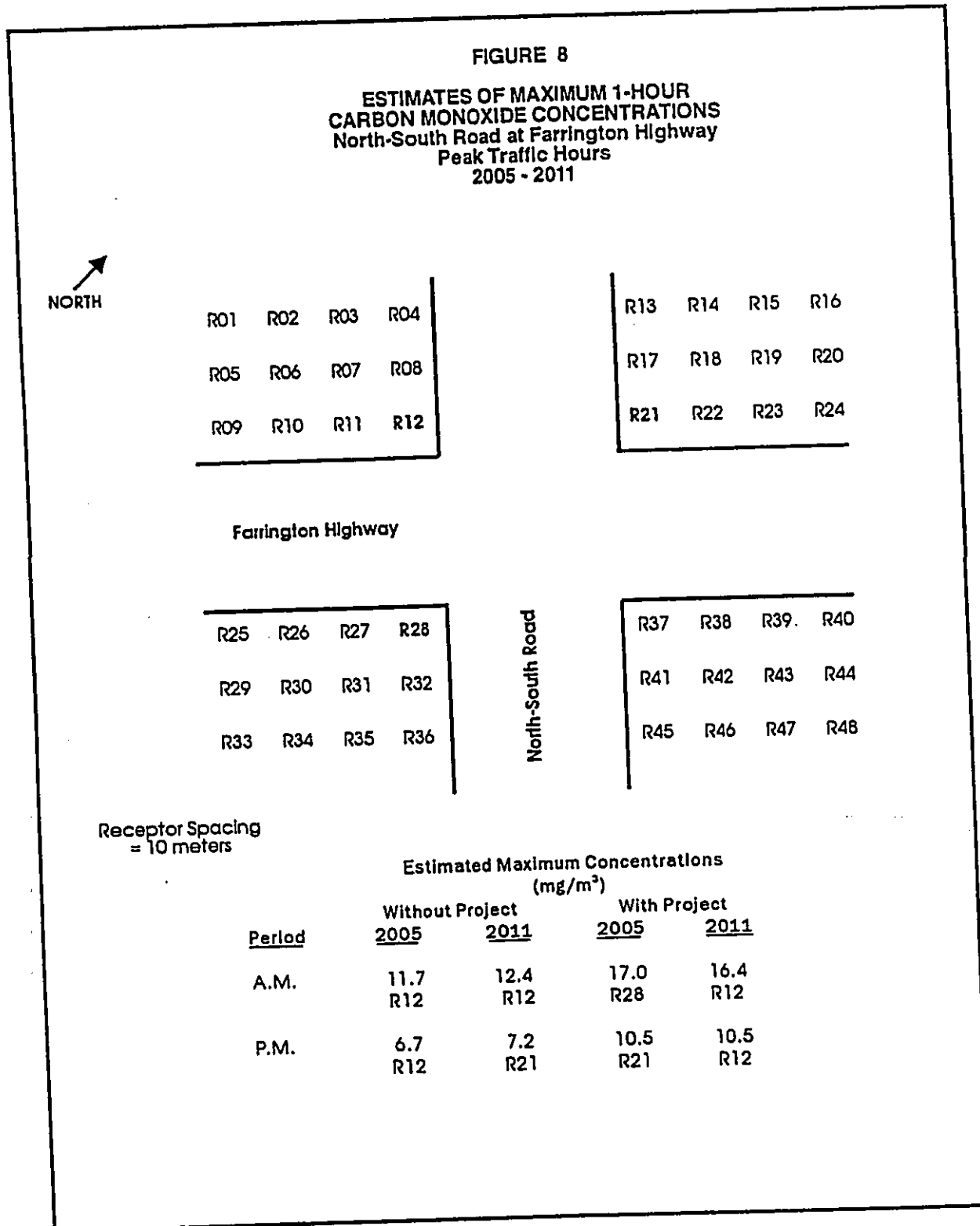
The EPA guideline model CAL3QHC [20,21] was employed to estimate near-intersection carbon monoxide concentrations. An array of 48 receptor sites at distances of 10 meters from the road edge were input to the model. Because the area is urbanizing with an increasing number of streets and traffic, a background CO concentration of 1.0 milligram per cubic meter ( $\text{mg}/\text{m}^3$ ) was assumed. The model uses an iterative process to identify the wind direction producing the maximum CO concentration at each receptor location.

**6.4 Results: 1-Hour Concentrations.** The results of this modeling are presented in Figures 6 - 9. Each figure depicts the locations of the 48 receptor sites around the respective intersections. Maximum estimated concentrations in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) for each of the evaluated scenarios are also presented along with the particular receptor location at which they were predicted.

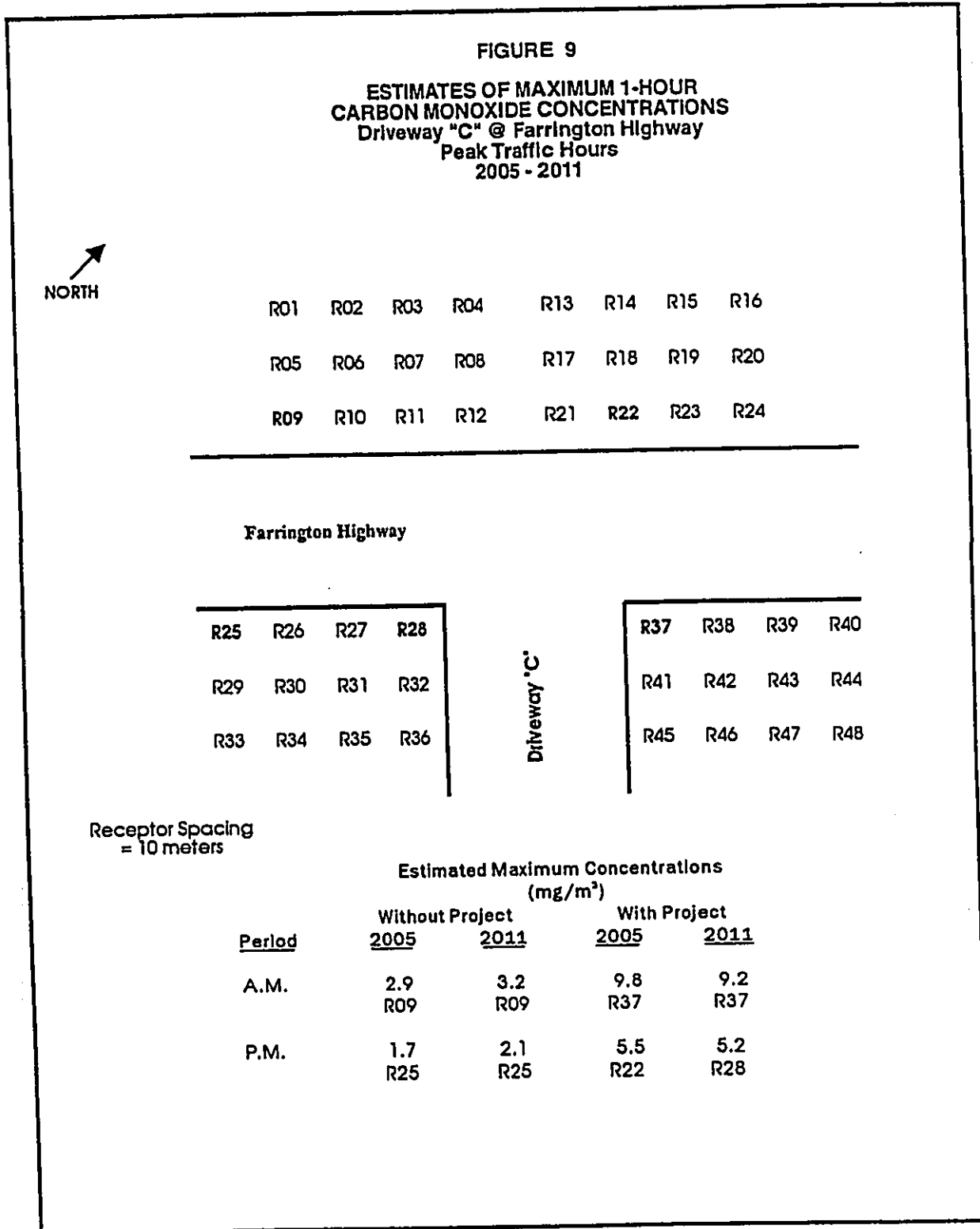
There appears to be some potential for exceedances of the state 1-hour CO standard in close proximity, i.e., within 10 meters, to the intersections along the future North-South Road during both a.m. and p.m. peak traffic hours. In fact, even without the project, exceedances are predicted during the a.m. peak hour at the intersection with Farrington Highway. No exceedances of the federal standard are predicted.











4 OCTOBER 1994

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The probability of these exceedances actually occurring, however, is low since the winds (speed and direction) and atmospheric stability conditions necessary to produce them generally occur at an overall frequency less than 1%.

6.5 Results: 8-Hour Concentrations. Estimates of 8-hour concentrations can be derived by applying a "persistence" factor of 0.6 to the 1-hour concentrations. This "persistence" factor has been recommended in an EPA publication on indirect source analysis [22] and has been further corroborated by analysis of carbon monoxide monitoring data in Honolulu which yielded the same 8-hour-to-1-hour ratio [23]. Applying this factor to the maximum 1-hour estimates indicates compliance with the federal 8-hour standard but possible exceedance of the more stringent state standard in close proximity (< 10 meters) to the intersections studied.

Again, since the probability of the estimated maximum 1-hour concentrations is low, the 8-hour values derived from those concentrations would be expected to have an even lower probability given the longer averaging time and the changes in meteorological conditions which normally occur throughout the day.

7. OFFSITE IMPACTS

7.1 Electrical Generation. The estimated 59.6 and 55.9 million kilowatt hours (kwhrs) of annual electrical demand by Phases I and II of the project, respectively, will necessitate the generation of electricity by power plants. Currently, most of Oahu's electrical energy is generated by Hawaiian Electric Company's oil-fired plants at Kahe Point and Waiiau. These units fire low sulfur (0.5%) fuel oil. The estimated emissions resulting from fuel burned to provide the power needed by the project are presented in Table 5.

7.2 Solid Waste Disposal. The refuse generated by the thousands of new residents eventually inhabiting the project area will require disposal. It is expected that most of this material will be reduced in volume by combustion prior to landfilling. Combustion will be accomplished at the existing resource recovery facility (HPOWER) located at the Campbell Industrial Park southwest of the project site. Estimates of annual emissions attributable to the burning of this waste are presented in Table 6.

TABLE 5  
ESTIMATES OF ANNUAL EMISSIONS  
DUE TO ELECTRICAL GENERATION

Pollutant	Emissions (T/yr)			Percent of 1980 Inventory
	Phase 1	Phase 2	Total	
Sulfur oxides (SOx)	163	153	316	0.6
Nitrogen oxides (NOx)	139	130	169	0.6
Particulate matter (PM)	16.2	15.2	31.4	0.2
Carbon monoxide (CO)	10.4	9.7	20.1	0.1
Total organics (TOC)	2.2	2.0	4.2	<0.1

TABLE 6  
ESTIMATES OF ANNUAL EMISSIONS  
DUE TO SOLID WASTE COMBUSTION

Pollutant	Emissions (T/yr)			Percent of 1980 Inventory
	Phase 1	Phase 2	Total	
Nitrogen oxides (NOx)	30.3	34.5	64.8	0.16
Carbon monoxide (CO)	26.7	30.5	57.2	<0.1
Sulfur oxides (SOx)	6.2	7.1	13.3	<0.1
Particulate matter (PM)	2.5	2.9	5.4	<0.1
Total hydrocarbons (THC)	1.6	1.8	3.4	<0.1

## 8. DISCUSSION, CONCLUSIONS AND MITIGATION

8.1 Short-Term Impacts. Since as noted in Section 5, there is a potential for fugitive dust due to the dry climate and fine soils, it will be important for adequate dust control measures to be employed during the construction period. Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50% [13]. The soonest possible landscaping of completed areas will also help.

8.2 Mobile Source Impacts. As noted in Section 6, possible exceedances of state carbon monoxide standards are predicted for 2005 and 2011 with the project. Factors which mitigate against this being a matter of serious concern for the proposed project are:

- the predicted exceedances were found only very close to the intersection (within 10 meters of the roadway) and at only particular receptor locations, not all close-in receptors; beyond that all standards are met.
- the probability of "worst case" conditions occurring and persisting for 1 to 8 hours is low.

8.3 Electrical Generation. The proposed project will increase electrical demand which in turn will cause more fuel to be burned and more pollutants to be emitted into Oahu's air. The estimated emissions represent relatively small increases (< 1%) over the latest available county emissions inventory. Until other nonpolluting means of generating electricity are developed or higher efficiency control technologies are applied, such increases in emissions are inevitable. Electrical demand, fuel consumption, and emissions can be reduced by energy conservations measures such as use of solar water heaters, heat pumps, proper design of buildings to reduce air conditioning needs, etc. For the present and future, the HECO facilities providing the power must demonstrate compliance with all applicable ambient air quality standards and control regulations in order to retain its operating permit.

8.4 Solid Waste Disposal. The proposed project will contribute additional solid waste which must be disposed of. Combustion of this waste to reduce its volume prior to landfilling will result in air emissions amounting to less than 0.5% of the most recent available Oahu emissions inventory. The combustion facility itself must at all times meet state and federal ambient air quality standards as well as emission limitations in its operating permit.

AQIR: EAST KAPOLEI PROJECT

4 OCTOBER 1994

The proposed project can reduce solid waste generation by encouraging recycling of materials and composting of yard waste and other natural organic materials. Recycling and composting could be made an integral part of the project.

J. W. Morrow

-22

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**AIR QUALITY IMPACT REPORT**

***EAST KAPOLEI PROJECT***

**18 December 1995**

**PREPARED FOR:**

**Schuler Homes, Inc.**

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.	INTRODUCTION.....	1
2.	AIR QUALITY STANDARDS.....	4
3.	EXISTING AIR QUALITY.....	6
3.1	General.....	6
3.2	Department of Health Monitoring.....	6
4.	CLIMATE & METEOROLOGY.....	9
4.1	Temperature and Rainfall.....	9
4.2	Surface Winds.....	9
5.	SHORT-TERM IMPACTS.....	10
5.1	Onsite Impacts.....	10
5.2	Offsite Impacts.....	10
6.	MOBILE SOURCE IMPACTS.....	14
6.1	Mobile Source Activity.....	14
6.2	Emission Factors.....	14
6.3	Modeling Methodology.....	14
6.4	Results: 1-Hour Concentrations.....	15
6.5	Results: 8-Hour Concentrations.....	15
7.	OFFSITE IMPACTS.....	20
7.1	Electrical Generation.....	20
7.2	Solid Waste Disposal.....	20
8.	DISCUSSION, CONCLUSIONS AND MITIGATION.....	21
8.1	Short-Term Impacts.....	21
8.2	Mobile Source Impacts.....	21
8.3	Electrical Generation.....	21
8.4	Solid Waste Disposal.....	21

REFERENCES

LIST OF TABLES

<u>NUMBER</u>	<u>TITLE</u>
1	Proposed Land Uses
2	Summary of State of Hawaii and Federal Ambient Air Quality Standards
3	Air Monitoring Data, Department of Health Building, 1988 - 1990
4	Speed and Direction, Honolulu International Airport
5	Estimates of Annual Emissions Due to Electrical Generation
6	Estimates of Annual Emissions Due to Solid Waste Combustion

LIST OF FIGURES

<u>NUMBER</u>	<u>TITLE</u>
1	Project Location
2	Existing Site Conditions, September 1994
3	Monthly PM <sub>10</sub> Averages, Pearl City and Barbers Point Monitoring Stations, 1990
4	January Wind Rose, Honolulu International Airport, 1940-1967
5	August Wind Rose, Honolulu International Airport, 1940-1967
6	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Driveway "B" at North-South Road, Peak Traffic Hours, 2010
7	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Driveway "A" at North-South Road, Peak Traffic Hours, 2010
8	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: North-South Road at Farrington Highway, Peak Traffic Hours, 2010
9	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Driveway "C" at Farrington Highway, Peak Traffic Hours, 2010

**AQIR: EAST KAPOLEI PROJECT**

**18 DECEMBER 1995**

**1. INTRODUCTION**

Schuler Homes, Inc. is proposing to construct a primarily residential project on an approximately 794-acre parcel in the Ewa District of the island of Oahu (Figure 1). The property was formerly used for sugar cane cultivation (Figure 2).

The intent is to complete project development by the year 2010. Proposed land uses are summarized in Table 1.

**TABLE 1  
PROPOSED LAND USES**

Land Use	Area (acres)	Density (DU/ac)	Dwelling Units (DU)
Residential	649	12/acre	8,000
Neighborhood Commercial	16		
Schools	25		
Parks	32		
Circulation	20		

The purpose of this report is to assess the impact of the proposed development on air quality on a local and regional scale. The overall project can be considered an "indirect source" of air pollution as defined in the federal Clean Air Act [1] since its primary association with air quality is its inherent attraction for mobile sources, i.e., motor vehicles. Much of the focus of this analysis, therefore, is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for the year 2010 with and without the project.

A project such as this also requires electrical power and solid waste disposal, both of which involve combustion and emissions into the air at offsite locations. These have been addressed in the report.

FIGURE 1  
PROJECT LOCATION

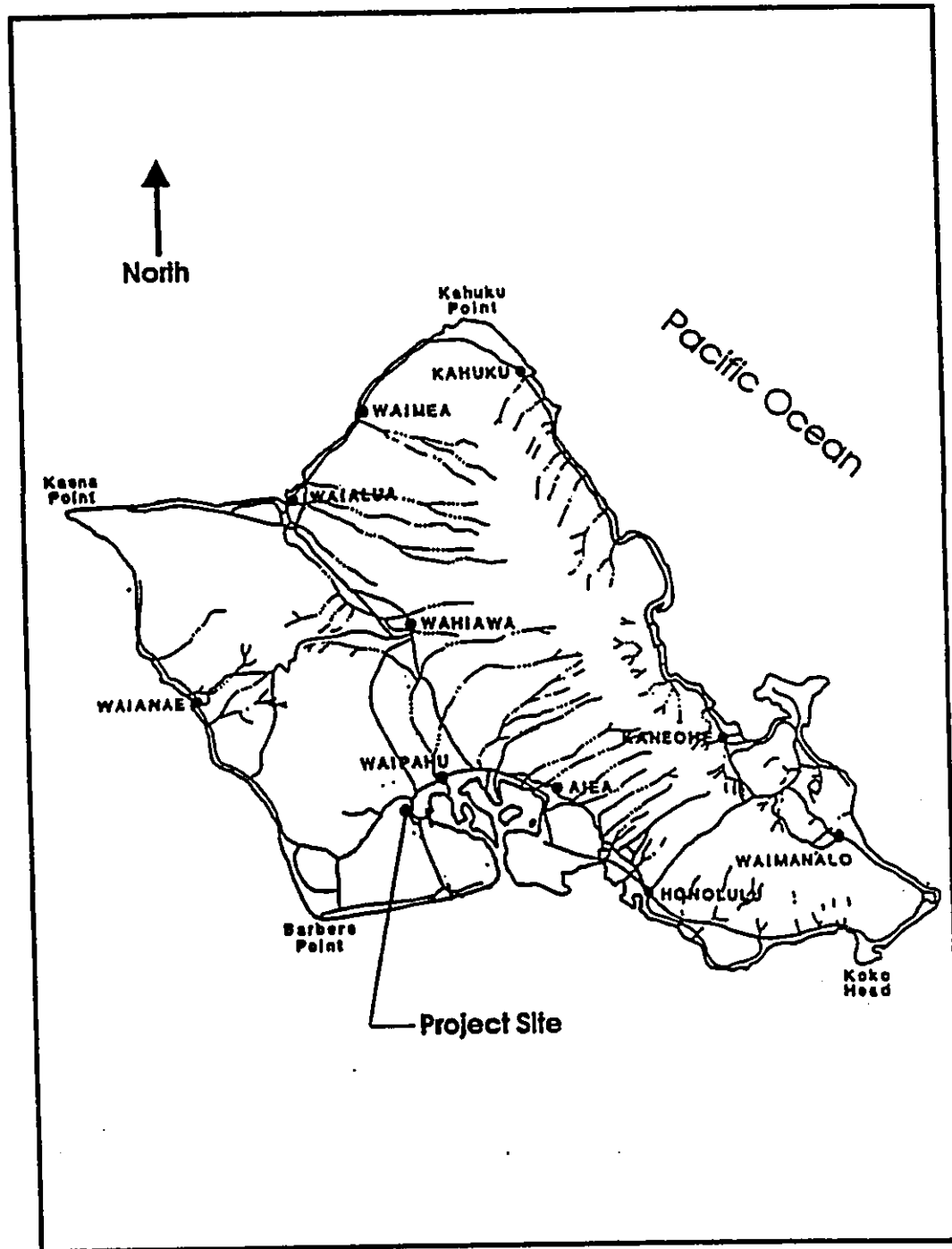
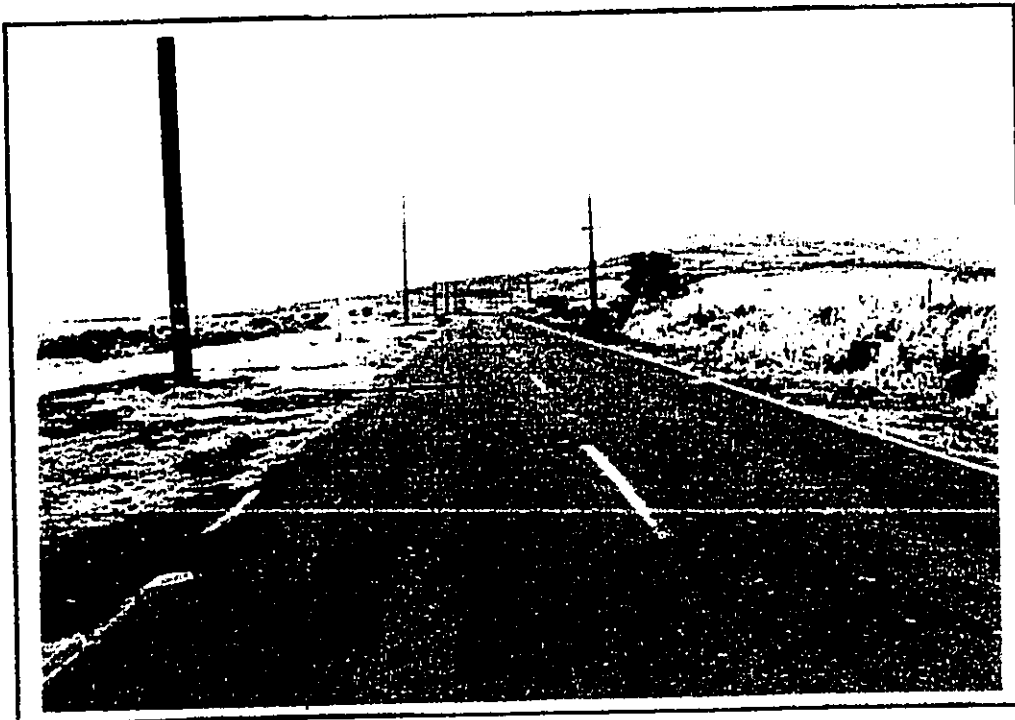


FIGURE 2

EXISTING SITE CONDITIONS  
SEPTEMBER 1994

Cane Fields  
(facing south)



Farrington Highway  
Bordering Property  
(facing southwest)

J. W. Morrow

18 DECEMBER 1995

Finally, during construction of the various buildings and facilities air pollutant emissions will be generated onsite and offsite due to vehicular movement, grading, concrete and asphalt batching, and general dust-generating construction activities. These impacts have also been addressed.

## 2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 2 [2, 3]. Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [4].

Some of Hawaii's standards (CO, NO<sub>2</sub>, and O<sub>3</sub>) are clearly more stringent than their federal counterparts but, like their federal counterparts, may be exceeded once per year. It should also be noted that in November 1993, the Governor signed amendments to Chapter 59, Ambient Air Quality Standards [3], adopting the federal standard for particulate matter equal to or less than 10 microns in diameter (PM<sub>10</sub>). Since measurement data in Hawaii indicate that PM<sub>10</sub> comprises about 50% of total suspended particulate matter (TSP), the adoption of that federal standard with a numerical value equal to the original state TSP standard of 150 µg/m<sup>3</sup> represents a substantial relaxation of the standard (approximately doubling it).

In the case of the automotive pollutants [carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>), 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 [1]. The last review resulted in the relaxation of the oxidant standard from 160 to 235 micrograms/cubic meter (ug/m<sup>3</sup>) [6]. The carbon monoxide (CO), particulate matter, sulfur dioxide (SO<sub>2</sub>), and nitrogen dioxide (NO<sub>2</sub>) standards have been reviewed, but no new standards were proposed.

TABLE 2  
SUMMARY OF STATE OF HAWAII AND FEDERAL  
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	NAAQS PRIMARY	NAAQS SECONDARY	STATE STANDARDS
PM <sub>10</sub>	Annual	50	50	50
	24-hr	150	150	150
SO <sub>2</sub>	Annual	80	---	80
	24-hr	365	---	365
	3-hr	---	1,300	1,300
NO <sub>2</sub>	Annual	100	---	70
CO	8-hr	10	---	5
	1-hr	40	---	10
O <sub>3</sub>	1-hr	235	---	100
H <sub>2</sub> S	1-hr	---	---	35
Pb	Calendar Quarter	1.5	---	1.5

KEY: TSP - total suspended particulate matter  
 PM<sub>10</sub> - particulate matter < 10 microns  
 SO<sub>2</sub> - sulfur dioxide  
 NO<sub>2</sub> - nitrogen dioxide  
 CO - carbon monoxide  
 O<sub>3</sub> - ozone  
 Pb - lead

All concentrations in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )  
 except CO which is in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ).



Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [7].

There simply can be no visible emissions from fugitive dust sources.

### 3. EXISTING AIR QUALITY

3.1 General. The State Department of Health (DOH) maintains a limited network of air monitoring stations around the state to gather data on the following regulated pollutants:

- o particulate matter  $\leq$  10 microns (PM<sub>10</sub>)
- o total suspended particulate matter (TSP)
- o sulfur dioxide (SO<sub>2</sub>)
- o carbon monoxide (CO)
- o ozone (O<sub>3</sub>)

In the case of PM<sub>10</sub> and SO<sub>2</sub>, measurements are made on a 24-hour basis to correspond with the averaging period specified in State and Federal standards. Samples are collected once every six days in accordance with U.S. Environmental Protection Agency (EPA) guidelines. Carbon monoxide and ozone, however, are measured on a continuous basis due to their short-term (1-hour) standards. Lead concentrations are determined from the TSP samples which are sent to an EPA laboratory for analysis. It should also be noted that the majority of these pollutants are monitored only in Honolulu.

3.2 Department of Health Monitoring. There are no air monitoring sites in the immediate vicinity of the project site. The nearest stations are at Pearl City and Barbers Point where PM<sub>10</sub> is measured. A summary of the most recent published data from those sites are presented in Figure 3. Particulate matter levels are well below the 50  $\mu\text{g}/\text{m}^3$  annual and 150  $\mu\text{g}/\text{m}^3$  twenty-four hour standards.

The summary of monitoring results from the Department of Health building in downtown Honolulu presented in Table 3 also indicates compliance with standards. Air quality at the project area should be comparable or perhaps somewhat better given the site's more rural location.

FIGURE 3  
MONTHLY PM<sub>10</sub> AVERAGES  
PEARL CITY AND BARBERS POINT  
MONITORING STATIONS  
1990

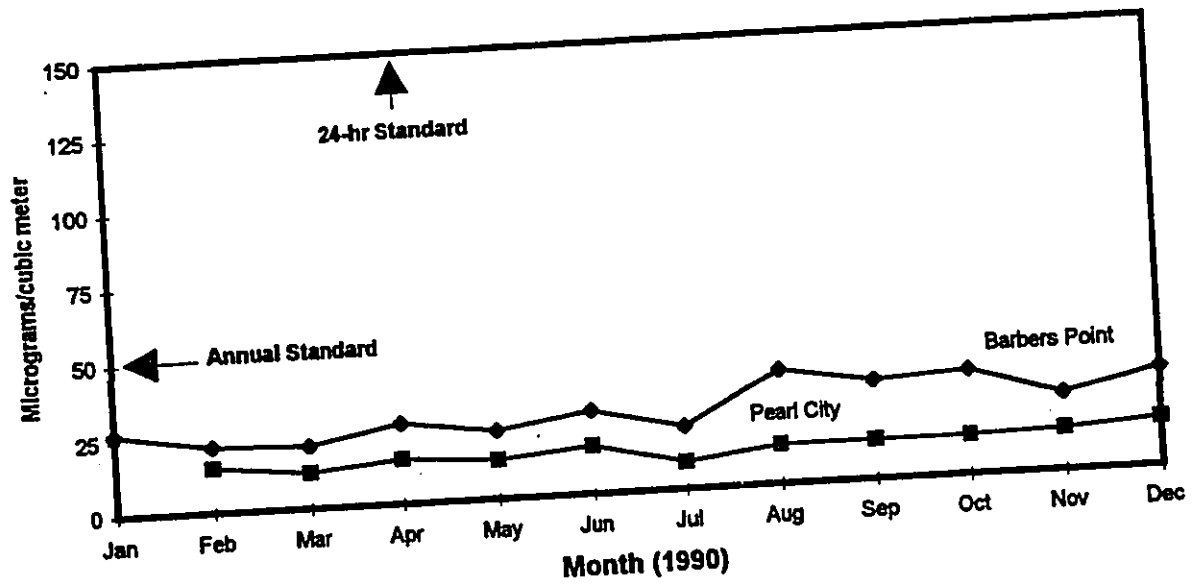


TABLE 3  
 AIR MONITORING DATA  
 DEPARTMENT OF HEALTH BUILDING<sup>1</sup>  
 1988 - 1990

POLLUTANT	Concentration ( $\mu\text{g}/\text{m}^3$ )		
	1988	1989	1990
Total Suspended Particulate Matter (TSP)	15 - 45 26	6 - 48 29	13 - 47 30
Particulate Matter < 10 microns (PM <sub>10</sub> ) <sup>2</sup>	9 - 25 17	10 - 33 16	8 - 36 15
Sulfur Dioxide (SO <sub>2</sub> )	<5 - <5 <5	<5 - 8 <5	<5 - <5 <5
Carbon Monoxide <sup>3</sup> (CO)	0.2 - 10.3 1.7	0.3 - 9.7 1.9	0.1 - 7.1 1.5
Ozone (O <sub>3</sub> ) <sup>4</sup>	0 - 92 14	0 - 94 15	4 - 116 36
Lead (Pb)	0 - 0.1 0	0 - 0.1 0	0 - 0 0
Notes:	1. Values indicate range and annual mean. 2. PM <sub>10</sub> data are from the Liliha site. 3. CO values are $\text{mg}/\text{m}^3$ . 4. O <sub>3</sub> data are from the Sand Island site.		

#### 4. CLIMATE AND METEOROLOGY

4.1 Temperature and Rainfall. Temperatures in the project area are expected to be similar to those found elsewhere in Hawaii. The nearest long-term weather station operated by the National Weather Service is located at the Honolulu International Airport. In an annual summary for that station, the National Climatic Center has summarized Honolulu's temperature regime as follows:

*Hawaii's equable temperatures are associated with the small seasonal variation in the amount of energy received from the sun and the tempering effect of the surrounding ocean. The range of temperatures averages only 7 degrees between the warmest months (August and September) and the coolest months (January and February) and about 12 degrees between day and night. Daily maximums run from the high 70's in winter to the mid-80's in summer, and daily minimums from the mid-60's to the low 70's. However, the Honolulu Airport area has recorded as high as 93 degrees and as low as 53 [9].*

Historical rainfall data from the Honolulu International Airport indicate an annual average of 23 inches. Based on this average and in accordance with Thornwaite's scheme for climatic classification, the area is considered semi-arid [10].

4.2 Surface Winds. Meteorological data records were reviewed from the nearby Honolulu International Airport and Hickam Air Force Base. The annual prevalence of northeast trade winds is clearly shown in Table 4. A closer examination of the data, however, indicates that low velocities (less than 10 mph) occur frequently and that the "normal" northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring. It is during these times that Honolulu generally experiences elevated pollutant levels. This seasonal difference in wind conditions can be easily contrasted by comparing August and January wind roses (Figures 4 and 5).

Of particular interest from an air pollution standpoint were the stability wind roses prepared for Hickam Air Force Base [11]. These data indicated that stable conditions, i.e., Pasquill-Gifford stability categories E and F [12], occur about 28% of the time on an annual basis and 36% of the time during the peak winter month (January). It is under such conditions that the greatest potential for air pollutant buildup from groundlevel sources, e.g., motor vehicles, exists.

**5. SHORT-TERM IMPACTS**

5.1 Onsite Impacts. The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along the existing roadways as well as on the project site itself. The additional construction vehicle traffic should not exceed street capacities although the presence of large trucks can reduce a roadway's capacity as well as lower average travel speeds.

The site preparation and earth moving will create particulate emissions as will building and onsite road construction. Construction vehicles movement on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust

emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 [10,13].

Onsite soils are high in clay content which suggests silt content of about 30% [14], the same as cited above. In conjunction with the semi-arid local climate (P/E Index 28.9), this suggests a potential for somewhat greater fugitive dust emissions than estimated by the EPA.

5.2 Offsite Impacts. In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt batching plants needed for construction. Such plants routinely emit particulate matter and other gaseous pollutants. It is too early, however, to identify the specific facilities that will be providing these materials and thus the discussion of air quality impacts is necessarily generic. The batch plants which will be producing the concrete for foundations, curbing, etc. and the asphalt for roadways must be permitted by the Department of Health Clean Air Branch pursuant to state regulations [7]. In order to obtain these permits they must demonstrate their ability to continuously comply with both emission [7] and ambient air quality [3] standards. Under the recently promulgated federal Title V operating permit requirements [15], now incorporated in Hawaii's rules [7], air pollution sources must regularly attest to their compliance with all applicable requirements.

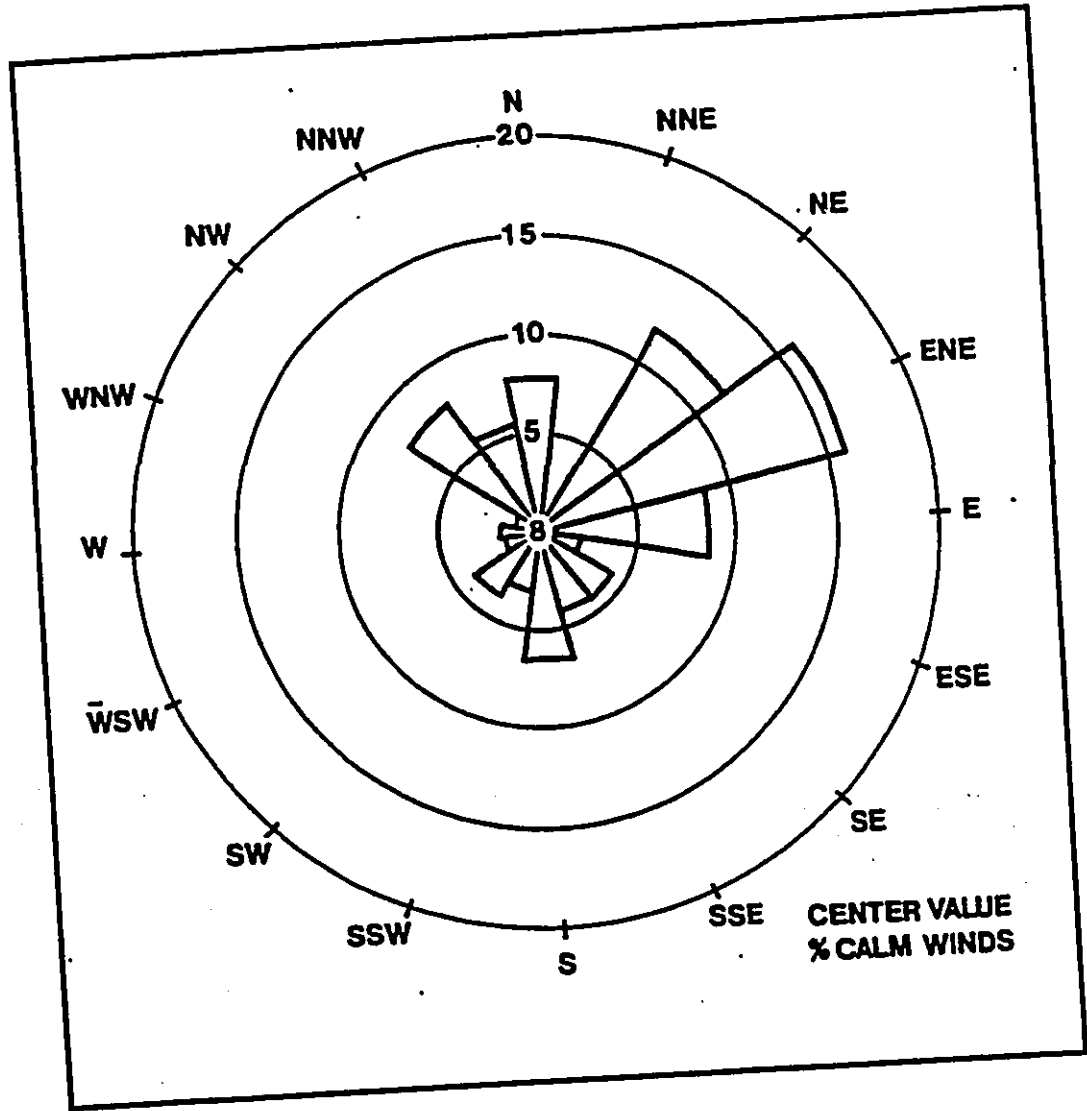
TABLE 4

**ANNUAL JOINT FREQUENCY DISTRIBUTION  
OF WIND SPEED AND DIRECTION  
HONOLULU INTERNATIONAL AIRPORT**

Direction	Wind Speed (kts)						Total
	0-3	4-7	8-12	13-18	19-24	>24	
N	.0149	.0261	.0075	.0020	.0002	.0000	.0506
NNE	.0114	.0219	.0106	.0046	.0005	.0000	.0490
NE	.0114	.0449	.0829	.0853	.0204	.0018	.2466
ENE	.0088	.0637	.1559	.1209	.0224	.0014	.3731
E	.0039	.0179	.0329	.0210	.0023	.0001	.0782
ESE	.0021	.0056	.0050	.0015	.0003	.0001	.0146
SE	.0021	.0059	.0091	.0049	.0006	.0002	.0228
SSE	.0023	.0074	.0123	.0038	.0008	.0002	.0268
S	.0025	.0104	.0127	.0033	.0005	.0003	.0296
SSW	.0011	.0041	.0053	.0017	.0003	.0000	.0125
SW	.0007	.0031	.0058	.0022	.0003	.0001	.0122
WSW	.0006	.0017	.0031	.0022	.0005	.0001	.0082
W	.0019	.0030	.0021	.0009	.0002	.0001	.0082
WNW	.0027	.0051	.0012	.0003	.0001	.0000	.0094
NW	.0084	.0153	.0031	.0008	.0003	.0000	.0279
NNW	.0087	.0166	.0041	.0012	.0002	.0000	.0308
Total	.0835	.2527	.3534	.2567	.0496	.0043	1.0002

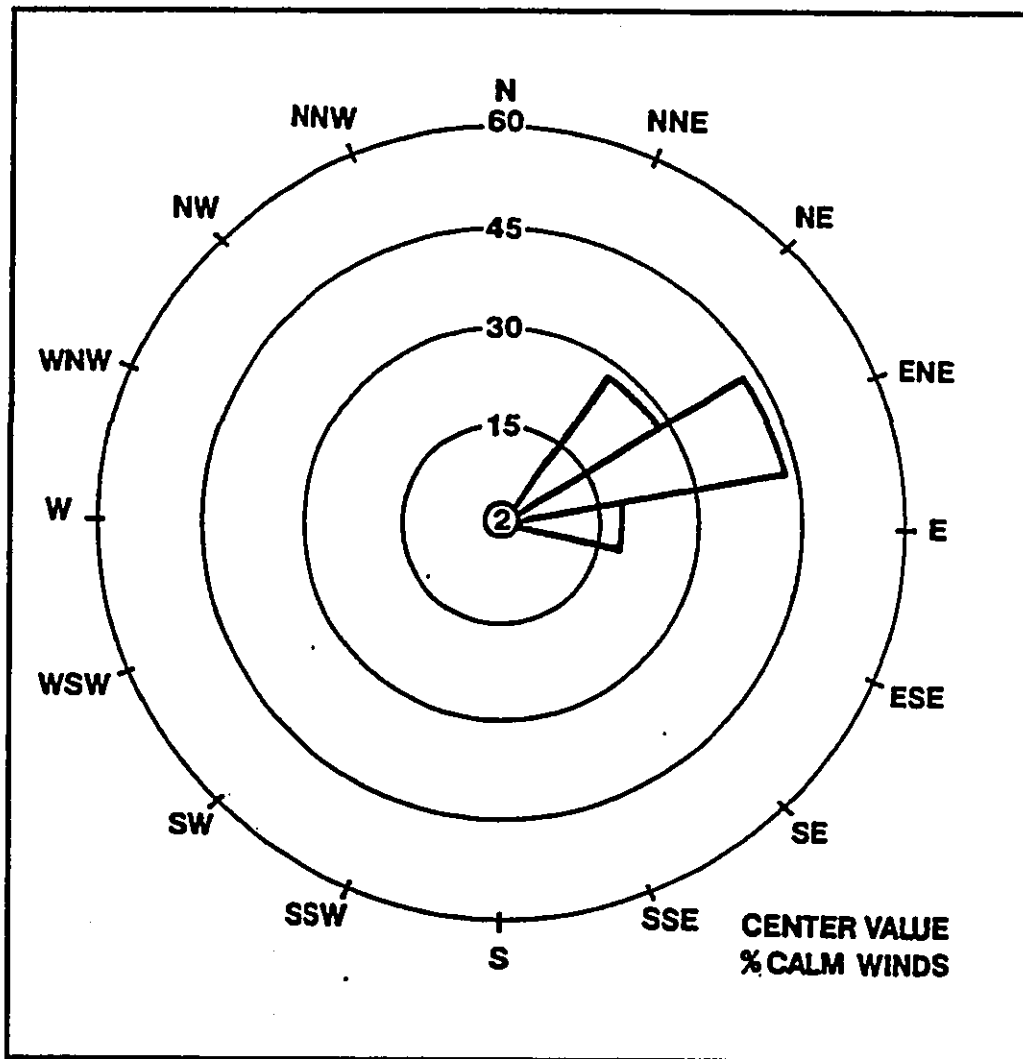
SOURCE: National Weather Service  
Historical Records, 1940-67

FIGURE 4  
JANUARY WIND ROSE  
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service  
Historical Records, 1940-67

FIGURE 5  
AUGUST WIND ROSE  
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service  
Historical Records, 1940-67



## 6. MOBILE SOURCE IMPACTS

6.1 Mobile Source Activity. The traffic assessment prepared for the proposed project served as the basis for this mobile source impact analysis [8]. Traffic projections for the year 2010 with and without the project were provided for the major intersections serving the project area.

6.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar year 2010 using the Mobile Source Emissions Model (MOBILE-5A) [16]. To localize the emission factors as much as possible, the March 1992 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 traveled as well.

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 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.

Using the available traffic data, modeling was performed for the following intersections:

- Driveway "B" @ North-South Road
- Driveway "A" @ North-South Road
- North-South Road @ Farrington Highway
- Driveway "C" @ Farrington Highway

Because of the rural nature of the area, a stable atmosphere (Category "F") [19] was assumed for the morning and a neutral atmosphere (Category "D") for afternoon peak hours. A 1 meter per second (m/sec) wind speed was also assumed as worst case meteorological conditions.

The EPA guideline model CAL3QHC [20,21] was employed to estimate near-intersection carbon monoxide concentrations. An array of 48 receptor sites at distances of 10 meters from the road edge were input to the model. Because the area is urbanizing with an increasing number of streets and traffic, a background CO concentration of 1.0 milligram per cubic meter ( $\text{mg}/\text{m}^3$ ) was assumed.

The model uses an iterative process to identify the wind direction producing the maximum CO concentration at each receptor location.

6.4 Results: 1-Hour Concentrations. The results of this modeling are presented in Figures 6 - 9. Each figure depicts the locations of the 48 receptor sites around the respective intersections. Maximum estimated concentrations in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) for each of the evaluated scenarios are also presented along with the particular receptor location at which they were predicted.

There appears to be some potential for exceedances of the state 1-hour CO standard in close proximity, i.e., within 10 meters, to the intersections along the future North-South Road during both a.m. and p.m. peak traffic hours. In fact, even without the project, exceedances are predicted during the a.m. peak hour at the intersection with Farrington Highway. No exceedances of the federal standard are predicted.

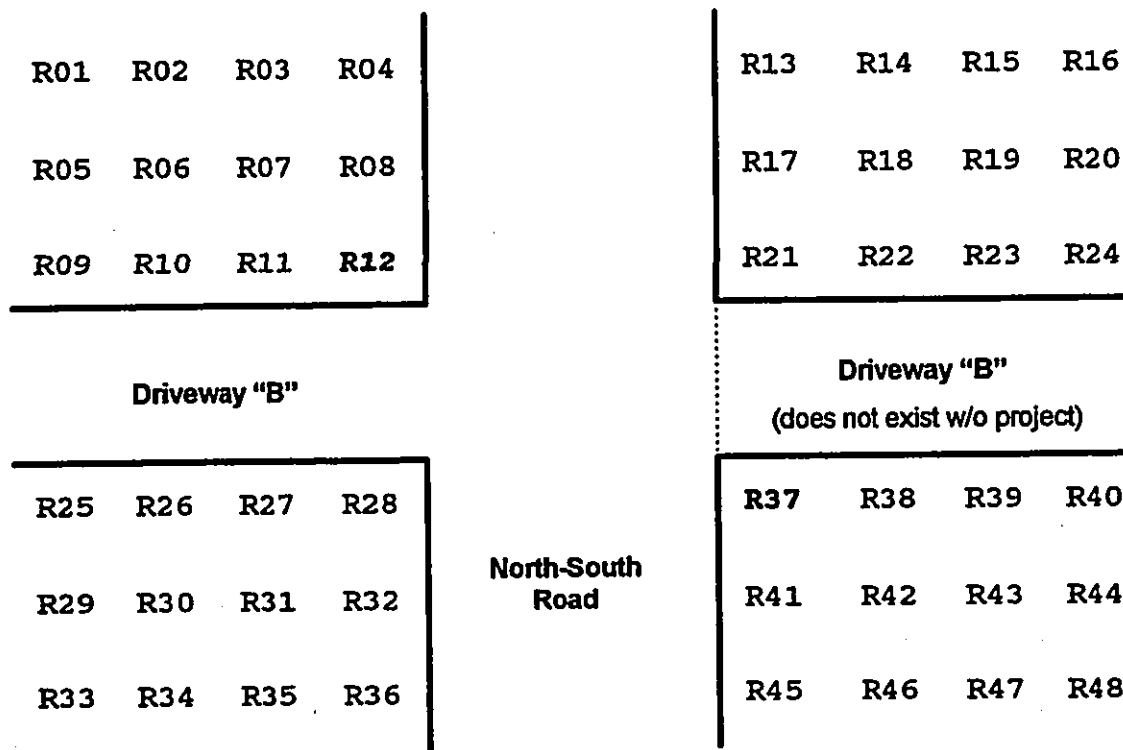
The probability of these exceedances actually occurring, however, is low since the winds (speed and direction) and atmospheric stability conditions necessary to produce them generally occur at an overall frequency less than 1%.

6.5 Results: 8-Hour Concentrations. Estimates of 8-hour concentrations can be derived by applying a "persistence" factor to the 1-hour concentrations. This "persistence" factor accounts for the fact that the worst case 1-hour meteorology and traffic volumes do not persist for 8 hours. EPA recommends calculation of a persistence factor based on actual 1-hour and 8-hour CO measurements. This was done for a recent Hawaii project [22] and yielded an average persistence factor of 0.5. Applying this factor to the maximum 1-hour estimates indicates compliance with the federal 8-hour standard but possible exceedance of the more stringent state standard in close proximity (< 10 meters) to the intersections studied.

Again, since the probability of the estimated maximum 1-hour concentrations is low, the 8-hour values derived from those concentrations would be expected to have an even lower probability given the longer averaging time and the changes in meteorological conditions which normally occur throughout the day.

FIGURE 6

ESTIMATES OF MAXIMUM 1-HOUR  
CARBON MONOXIDE CONCENTRATIONS  
Driveway "B" at North-South Road  
Peak Traffic Hours  
2010



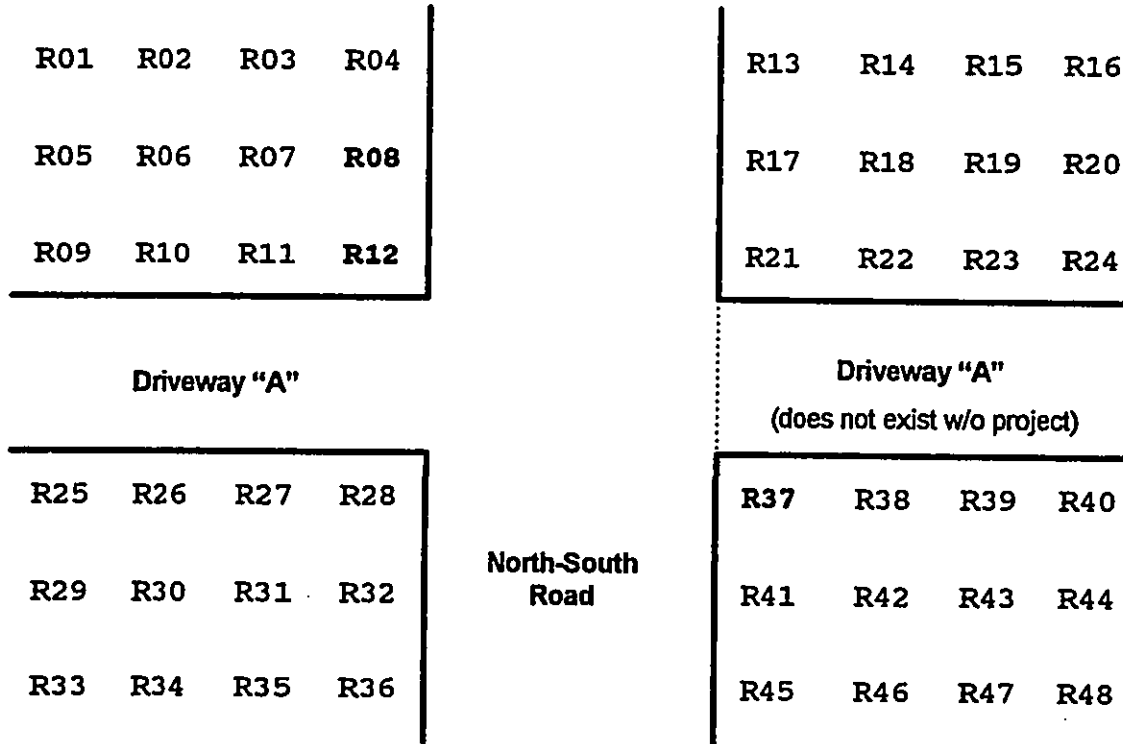
Receptor Spacing  
= 10 meters

Estimated Maximum Concentrations  
(mg/m<sup>3</sup>)

<u>Period</u>	<u>Without Project</u>	<u>With Project</u>
A.M	5.6	13.2
	R12	R37
P.M	3.5	9.5
	R12	R37

FIGURE 7

ESTIMATES OF MAXIMUM 1-HOUR  
CARBON MONOXIDE CONCENTRATIONS  
Driveway "A" at North-South Road  
Peak Traffic Hours  
2010



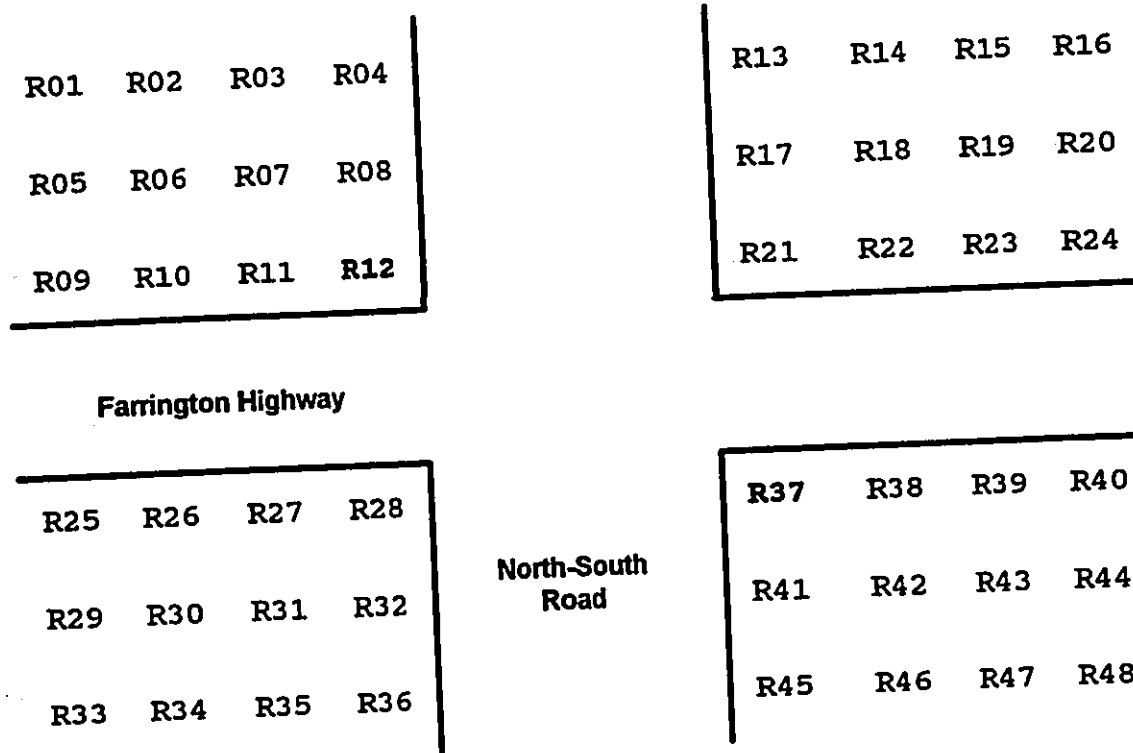
Receptor Spacing  
= 10 meters

Estimated Maximum Concentrations  
(mg/m<sup>3</sup>)

<u>Period</u>	<u>Without Project</u>	<u>With Project</u>
A.M	6.3	11.3
	R08	R37
P.M	3.8	8.5
	R12	R37

FIGURE 8

ESTIMATES OF MAXIMUM 1-HOUR  
CARBON MONOXIDE CONCENTRATIONS  
North-South Road at Farrington Highway  
Peak Traffic Hours  
2010



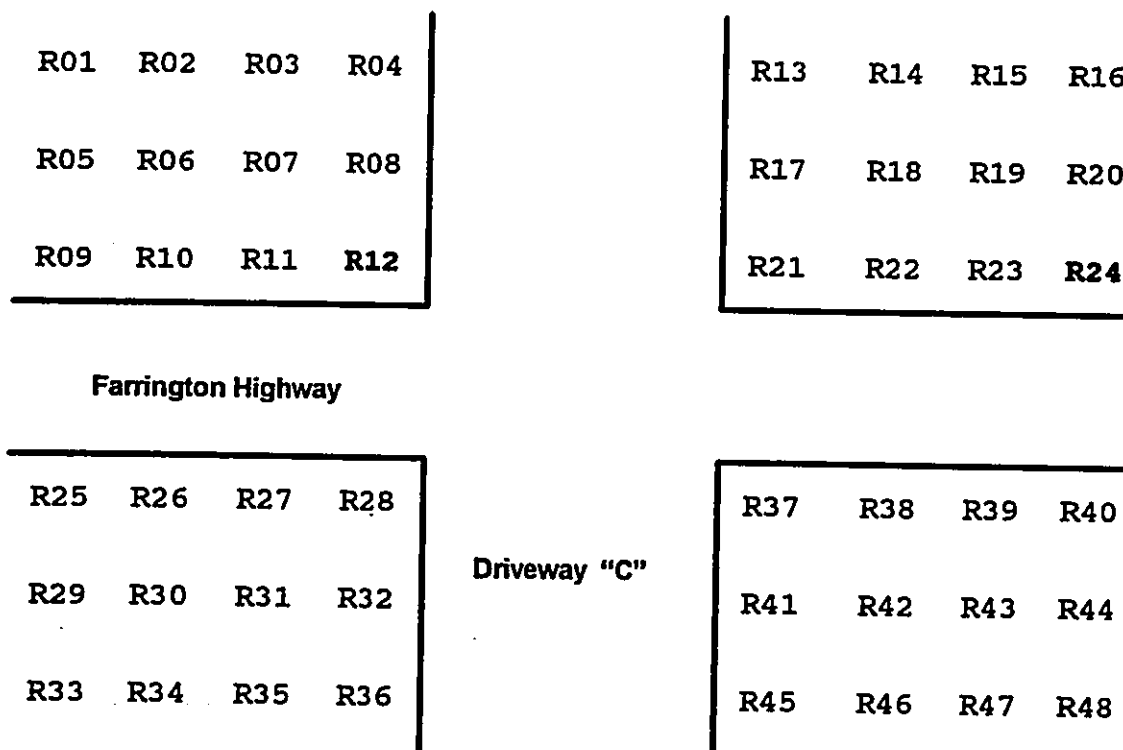
Receptor Spacing  
= 10 meters

Estimated Maximum Concentrations  
(mg/m<sup>3</sup>)

<u>Period</u>	<u>Without Project</u>	<u>With Project</u>
A.M	12.2	16.1
	R12	R37
P.M	6.5	11.4
	R12	R37

FIGURE 9

ESTIMATES OF MAXIMUM 1-HOUR  
CARBON MONOXIDE CONCENTRATIONS  
Driveway "C" at Farrington Highway  
Peak Traffic Hours  
2010



Receptor Spacing  
= 10 meters

Estimated Maximum Concentrations  
(mg/m<sup>3</sup>)

<u>Period</u>	<u>With Project</u>
A.M	10.6
	R12
P.M	7.6
	R24

## 7. OFFSITE IMPACTS

7.1 Electrical Generation. The estimated 98.1 million kilowatt hours (kwhrs) of annual electrical demand by the project will necessitate the generation of electricity by power plants. Currently, most of Oahu's electrical energy is generated by Hawaiian Electric Company's oil-fired plants at Kahe Point and Waiiau. These units fire low sulfur (0.5%) fuel oil. The estimated emissions resulting from fuel burned to provide the power needed by the project are presented in Table 5.

7.2 Solid Waste Disposal. The refuse generated by the thousands of new residents eventually inhabiting the project area will require disposal. It is expected that most of this material will be reduced in volume by combustion prior to landfilling. Combustion will be accomplished at the existing resource recovery facility (HPOWER) located at the Campbell Industrial Park southwest of the project site. Estimates of annual emissions attributable to the burning of this waste are presented in Table 6.

TABLE 5

ESTIMATES OF ANNUAL EMISSIONS  
DUE TO ELECTRICAL GENERATION

Pollutant	Emissions (T/yr)	Percent of 1980 Inventory
Sulfur oxides (SO <sub>x</sub> )	268	0.6
Nitrogen oxides (NO <sub>x</sub> )	228	0.6
Particulate matter (PM)	27	0.2
Carbon monoxide (CO)	17	<0.1
Total organics (TOC)	3.5	<0.1

TABLE 6

ESTIMATES OF ANNUAL EMISSIONS  
DUE TO SOLID WASTE COMBUSTION

Pollutant	Emissions (T/yr)	Percent of 1980 Inventory
Nitrogen oxides (NOx)	48.5	0.12
Carbon monoxide (CO)	42.7	0.02
Sulfur oxides (SOx)	9.9	0.02
Particulate matter (PM)	4.1	0.03
Total hydrocarbons (THC)	2.5	0.01

## 8. DISCUSSION, CONCLUSIONS AND MITIGATION

8.1 Short-Term Impacts. Since as noted in Section 5, there is a potential for fugitive dust due to the dry climate and fine soils, it will be important for adequate dust control measures to be employed during the construction period. Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50% [13]. The soonest possible landscaping of completed areas will also help.

8.2 Mobile Source Impacts. As noted in Section 6, possible exceedances of state carbon monoxide standards are predicted for 2010 with the project. Factors which mitigate against this being a matter of serious concern for the proposed project are:

- the predicted exceedances were found only very close to the intersection (within 10 meters of the roadway) and at only particular receptor locations, not all close-in receptors; beyond that all standards are met.
- the probability of "worst case" conditions occurring and persisting for 1 to 8 hours is low.



8.3 Electrical Generation. The proposed project will increase electrical demand which in turn will cause more fuel to be burned and more pollutants to be emitted into Oahu's air. The estimated emissions represent relatively small increases (< 1%) over the latest available county emissions inventory. Until other nonpolluting means of generating electricity are developed or higher efficiency control technologies are applied, such increases in emissions are inevitable. Electrical demand, fuel consumption, and emissions can be reduced by energy conservations measures such as use of solar water heaters, heat pumps, proper design of buildings to reduce air conditioning needs, etc. For the present and future, the HECO facilities providing the power must demonstrate compliance with all applicable ambient air quality standards and control regulations in order to retain its operating permit.

8.4 Solid Waste Disposal. The proposed project will contribute additional solid waste which must be disposed of. Combustion of this waste to reduce its volume prior to landfilling will result in air emissions amounting to less than 0.5% of the most recent available Oahu emissions inventory. The combustion facility itself must at all times meet state and federal ambient air quality standards as well as emission limitations in its operating permit. The proposed project can reduce solid waste generation by encouraging recycling of materials and composting of yard waste and other natural organic materials. Recycling and composting could be made an integral part of the project.

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POTABLE WATER MASTER PLAN FOR THE EAST KAPOLEI AREA,  
OCTOBER 1994;  
ADDENDUM REPORT FOR THE EAST KAPOLEI POTABLE WATER MASTER PLAN,  
DECEMBER 1995.

TOM NANCE WATER RESOURCE ENGINEERING

**Potable Water Master Plan  
for the  
East Kapolei Area**

*Prepared for*

**Gray Hong Bills & Associates, Inc.  
119 Merchant Street - Suite 607  
Honolulu, Hawaii 96813**

*Prepared by*

**Tom Nance Water Resource Engineering  
680 Ala Moana Boulevard - Suite 406  
Honolulu, Hawaii 96813**

**October 1994**

*THE ESTATE OF JAMES CAMPBELL*

October 6, 1994

Mr. Michael G. Angotti  
Director of Land Sales  
Schuler Homes, Inc.  
828 Fort Street Mall, 4th Floor  
Honolulu, Hawaii 96813

Dear Mike:

Re: Schuler Ewa Water Master Plan

I am writing this letter to explain Campbell Estate's position regarding the identification of the Ewa Shaft (EP 15 and 16) as the water source for the proposed Schuler Homes project in Ewa. It is important that a copy of this letter be included with the submission of your Water Master Plan to the Land Use Commission and any other governmental agency involved with your project.

As we have discussed, the Estate intends to reserve all water rights with respect to the lands that Schuler intends to acquire from the Estate for this project. These rights include the ownership and operation of the Ewa Shaft which will be a water source for the Estate's activities including on-going agricultural operations upon expiration of the Oahu Sugar Company Ltd. Lease on June 30, 1995.

We have received correspondence from the Board of Water Supply indicating they are interested in owning the Ewa Shaft. Our response to them is "...that the loss of the Ewa Shaft or the water therefrom would cause significant and possible irreparable damage to the Estate. Furthermore, the Estate's loss of use of the Ewa Shaft through eminent domain or regulation, or both, would entitle the Estate to substantial compensation, not only for such loss, but also for loss of value to the Estate's surrounding lands."

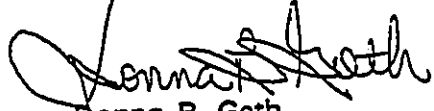
To date, the Estate has received no proposal from the Board of Water Supply which addresses any terms and conditions which would mitigate the Estate's concerns.

We would prefer that you delete any references to the Ewa Shaft as a potential water source. Inasmuch as you desire to provide as much detail as possible in your entitlement applications, your cooperation by including this explanation with your Water Master Plan submissions will help the Estate continue to defend its rights.

Mr. Michael G. Angotti  
October 6, 1994  
Page 2

I am available to respond to any questions.

Very truly yours,



Donna B. Goth  
Director, Hawaii Development

cc: Gray, Hong, Bills & Associates  
David B. Bills

Estate of James Campbell  
Jan Burns  
George Hiu

**Table of Contents**

	<u>Page</u>
Introduction .....	1
Projected Potable Water Supply Requirements .....	3
Layout of the Proposed Water System .....	3
Hydraulic Analysis of the 228-Foot Service Zone Distribution Pipe Network .....	8
Hydraulic Analysis of the 440-Foot Service Zone Distribution Pipe Network .....	8

**List of Figures**

<u>No.</u>	<u>Title</u>	
1	Land Use Areas Included in the East Kapolei Potable Water Master Plan .....	2
2	Proposed East Kapolei Potable Water System .....	6
3	Layout of the Proposed Storage Tanks, Transmission Pipelines, and Booster Pumping Station .....	7
4	Hydraulic Schematic of the 228-Foot Service Pressure Zone .....	9
5	Hydraulic Schematic of the 440-Foot Service Pressure Zone .....	10

**List of Tables**

<u>No.</u>	<u>Title</u>	
1	Water Demands for Projects in the 228-Foot Service Zone .....	4
2	Water Demands for Projects in the 440-Foot Service Zone .....	5

**Exhibit**

- 1 Hydraulic Analysis of the 228-Foot Service Zone
- 2 Hydraulic Analysis of the 440-Foot Service Zone
- 3 Hydraulic Analysis of the 440-Foot Service Zone With Two 5,000 GPM Pumps On



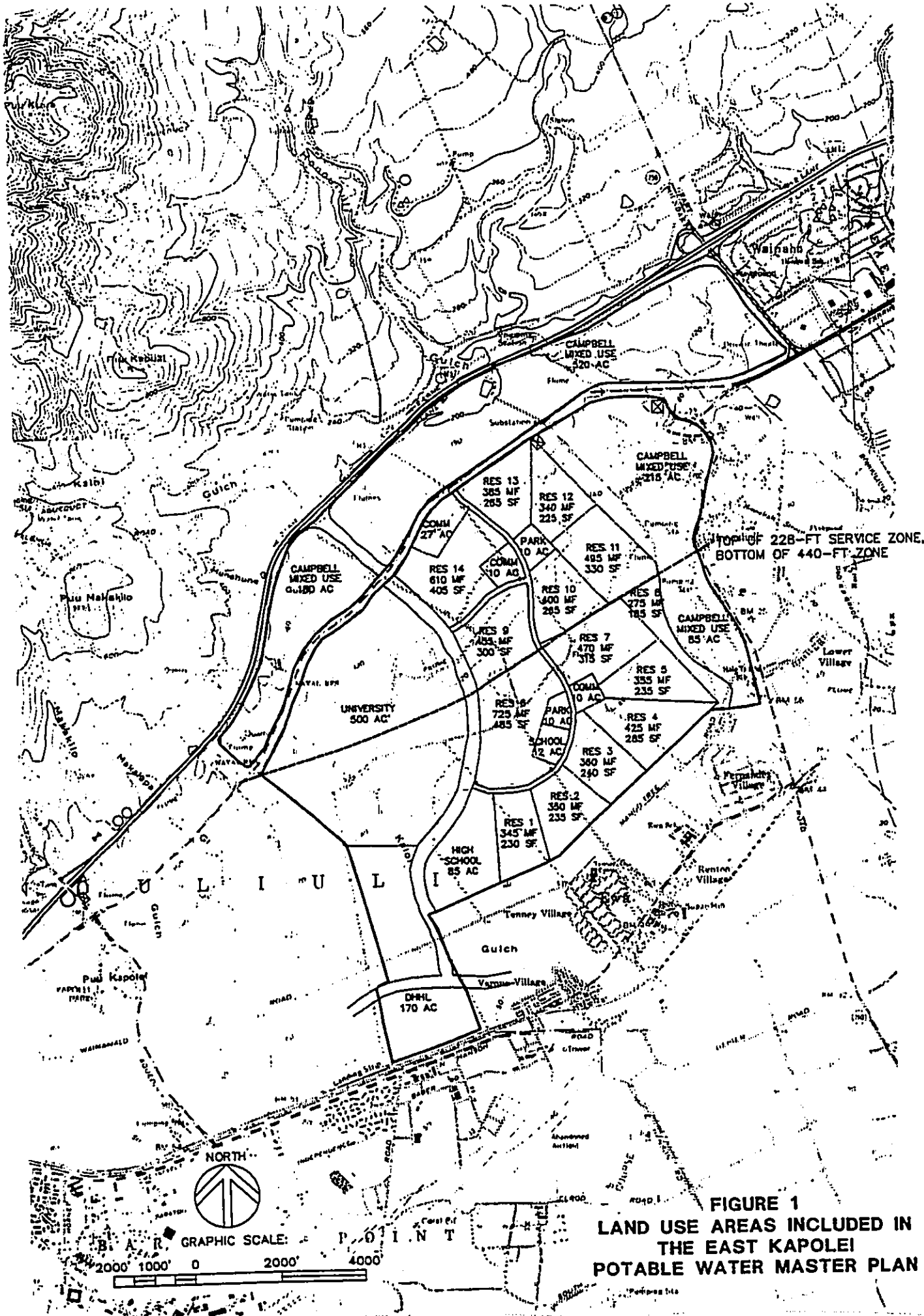
## Introduction

This water master plan has been created for the East Kapolei area of Ewa shown on Figure 1. Projects and lands included in the master plan are:

- The East Kapolei Project of Schuler Homes, Inc. consisting of 10,000 residential units and school, park, and commercial sites on 1,022 acres;
- The University of Hawaii's West Oahu Campus on 500 acres;
- An 85-acre high school site;
- Residential development by the Department of Hawaiian Home Lands on 170 acres; and
- Mixed use development on 1,000 acres of Campbell Estate land, generally comprising the mauka and eastern portions of the master planned area.

The master plan establishes storage, transmission, and distribution requirements for all potable system facilities. All of these facilities would be new, stand-alone improvements and are analyzed as such in this Master Plan. However, the plan does not deal directly with sources of supply. A possible source is the shaft known as EP 15 & 16 (State Well No. 2202-21). Oahu Sugar Company's (OSCO) use of the shaft is scheduled to end in June 1995. Other possible sources would be located further east toward Waipahu. The Board of Water Supply will designate the source after allocations are set by the State Commission on Water Resource Management. Although EP 15 & 16 is shown as the source in graphic presentations in this Master Plan, this does not imply that Campbell Estate supports use of EP 15 & 16 for this purpose.

The caprock underlying the makai half to two-thirds of the master plan area is comprised of alluvium and poorly permeable marine calcareous deposits. In the mauka area, it is entirely alluvium. Attempts to develop brackish wells for irrigation supply have shown that the caprock formation here does not have sufficient permeability for successful well development. Based on this, all potential non-potable irrigation sources for the master plan area are offsite. They are: Waiahole Ditch; OSCO basalt aquifer wells in lower Honouliuli (EP 3 & 4, 5 & 6, and 7 & 8, State Nos. 2102-02, -04 to -22, 2202-03 to -14, and 2202-15 to 20, respectively); and polished effluent from the City's Honouliuli Wastewater Treatment Plant. None of these prospective sources are currently available. Issues of ownership, water use allocation, present use by OSCO through June 1995, and required infrastructure development will delay their possible use for a number of years. Accordingly, this master plan assumes that all water supply requirements will be provided by the potable system.



**FIGURE 1**  
**LAND USE AREAS INCLUDED IN**  
**THE EAST KAPOLEI**  
**POTABLE WATER MASTER PLAN**

## Projected Potable Water Supply Requirements

The master plan area extends from elevations of 25 to 40 feet on its makai and east boundaries to just over 200 feet on the makai side of H-1 Freeway. These elevations span two service pressure zones which will be served from storage tanks with 228- and 440-foot tank spillway elevations. The boundary between the two service zones is shown on Figure 1. Ground elevations are typically 105 to 110 feet along the divide between the service areas.

Tables 1 and 2 provide parcel-by-parcel tabulations of the average, maximum day, and peak water demands within the 228- and 440-foot service zones, respectively. The total supply requirements are as follows:

Service Zone	Average (MGD)	Max. Day (MGD)	Peak (MGD)
228-Foot	5.0000	7.5000	15.0000
440-Foot	7.7360	11.6040	23.2080
Total	12.7360	19.1040	38.2080

## Layout of the Proposed Water System

Figure 2 is a layout of proposed water system improvements. For purposes of illustration, EP 15 & 16 is shown as the source of supply. Well pumping capacity of 28.656 MGD (19,900 GPM) would ultimately be required to provide the 19.104 MGD maximum day use in 16 hours for both service zones. The initial phase of development will consist of 500 acres of the Schuler project, all in the 228-foot service zone. Its maximum day supply requirement of 3.5287 MGD would require an initial well pumping capacity of 5.293 MGD (3,675 GPM).

Storage tanks for the 228-foot system would be located on a promontory on the makai side of H-1 Freeway. Figure 3 is a schematic layout of the initial 4 MG and subsequent 3.5 MG tanks that would be located there. Both tanks would have 20-foot working heights, 228-foot spillway elevations, and 208-foot finished floor elevations. Use of this site is predicated on utilizing berms and landscaping so the tank is visually acceptable to Campbell Estate.

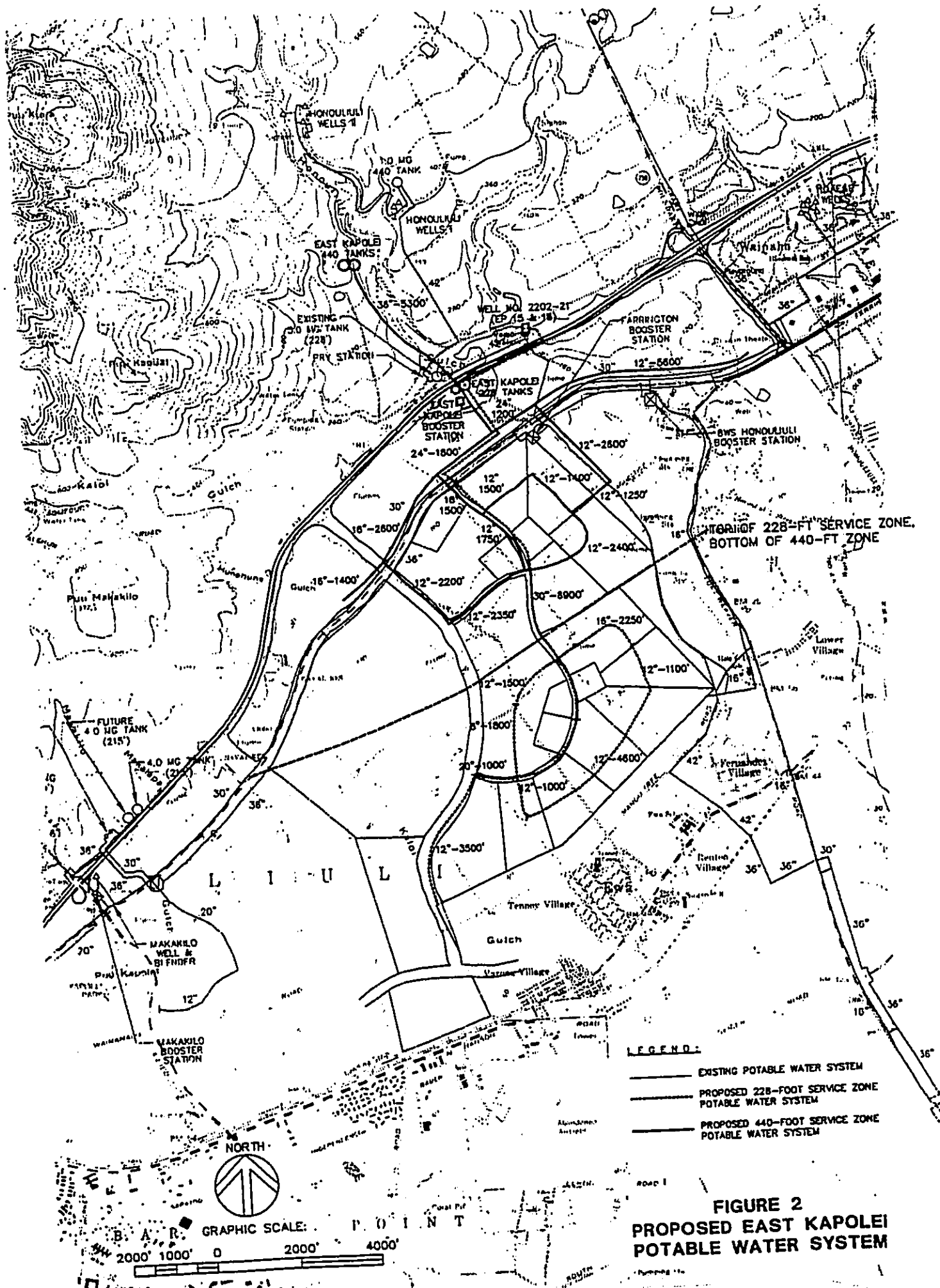
Table 1  
Water Demands for Projects in the 228-Foot Service Zone

Development Parcel	No. of Units	Area (Acres)	Unit Demand (GPD/Unit)	Water Demand Rates (MGD)			Location of Demand on Hydraulic Schematic (Node No. on Figure 4)
				Average Day	Maximum Day	Peak	
Schular Res 1 - MF	345		400	0.1380	0.2070	0.4140	10
	230		500	0.1150	0.1725	0.3450	10
Res 2 - MF	350		400	0.1400	0.2100	0.4200	9
	235		500	0.1175	0.1762	0.3525	9
Res 3 - MF	360		400	0.1440	0.2160	0.4320	9
	240		500	0.1200	0.1800	0.3600	9
Res 4 - MF	425		400	0.1700	0.2550	0.5100	8
	285		500	0.1425	0.2138	0.4275	8
Res 5 - MF	355		400	0.1420	0.2130	0.4260	8
	235		500	0.1175	0.1762	0.3525	8
Res 6 - MF	725		400	0.2900	0.4350	0.8700	11
	485		500	0.2425	0.3638	0.7275	11
Res 7 - MF	470		400	0.1880	0.2820	0.5640	6
	315		500	0.1575	0.2362	0.4725	6
Res 8 - MF	275		400	0.1100	0.1650	0.3300	7
	185		500	0.0925	0.1388	0.2775	7
Commerical		10	4,000	0.0400	0.0600	0.1200	2
Park		10	4,000	0.0400	0.0600	0.1200	2
Elem. School		12	4,000	0.0480	0.0720	0.1440	2
High School		85	4,000	0.3400	0.5100	1.0200	4
University (Lower Hall)		250	4,000	1.0000	1.5000	3.0000	4
DHHL		170	4,000	0.6800	1.0200	2.0400	5
Campbell Mixed Use (Portion D)		85	5,000	0.4250	0.6375	1.2750	7
<b>Totals</b>	<b>5,515</b>	<b>622</b>	<b>--</b>	<b>5.0000</b>	<b>7.5000</b>	<b>15.0000</b>	<b>--</b>

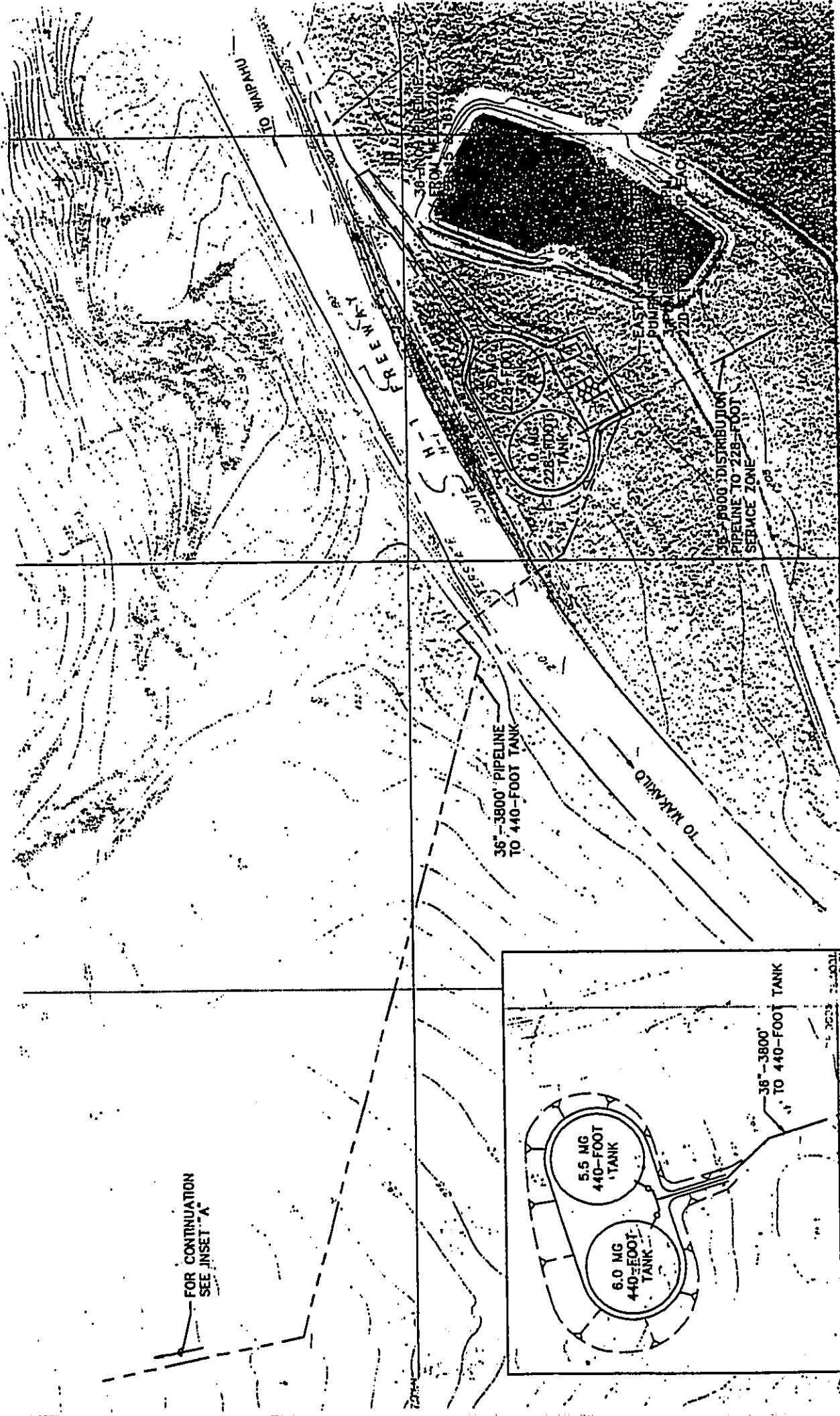
Table 2

Water Demands for Projects in the 440-Foot Service Zone

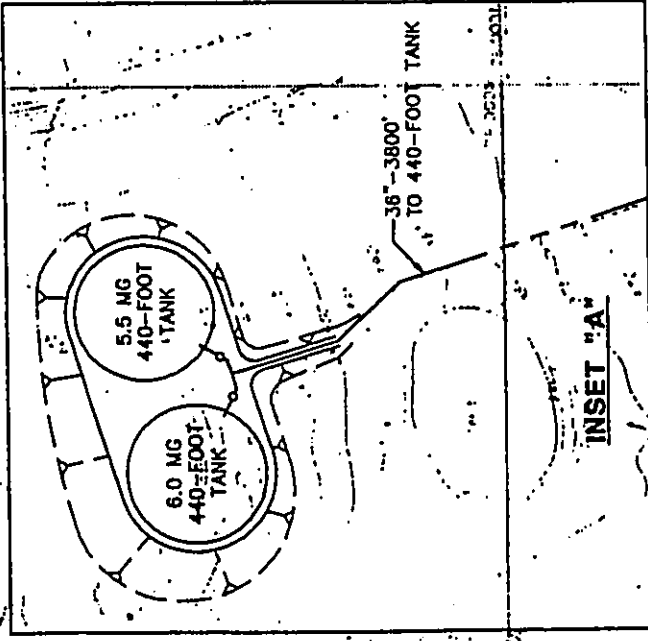
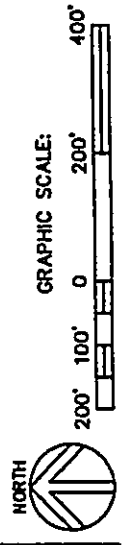
Development Parcel	No. of Units	Area (Acres)	Unit Demand (GPD/Unit)	Water Demand Rates (MGD)			Location of Demand on Hydraulic Schematic (Node No. on Figure 4)
				Average Day	Maximum Day	Peak	
Schuler Res 9 - MF	455		400	0.1820	0.2730	0.5460	5 & 6
SF	300		500	0.1500	0.2250	0.4500	5 & 6
Res 10 - MF	400		400	0.1600	0.2400	0.4800	7
SF	265		500	0.1325	0.1988	0.3975	7
Res 11 - MF	495		400	0.1980	0.2970	0.5940	7
SF	330		500	0.1650	0.2475	0.4950	7
Res 12 - MF	340		400	0.1360	0.2040	0.4080	9
SF	225		500	0.1125	0.1688	0.3375	9
Res 13 - MF	395		400	0.1580	0.2370	0.4740	9
SF	265		500	0.1325	0.1987	0.3975	9
Res 14 - MF	610		400	0.2440	0.3660	0.7320	5 & 10
SF	405		500	0.2025	0.3037	0.6075	5 & 10
Park		10	4,000	0.0400	0.0600	0.1200	6
Commercial		10	4,000	0.0400	0.0600	0.1200	6
University (Upper Half)		250	4,000	1.0000	1.5000	3.0000	4 & 5
Campbell Est. Commercial		27	4,000	0.1080	0.1620	0.3240	2
Mixed Use		180	5,000	0.9000	1.3500	2.7000	4
Mixed Use		520	5,000	2.6000	3.9000	7.8000	2, 12, & 13
Mixed Use		215	5,000	1.0750	1.6125	3.2250	11 & 12
<b>Totals</b>	<b>4,485</b>	<b>1,212</b>	<b>--</b>	<b>7.7360</b>	<b>11.6040</b>	<b>23.2080</b>	<b>--</b>



**FIGURE 2  
PROPOSED EAST KAPOLEI  
POTABLE WATER SYSTEM**



**FIGURE 3**  
**LAYOUT OF THE PROPOSED STORAGE TANKS,**  
**TRANSMISSION PIPELINES, AND**  
**BOOSTER PUMPING STATION**



Storage for the 440-foot zone would be on the mauka side of the freeway (also shown on Figure 3). The 36-inch connecting transmission-distribution pipeline to the 440-foot tanks would be tunnelled through H-1 Freeway. The alternative to tunneling would be to route the pipeline underneath the Honouliuli Gulch bridge. The substantially greater length of this route would be more costly. Also, the remaining space through the Honouliuli Gulch opening is actually quite limited, particularly if EP 15 & 16 becomes the source of supply. The required ultimate storage capacity of 11.604 in the 440-foot zone would be provided by 6.0 and 5.5 MG tanks. A booster pumping station at the 228-tanks would lift water into the 440-foot tanks. Its ultimate capacity will have to be 17.406 MGD (12,087 GPM). This would be provided by three identical pumps with rated capacities of 6,000 GPM against 220-foot TDH and driven by 450 HP motors.

Except for the North-South Road and a major collector through the Schuler project, the roadway network through the master plan area has not yet been finalized. Portions of the layout of distribution pipelines shown on Figure 2 assume the existence of a road system which the pipelines would follow. When planning of these areas is further refined, the pipeline routes can be adjusted to match the actual roadway pattern.

#### **Hydraulic Analysis of the 228-Foot Service Zone Distribution Pipe Network**

The schematic drawing on Figure 4 identifies pipe and node numbers used for the pipe network analyses of the 228-foot service zone. Table 1 identifies the nodes to which water demands of each of the development parcels were assigned. The analysis itself was done with the Kentucky Pipe Network computer program. Exhibit 1 is a printout of its results. All BWS criteria for allowable velocities and minimum pressures during peak and fire flow conditions are met with the pipe sizes chosen. The hydraulic analysis is based on a stand-alone system without interconnections to existing facilities. However, interconnection with the 42-inch, mauka-makai pipeline installed by EPWDC would ultimately be appropriate to provide operational flexibility and backup capacity.

#### **Hydraulic Analysis of the 440-Foot Service Zone Distribution Pipe Network**

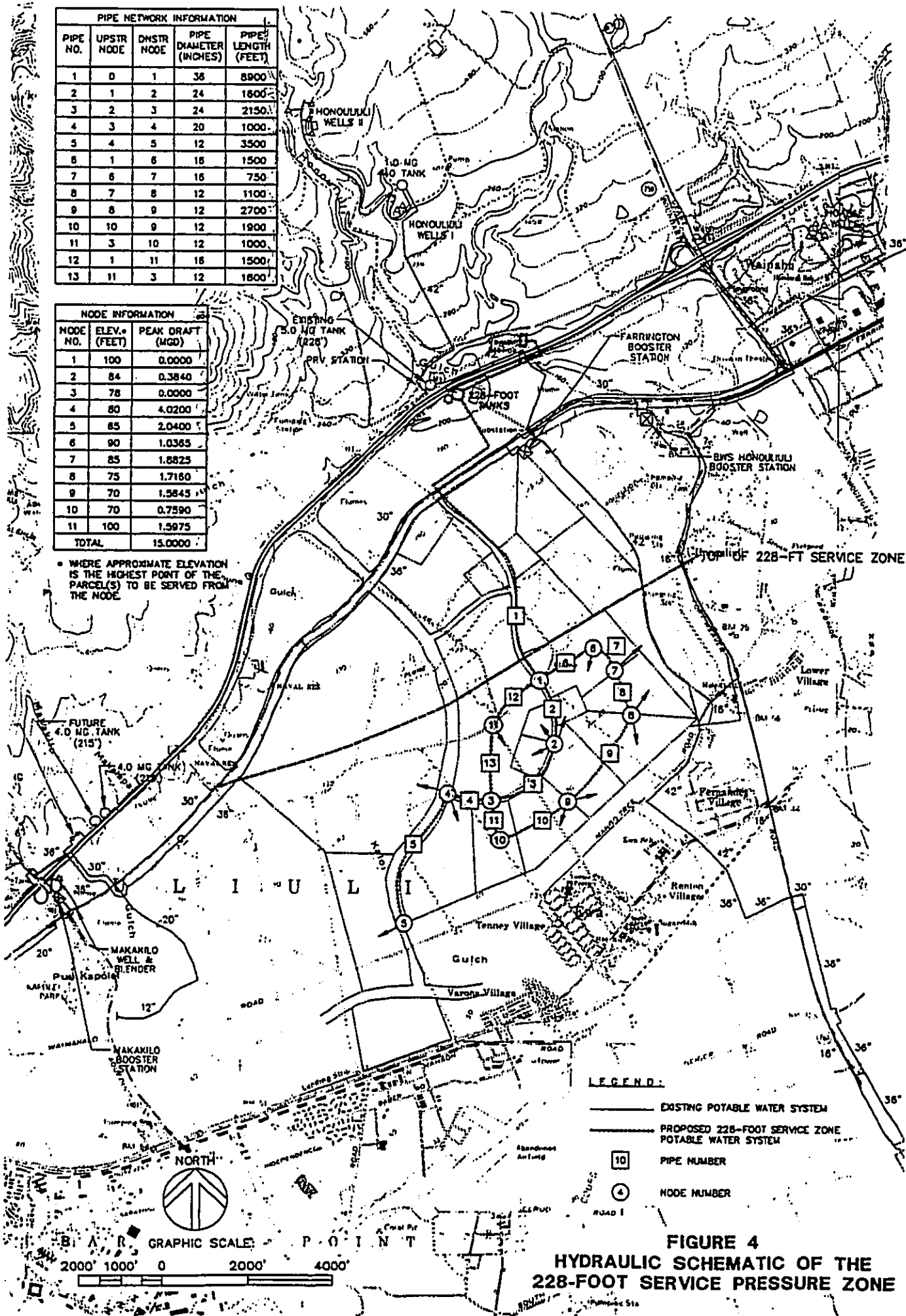
A schematic depiction of the distribution system for the 440-foot service zone is shown on Figure 5. Assignment of water demands to nodes in the network is indicated on the right-hand side of Table 2. Exhibit 2 is a printout of the computer analysis of the pipe network based on gravity delivery from the 440-foot tank. As with the 228-foot zone, all velocities and residual pressures meet BWS criteria for peak and fire flow conditions.



PIPE NETWORK INFORMATION				
PIPE NO.	UPSTR NODE	DNSTR NODE	PIPE DIAMETER (INCHES)	PIPE LENGTH (FEET)
1	0	1	36	8900
2	1	2	24	1800
3	2	3	24	2150
4	3	4	20	1000
5	4	5	12	3500
6	1	6	18	1500
7	6	7	18	750
8	7	8	12	1100
9	8	9	12	2700
10	10	9	12	1900
11	3	10	12	1000
12	1	11	18	1500
13	11	3	12	1800

NODE INFORMATION		
NODE NO.	ELEV. (FEET)	PEAK DRAFT (MGD)
1	100	0.0000
2	84	0.3840
3	78	0.0000
4	80	4.0200
5	85	2.0400
6	90	1.0365
7	85	1.6825
8	75	1.7180
9	70	1.5845
10	70	0.7590
11	100	1.5975
TOTAL		15.0000

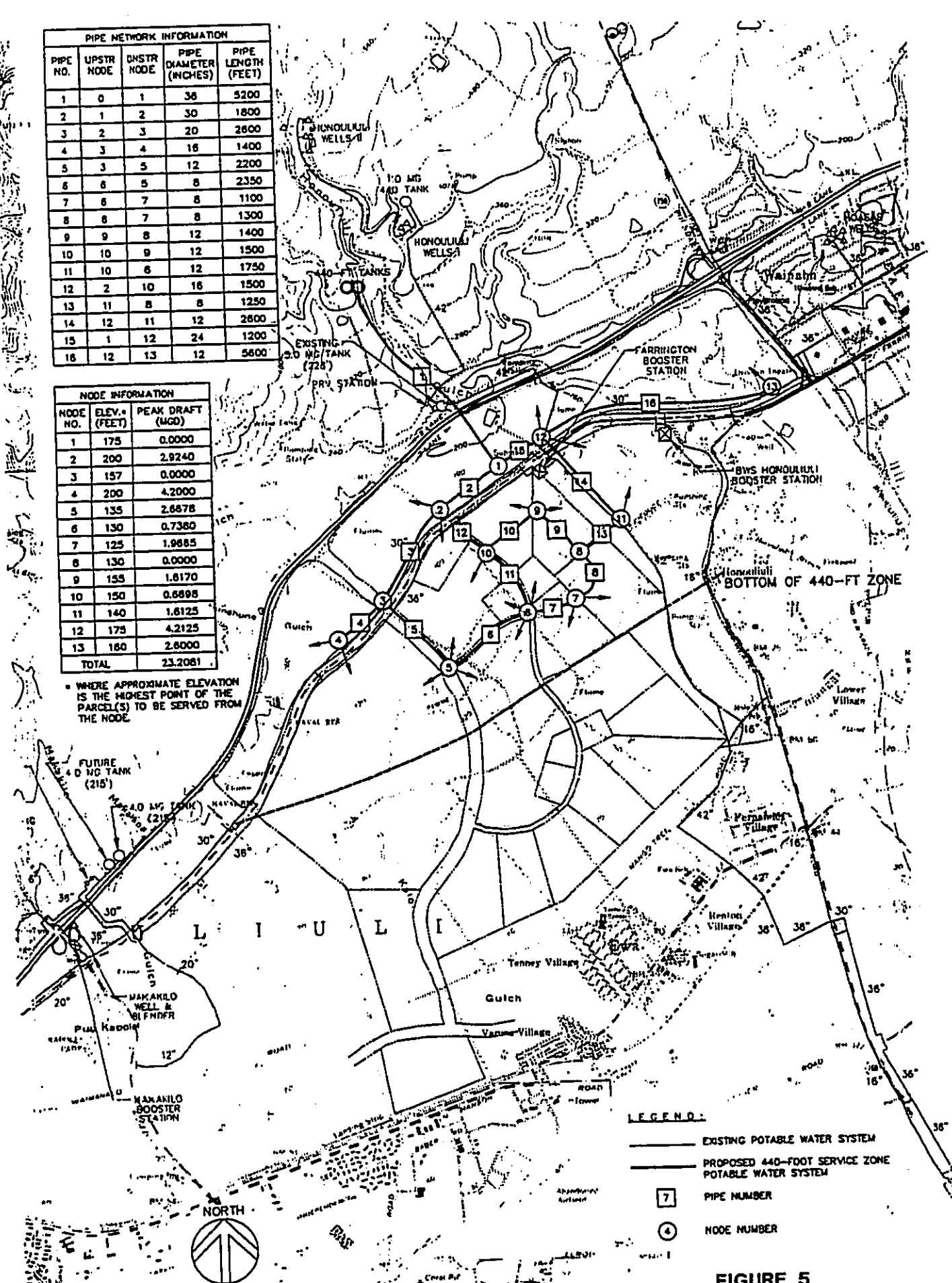
• WHERE APPROXIMATE ELEVATION IS THE HIGHEST POINT OF THE PARCEL(S) TO BE SERVED FROM THE NODE.



PIPE NETWORK INFORMATION				
PIPE NO.	UPSTR NODE	DNSTR NODE	PIPE DIAMETER (INCHES)	PIPE LENGTH (FEET)
1	0	1	36	5200
2	1	2	30	1800
3	2	3	20	2600
4	3	4	16	1400
5	3	5	12	2200
6	6	5	8	2350
7	6	7	8	1100
8	6	7	8	1300
9	9	8	12	1400
10	10	9	12	1500
11	10	6	12	1750
12	2	10	16	1500
13	11	8	8	1250
14	12	11	12	2800
15	1	12	24	1200
16	12	13	12	5800

NODE INFORMATION		
NODE NO.	ELEV. (FEET)	PEAK DRAFT (MGD)
1	175	0.0000
2	200	2.9240
3	157	0.0000
4	200	4.2000
5	135	2.6878
6	130	0.7380
7	125	1.9685
8	130	0.0000
9	155	1.6170
10	150	0.6898
11	140	1.6125
12	175	4.2125
13	160	2.8000
TOTAL		23.2061

WHERE APPROXIMATE ELEVATION IS THE HIGHEST POINT OF THE PARCEL(S) TO BE SERVED FROM THE NODE



**LEGEND:**

- EXISTING POTABLE WATER SYSTEM
- PROPOSED 440-FOOT SERVICE ZONE POTABLE WATER SYSTEM
- 7 PIPE NUMBER
- ④ NODE NUMBER

**FIGURE 5  
HYDRAULIC SCHEMATIC OF THE  
440-FOOT SERVICE PRESSURE ZONE**

Exhibit 3 is a hydraulic analysis of the 440-foot service zone with the booster pumps operating (two of the three proposed pumps on and producing approximately 10,000 GPM). To accommodate the booster pumps for this analysis, a node was added at the booster station (node No. 14), pipe No. 1 was divided into two pipe sections (Nos. 1 and 17), and another pipe was added to connect the booster pumps and the 228-foot tanks to the 440-foot system at node No. 14 (pipe No. 18). As might be expected, most pressures throughout the system are slightly higher when the booster pumps are on than during gravity delivery from the 440-foot tank.

**Exhibit 1**  
**Hydraulic Analysis of the**  
**228-Foot Service Zone**

\*\*\* UNIVERSITY OF KENTUCKY PIPE NETWORK ANALYSIS PROGRAM - 1985 VERSION \*\*\*  
 RESULTS TO OUTPUT FILE

INPUT DATA FILE NAME FOR THIS SIMULATION = EKLR.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = EKLR.OUT

NUMBER OF PIPES = 13  
 NUMBER OF JUNCTION NODES = 11  
 FLOW UNITS = MILLION GALLONS / DAY  
 PRESSURE UNITS = PSI

\*\*\*\* SUMMARY OF INPUT DATA \*\*\*\*

PIPE NO.	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	HW-C VALUE	SUM-M FACT.	PUMP TYPE	FGN GRADE
1	0	1	8900.0	36.0	130.0	0.0	0.0	223.0
2	1	2	1600.0	24.0	130.0	0.0	0.0	
3	2	3	2150.0	24.0	130.0	0.0	0.0	
4	3	4	1000.0	20.0	120.0	0.0	0.0	
5	4	5	3500.0	12.0	110.0	0.0	0.0	
6	1	6	1500.0	16.0	120.0	0.0	0.0	
7	6	7	750.0	16.0	120.0	0.0	0.0	
8	7	8	1100.0	12.0	110.0	0.0	0.0	
9	8	9	2700.0	12.0	110.0	0.0	0.0	
10	10	9	1900.0	12.0	110.0	0.0	0.0	
11	3	10	1000.0	12.0	110.0	0.0	0.0	
12	1	11	1500.0	16.0	120.0	0.0	0.0	
13	11	3	1800.0	12.0	110.0	0.0	0.0	

JUNCT. NO.	DEMAND	ELEVATION
1	0.0	100.0
2	0.4	95.0
3	0.0	78.0
4	4.0	110.0
5	2.0	80.0
6	1.0	105.0
7	1.9	100.0
8	1.7	90.0
9	1.6	85.0
10	0.8	75.0
11	1.6	115.0

Peak Flowrate

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 5 - ACCURACY ATTAINED = .0009

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	15.00	8.22	0.00	0.00	3.28	0.92
2	1	2	7.56	2.99	0.00	0.00	3.72	1.87
3	2	3	7.17	3.65	0.00	0.00	3.53	1.70
4	3	4	6.06	3.50	0.00	0.00	4.30	3.50
5	4	5	2.04	23.05	0.00	0.00	4.02	6.59
6	1	6	4.82	10.17	0.00	0.00	5.34	6.78
7	6	7	3.78	3.25	0.00	0.00	4.19	4.33
8	7	8	1.90	6.33	0.00	0.00	3.74	5.76
9	8	9	0.18	0.20	0.00	0.00	0.36	0.07

10	10	9	1.38	6.10	0.00	0.00	2.73	3.21
11	3	10	2.14	7.21	0.00	0.00	4.22	7.21
12	1	11	2.63	3.31	0.00	0.00	2.91	2.20
13	11	3	1.03	3.33	0.00	0.00	2.03	1.85

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	49.7	214.8
2	95.0	0.4	50.6	211.8
3	78.0	0.0	56.4	208.1
4	110.0	4.0	41.0	204.6
5	80.0	2.0	44.0	181.6
6	105.0	1.0	43.2	204.6
7	100.0	1.9	43.9	201.4
8	90.0	1.7	45.5	195.0
9	85.0	1.6	47.6	194.8
10	75.0	0.8	54.6	200.9
11	115.0	1.6	41.8	211.5

THE NET SYSTEM DEMAND = 15  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO.      FLOW  
1              15.00

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO.      DEMAND  
GLOBAL DEMAND FACTOR = .5  
4              4.89

Max. Day Plus 2,000 GPM  
Fire Flow at Node 4

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 3 - ACCURACY ATTAINED = 0

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	10.38	4.16	0.00	0.00	2.27	0.47
2	1	2	6.05	1.98	0.00	0.00	2.98	1.24
3	2	3	5.86	2.51	0.00	0.00	2.89	1.17
4	3	4	5.91	3.34	0.00	0.00	4.19	3.34
5	4	5	1.02	6.39	0.00	0.00	2.01	1.82
6	1	6	2.57	3.18	0.00	0.00	2.85	2.12
7	6	7	2.05	1.05	0.00	0.00	2.28	1.40
8	7	8	1.11	2.36	0.00	0.00	2.19	2.15
9	8	9	0.26	0.38	0.00	0.00	0.50	0.14
10	10	9	0.53	1.02	0.00	0.00	1.04	0.54
11	3	10	0.91	1.47	0.00	0.00	1.79	1.47
12	1	11	1.76	1.57	0.00	0.00	1.95	1.05
13	11	3	0.96	2.92	0.00	0.00	1.89	1.62

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	51.5	218.8
2	95.0	0.2	52.8	216.9
3	78.0	0.0	59.1	214.4
4	110.0	4.9	43.8	211.0
5	80.0	1.0	54.0	204.6
6	105.0	0.5	48.0	215.7
7	100.0	0.9	49.7	214.6

8	90.0	0.9	53.0	212.2
9	85.0	0.8	55.0	211.9
10	75.0	0.4	59.8	212.9
11	115.0	0.8	44.3	217.3

THE NET SYSTEM DEMAND = 10.38  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO.           FLOW  
1                   10.38

THE FOLLOWING CHANGES ARE MADE

Max. Day Plus 2,000 GPM  
Fire Flow at Node 6

JUNCT. NO.       DEMAND  
GLOBAL DEMAND FACTOR = .5  
6                   3.39825  
4                   2.01

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 4 - ACCURACY ATTAINED = .0016

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	10.38	4.16	0.00	0.00	2.27	0.47
2	1	2	4.17	0.99	0.00	0.00	2.05	0.62
3	2	3	3.97	1.22	0.00	0.00	1.96	0.57
4	3	4	3.03	0.97	0.00	0.00	2.15	0.97
5	4	5	1.02	6.39	0.00	0.00	2.01	1.82
6	1	6	4.82	10.20	0.00	0.00	5.35	6.80
7	6	7	1.43	0.53	0.00	0.00	1.58	0.71
8	7	8	0.48	0.51	0.00	0.00	0.95	0.46
9	8	9	-0.37	0.77	0.00	0.00	0.74	0.28
10	10	9	1.16	4.37	0.00	0.00	2.28	2.30
11	3	10	1.54	3.89	0.00	0.00	3.02	3.89
12	1	11	1.39	1.02	0.00	0.00	1.54	0.68
13	11	3	0.59	1.20	0.00	0.00	1.16	0.66

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	51.5	218.8
2	95.0	0.2	53.2	217.9
3	78.0	0.0	60.1	216.6
4	110.0	2.0	45.8	215.7
5	80.0	1.0	56.0	209.3
6	105.0	3.4	44.9	208.6
7	100.0	0.9	46.8	208.1
8	90.0	0.9	51.0	207.6
9	85.0	0.8	53.5	208.4
10	75.0	0.4	59.7	212.7
11	115.0	0.8	44.6	217.8

THE NET SYSTEM DEMAND = 10.38  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO.           FLOW  
1                   10.38

THE FOLLOWING CHANGES ARE MADE

Max. Day Plus 2,000 GPM  
Fire Flow at Node 11

JUNCT. NO. DEMAND  
GLOBAL DEMAND FACTOR = .5  
11 3.67875  
4 2.01  
6 .51825

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 4 - ACCURACY ATTAINED = .0001

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	10.38	4.16	0.00	0.00	2.27	0.47
2	1	2	4.86	1.32	0.00	0.00	2.39	0.82
3	2	3	4.67	1.65	0.00	0.00	2.30	0.77
4	3	4	3.03	0.97	0.00	0.00	2.15	0.97
5	4	5	1.02	6.39	0.00	0.00	2.01	1.82
6	1	6	2.48	2.97	0.00	0.00	2.75	1.98
7	6	7	1.96	0.96	0.00	0.00	2.17	1.28
8	7	8	1.02	2.01	0.00	0.00	2.01	1.82
9	8	9	0.16	0.16	0.00	0.00	0.32	0.06
10	10	9	0.62	1.38	0.00	0.00	1.22	0.73
11	3	10	1.00	1.76	0.00	0.00	1.97	1.76
12	1	11	3.04	4.34	0.00	0.00	3.37	2.89
13	11	3	-0.64	1.37	0.00	0.00	1.26	0.76

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	51.5	218.8
2	95.0	0.2	53.1	217.5
3	78.0	0.0	59.7	215.9
4	110.0	2.0	45.5	214.9
5	80.0	1.0	55.7	208.5
6	105.0	0.5	48.0	215.9
7	100.0	0.9	49.8	214.9
8	90.0	0.9	53.3	212.9
9	85.0	0.8	55.4	212.7
10	75.0	0.4	60.3	214.1
11	115.0	3.7	43.1	214.5

THE NET SYSTEM DEMAND = 10.38  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)

PIPE NO.	FLOW
1	10.38

THE FOLLOWING CHANGES ARE MADE

Max. Day Plus 2,000 GPM  
Fire Flow at Node 5

JUNCT. NO. DEMAND  
GLOBAL DEMAND FACTOR = .5  
5 3.9  
4 2.01  
6 .51825  
11 .79875

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 4 - ACCURACY ATTAINED = 0

PIPE NO.	NODE	NODE	FLOW	HEAD	MINOR	PUMP	LINE	HL
----------	------	------	------	------	-------	------	------	----



NO.	#1	#2	RATE	LOSS	LOSS	HEAD	VELOCITY	1000
1	0	1	10.38	4.16	0.00	0.00	2.27	0.47
2	1	2	6.05	1.98	0.00	0.00	2.98	1.24
3	2	3	5.86	2.51	0.00	0.00	2.89	1.17
4	3	4	5.91	3.34	0.00	0.00	4.19	3.34
5	4	5	3.90	76.55	0.00	0.00	7.68	21.87
6	1	6	2.57	3.18	0.00	0.00	2.85	2.12
7	6	7	2.05	1.05	0.00	0.00	2.28	1.40
8	7	8	1.11	2.36	0.00	0.00	2.19	2.15
9	8	9	0.26	0.38	0.00	0.00	0.50	0.14
10	10	9	0.53	1.02	0.00	0.00	1.04	0.54
11	3	10	0.91	1.47	0.00	0.00	1.79	1.47
12	1	11	1.76	1.57	0.00	0.00	1.95	1.05
13	11	3	0.96	2.92	0.00	0.00	1.89	1.62

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	51.5	218.8
2	95.0	0.2	52.8	216.9
3	78.0	0.0	59.1	214.4
4	110.0	2.0	43.8	211.0
5	80.0	3.9	23.6	134.5
6	105.0	0.5	48.0	215.7
7	100.0	0.9	49.7	214.6
8	90.0	0.9	53.0	212.2
9	85.0	0.8	55.0	211.9
10	75.0	0.4	59.8	212.9
11	115.0	0.8	44.3	217.3

THE NET SYSTEM DEMAND = 10.38  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
/PIPE NO. FLOW  
1 10.38

\*\*\*\*\* END OF THIS SIMULATION \*\*\*\*\*

**Exhibit 2**  
**Hydraulic Analysis of the**  
**440-Foot Service Zone**

\*\*\* UNIVERSITY OF KENTUCKY PIPE NETWORK ANALYSIS PROGRAM - 1985 VERSION \*\*\*  
RESULTS TO OUTPUT FILE

INPUT DATA FILE NAME FOR THIS SIMULATION = EKUR.DAT  
OUTPUT DATA FILE NAME FOR THIS SIMULATION = EKUR.OUT

NUMBER OF PIPES = 16  
NUMBER OF JUNCTION NODES = 13  
FLOW UNITS = MILLION GALLONS / DAY  
PRESSURE UNITS = PSI

\*\*\*\* SUMMARY OF INPUT DATA \*\*\*\*

PIPE NO.	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	HW-C VALUE	SUM-M FACT.	PUMP TYPE	FGN GRADE
1	0	1	5300.0	36.0	130.0	0.0	0.0	435.0
2	1	2	1800.0	30.0	130.0	0.0	0.0	
3	2	3	2600.0	20.0	120.0	0.0	0.0	
4	3	4	1400.0	16.0	120.0	0.0	0.0	
5	3	5	2200.0	12.0	110.0	0.0	0.0	
6	6	5	2350.0	8.0	110.0	0.0	0.0	
7	6	7	1100.0	8.0	110.0	0.0	0.0	
8	8	7	1300.0	8.0	110.0	0.0	0.0	
9	9	8	1400.0	8.0	110.0	0.0	0.0	
10	10	9	1500.0	12.0	110.0	0.0	0.0	
11	10	6	1750.0	12.0	110.0	0.0	0.0	
12	2	10	1500.0	16.0	120.0	0.0	0.0	
13	11	8	1250.0	8.0	110.0	0.0	0.0	
14	12	11	2600.0	12.0	110.0	0.0	0.0	
15	1	12	1200.0	24.0	130.0	0.0	0.0	
16	12	13	5600.0	12.0	110.0	0.0	0.0	

JUNCT. NO.	DEMAND	ELEVATION
1	0.0	175.0
2	2.9	200.0
3	0.0	157.0
4	4.2	200.0
5	2.7	155.0
6	0.7	135.0
7	2.0	135.0
8	0.0	130.0
9	1.6	175.0
10	0.7	155.0
11	1.6	175.0
12	4.2	200.0
13	2.6	165.0

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

Peak Flowrate

NO. OF TRIALS = 3 - ACCURACY ATTAINED = .0002

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	23.21	10.98	0.00	0.00	5.08	2.07
2	1	2	14.25	3.67	0.00	0.00	4.49	2.04
3	2	3	6.48	10.30	0.00	0.00	4.60	3.96
4	3	4	4.20	7.36	0.00	0.00	4.65	5.26

5	3	5	2.28	17.83	0.00	0.00	4.49	8.10
6	6	5	0.39	5.11	0.00	0.00	1.71	2.17
7	6	7	1.03	14.74	0.00	0.00	4.57	13.40
8	8	7	0.94	14.56	0.00	0.00	4.15	11.20
9	9	8	0.40	3.26	0.00	0.00	1.78	2.33
10	10	9	2.02	9.68	0.00	0.00	3.97	6.45
11	10	6	2.15	12.76	0.00	0.00	4.24	7.29
12	2	10	4.84	10.27	0.00	0.00	5.37	6.85
13	11	8	0.54	4.97	0.00	0.00	2.37	3.98
14	12	11	2.15	18.83	0.00	0.00	4.23	7.24
15	1	12	8.96	3.07	0.00	0.00	4.41	2.56
16	12	13	2.60	57.80	0.00	0.00	5.12	10.32

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	107.9	424.0
2	200.0	2.9	95.5	420.3
3	157.0	0.0	109.7	410.0
4	200.0	4.2	87.8	402.7
5	155.0	2.7	102.8	392.2
6	135.0	0.7	113.7	397.3
7	135.0	2.0	107.3	382.6
8	130.0	0.0	115.8	397.1
9	175.0	1.6	97.7	400.4
10	155.0	0.7	110.5	410.1
11	175.0	1.6	98.4	402.1
12	200.0	4.2	95.7	420.9
13	165.0	2.6	85.9	363.1

THE NET SYSTEM DEMAND = 23.208  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO.           FLOW  
1                   23.21

THE FOLLOWING CHANGES ARE MADE

Max. Day Plus 2,000 GPM  
Fire Flow at Node 4

JUNCT. NO.       DEMAND  
GLOBAL DEMAND FACTOR = .5  
4                   4.98

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 3 - ACCURACY ATTAINED = .0023

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	14.48	4.59	0.00	0.00	3.17	0.87
2	1	2	9.95	1.89	0.00	0.00	3.14	1.05
3	2	3	5.94	8.77	0.00	0.00	4.21	3.37
4	3	4	4.98	10.10	0.00	0.00	5.52	7.21
5	3	5	0.96	3.60	0.00	0.00	1.89	1.64
6	6	5	0.37	4.78	0.00	0.00	1.65	2.03
7	6	7	0.48	3.57	0.00	0.00	2.13	3.25
8	8	7	0.50	4.62	0.00	0.00	2.23	3.56
9	9	8	0.19	0.79	0.00	0.00	0.83	0.56
10	10	9	0.99	2.61	0.00	0.00	1.96	1.74
11	10	6	1.22	4.46	0.00	0.00	2.41	2.55
12	2	10	2.55	3.13	0.00	0.00	2.83	2.09
13	11	8	0.32	1.89	0.00	0.00	1.41	1.51

14	12	11	1.12	5.67	0.00	0.00	2.21	2.18
15	1	12	4.53	0.87	0.00	0.00	2.23	0.72
16	12	13	1.30	16.01	0.00	0.00	2.56	2.86

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	110.7	430.4
2	200.0	1.5	99.0	428.5
3	157.0	0.0	113.9	419.8
4	200.0	5.0	90.9	409.7
5	155.0	1.3	113.2	416.2
6	135.0	0.4	123.9	420.9
7	135.0	1.0	122.4	417.4
8	130.0	0.0	126.5	422.0
9	175.0	0.8	107.4	422.8
10	155.0	0.3	117.2	425.4
11	175.0	0.8	107.8	423.9
12	200.0	2.1	99.5	429.5
13	165.0	1.3	107.7	413.5

THE NET SYSTEM DEMAND = 14.484  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO. FLOW  
1 14.48

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO. DEMAND  
GLOBAL DEMAND FACTOR = .5  
2 4.342  
4 2.1

Max. Day Plus 2,000 GPM  
Fire Flow at Node 2

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 3 - ACCURACY ATTAINED = .0001

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	14.48	4.59	0.00	0.00	3.17	0.87
2	1	2	9.98	1.90	0.00	0.00	3.14	1.05
3	2	3	3.24	2.85	0.00	0.00	2.30	1.10
4	3	4	2.10	2.04	0.00	0.00	2.33	1.46
5	3	5	1.14	4.91	0.00	0.00	2.24	2.23
6	6	5	0.20	1.46	0.00	0.00	0.87	0.62
7	6	7	0.51	3.97	0.00	0.00	2.25	3.61
8	8	7	0.48	4.16	0.00	0.00	2.11	3.20
9	9	8	0.18	0.74	0.00	0.00	0.80	0.53
10	10	9	0.99	2.58	0.00	0.00	1.95	1.72
11	10	6	1.07	3.51	0.00	0.00	2.11	2.00
12	2	10	2.40	2.79	0.00	0.00	2.65	1.86
13	11	8	0.30	1.66	0.00	0.00	1.31	1.33
14	12	11	1.10	5.48	0.00	0.00	2.17	2.11
15	1	12	4.51	0.86	0.00	0.00	2.22	0.72
16	12	13	1.30	16.01	0.00	0.00	2.56	2.86

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	110.7	430.4
2	200.0	4.3	99.0	428.5

3	157.0	0.0	116.4	425.7
4	200.0	2.1	96.9	423.6
5	155.0	1.3	115.2	420.8
6	135.0	0.4	124.5	422.2
7	135.0	1.0	122.7	418.2
8	130.0	0.0	126.7	422.4
9	175.0	0.8	107.5	423.1
10	155.0	0.3	117.3	425.7
11	175.0	0.8	107.9	424.1
12	200.0	2.1	99.5	429.6
13	165.0	1.3	107.7	413.5

THE NET SYSTEM DEMAND = 14.484  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)

PIPE NO.	FLOW
1	14.48

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO.	DEMAND
GLOBAL DEMAND FACTOR =	.5
12	4.98625
4	2.1
2	1.462

Max. Day Plus 2,000 GPM  
Fire Flow at Node 12

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 2 - ACCURACY ATTAINED = .0019

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	14.48	4.59	0.00	0.00	3.17	0.87
2	1	2	7.17	1.03	0.00	0.00	2.26	0.57
3	2	3	3.25	2.86	0.00	0.00	2.30	1.10
4	3	4	2.10	2.04	0.00	0.00	2.33	1.46
5	3	5	1.15	4.98	0.00	0.00	2.26	2.26
6	6	5	0.19	1.34	0.00	0.00	0.83	0.57
7	6	7	0.53	4.27	0.00	0.00	2.34	3.88
8	8	7	0.46	3.84	0.00	0.00	2.02	2.95
9	9	8	0.23	1.17	0.00	0.00	1.02	0.84
10	10	9	1.04	2.83	0.00	0.00	2.05	1.89
11	10	6	1.08	3.58	0.00	0.00	2.14	2.04
12	2	10	2.46	2.93	0.00	0.00	2.72	1.95
13	11	8	0.23	1.00	0.00	0.00	1.00	0.80
14	12	11	1.03	4.84	0.00	0.00	2.03	1.86
15	1	12	7.32	2.11	0.00	0.00	3.60	1.76
16	12	13	1.30	16.01	0.00	0.00	2.56	2.86

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	110.7	430.4
2	200.0	1.5	99.4	429.4
3	157.0	0.0	116.8	426.5
4	200.0	2.1	97.3	424.5
5	155.0	1.3	115.5	421.5
6	135.0	0.4	124.7	422.9
7	135.0	1.0	122.9	418.6
8	130.0	0.0	126.7	422.5
9	175.0	0.8	107.7	423.6

10	155.0	0.3	117.6	426.5
11	175.0	0.8	107.7	423.5
12	200.0	5.0	98.9	428.3
13	165.0	1.3	107.2	412.3

THE NET SYSTEM DEMAND = 14.484  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO.            FLOW  
1                    14.48

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO.      DEMAND  
GLOBAL DEMAND FACTOR = .5  
13                4.18  
4                 2.1  
2                 1.462  
12                2.10625

Max. Day Plus 2,000 GPM Fire Flow at Node 13
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\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 1 - ACCURACY ATTAINED = 0

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	14.48	4.59	0.00	0.00	3.17	0.87
2	1	2	7.17	1.03	0.00	0.00	2.26	0.57
3	2	3	3.25	2.86	0.00	0.00	2.30	1.10
4	3	4	2.10	2.04	0.00	0.00	2.33	1.46
5	3	5	1.15	4.98	0.00	0.00	2.26	2.26
6	6	5	0.19	1.34	0.00	0.00	0.83	0.57
7	6	7	0.53	4.27	0.00	0.00	2.34	3.88
8	8	7	0.46	3.84	0.00	0.00	2.02	2.95
9	9	8	0.23	1.17	0.00	0.00	1.02	0.84
10	10	9	1.04	2.83	0.00	0.00	2.05	1.89
11	10	6	1.08	3.58	0.00	0.00	2.14	2.04
12	2	10	2.46	2.93	0.00	0.00	2.72	1.95
13	11	8	0.23	1.00	0.00	0.00	1.00	0.80
14	12	11	1.03	4.84	0.00	0.00	2.03	1.86
15	1	12	7.32	2.11	0.00	0.00	3.60	1.76
16	12	13	4.18	139.25	0.00	0.00	8.23	24.87

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	110.7	430.4
2	200.0	1.5	99.4	429.4
3	157.0	0.0	116.8	426.5
4	200.0	2.1	97.3	424.5
5	155.0	1.3	115.5	421.5
6	135.0	0.4	124.7	422.9
7	135.0	1.0	122.9	418.6
8	130.0	0.0	126.7	422.5
9	175.0	0.8	107.7	423.6
10	155.0	0.3	117.6	426.5
11	175.0	0.8	107.7	423.5
12	200.0	2.1	98.9	428.3
13	165.0	4.2	53.8	289.0

THE NET SYSTEM DEMAND = 14.484

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-)  
PIPE NO.           FLOW  
1                   14.48

\*\*\*\*\* END OF THIS SIMULATION \*\*\*\*\*

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99



**Exhibit 3**  
**Hydraulic Analysis of the**  
**440-Foot Service Zone**  
**With Two 6,000 GPM Pumps On**

\*\*\* UNIVERSITY OF KENTUCKY PIPE NETWORK ANALYSIS PROGRAM - 1985 VERSION \*\*\*  
 RESULTS TO OUTPUT FILE

INPUT DATA FILE NAME FOR THIS SIMULATION = EKUPR.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = EKUPR.OUT

NUMBER OF PIPES = 18  
 NUMBER OF JUNCTION NODES = 14  
 FLOW UNITS = MILLION GALLONS / DAY  
 PRESSURE UNITS = PSI

\*\*\*\* SUMMARY OF INPUT DATA \*\*\*\*

PIPE NO.	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	HW-C VALUE	SUM-M FACT.	PUMP TYPE	FGN GRADE
1	0	1	3800.0	36.0	130.0	0.0	0.0	435.0
2	1	2	1800.0	30.0	130.0	0.0	0.0	
3	2	3	2600.0	20.0	120.0	0.0	0.0	
4	3	4	1400.0	16.0	120.0	0.0	0.0	
5	3	5	2200.0	12.0	110.0	0.0	0.0	
6	6	5	2350.0	8.0	110.0	0.0	0.0	
7	6	7	1100.0	8.0	110.0	0.0	0.0	
8	8	7	1300.0	8.0	110.0	0.0	0.0	
9	9	8	1400.0	8.0	110.0	0.0	0.0	
10	10	9	1500.0	12.0	110.0	0.0	0.0	
11	10	6	1750.0	12.0	110.0	0.0	0.0	
12	2	10	1500.0	16.0	120.0	0.0	0.0	
13	11	8	1250.0	8.0	110.0	0.0	0.0	
14	12	11	2600.0	12.0	110.0	0.0	0.0	
15	1	12	1200.0	24.0	130.0	0.0	0.0	
16	12	13	5600.0	12.0	110.0	0.0	0.0	
17	14	1	1500.0	36.0	130.0	0.0	0.0	
18	0	14	100.0	30.0	130.0	0.0	1.0	223.0

\*\*\* DATA FOR PUMPS FOR THIS SYSTEM \*\*\*

PUMP TYPE # 1 IS DESCRIBED BY THE FOLLOWING DATA:

HEAD	DISCHARGE
250	0
220	17.28
200	24.56

JUNCT. NO.	DEMAND	ELEVATION
1	0.0	175.0
2	2.9	200.0
3	0.0	157.0
4	4.2	200.0
5	2.7	155.0
6	0.7	135.0
7	2.0	135.0
8	0.0	130.0
9	1.6	175.0
10	0.7	155.0
11	1.6	175.0
12	4.2	200.0
13	2.6	165.0
14	0.0	208.0

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

Peak Flowrate

NO. OF TRIALS = 3 - ACCURACY ATTAINED = .0011

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	3.74	0.27	0.00	0.00	0.82	0.07
2	1	2	14.25	3.67	0.00	0.00	4.49	2.04
3	2	3	6.48	10.30	0.00	0.00	4.60	3.96
4	3	4	4.20	7.36	0.00	0.00	4.65	5.26
5	3	5	2.28	17.83	0.00	0.00	4.49	8.10
6	6	5	0.39	5.11	0.00	0.00	1.71	2.17
7	6	7	1.03	14.74	0.00	0.00	4.57	13.40
8	8	7	0.94	14.56	0.00	0.00	4.15	11.20
9	9	8	0.40	3.26	0.00	0.00	1.78	2.33
10	10	9	2.02	9.68	0.00	0.00	3.97	6.45
11	10	6	2.15	12.76	0.00	0.00	4.24	7.29
12	2	10	4.84	10.27	0.00	0.00	5.37	6.85
13	11	8	0.54	4.97	0.00	0.00	2.37	3.98
14	12	11	2.15	18.83	0.00	0.00	4.23	7.24
15	1	12	8.96	3.07	0.00	0.00	4.41	2.56
16	12	13	2.60	57.80	0.00	0.00	5.12	10.32
17	14	1	19.46	2.24	0.00	0.00	4.26	1.50
18	0	14	19.46	0.36	0.00	214.34	6.13	3.63

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	112.5	434.7
2	200.0	2.9	100.1	431.1
3	157.0	0.0	114.3	420.8
4	200.0	4.2	92.5	413.4
5	155.0	2.7	107.4	402.9
6	135.0	0.7	118.3	408.0
7	135.0	2.0	111.9	393.3
8	130.0	0.0	120.4	407.8
9	175.0	1.6	102.3	411.1
10	155.0	0.7	115.2	420.8
11	175.0	1.6	103.1	412.8
12	200.0	4.2	100.4	431.7
13	165.0	2.6	90.5	373.9
14	208.0	0.0	99.2	437.0

THE NET SYSTEM DEMAND = 23.208  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)

PIPE NO.	FLOW
1	3.74
18	19.46

SUMMARY OF PUMP OPERATION

PIPE NO.	PUMP TYPE	PUMP FLOW	PUMP HEAD	USEFUL POWER	EFFICIENCY	TOTAL KWH
18	1	19.46	214.34	732.26	0.80	682.83

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO.	DEMAND
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GLOBAL DEMAND FACTOR = .5  
 4 4.98

Max. Day Plus 2,000 GPM  
 Fire Flow at Node 4

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 3 - ACCURACY ATTAINED = .0012

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	-4.74	0.42	0.00	0.00	1.04	0.11
2	1	2	9.95	1.89	0.00	0.00	3.14	1.05
3	2	3	5.94	8.77	0.00	0.00	4.21	3.37
4	3	4	4.98	10.10	0.00	0.00	5.52	7.21
5	3	5	0.96	3.60	0.00	0.00	1.89	1.64
6	6	5	0.37	4.78	0.00	0.00	1.65	2.03
7	6	7	0.48	3.57	0.00	0.00	2.13	3.25
8	8	7	0.50	4.62	0.00	0.00	2.23	3.56
9	9	8	0.19	0.79	0.00	0.00	0.83	0.56
10	10	9	0.99	2.61	0.00	0.00	1.96	1.74
11	10	6	1.22	4.46	0.00	0.00	2.41	2.55
12	2	10	2.55	3.13	0.00	0.00	2.83	2.09
13	11	8	0.32	1.89	0.00	0.00	1.41	1.51
14	12	11	1.12	5.67	0.00	0.00	2.21	2.18
15	1	12	4.53	0.87	0.00	0.00	2.23	0.72
16	12	13	1.30	16.01	0.00	0.00	2.56	2.86
17	14	1	19.23	2.19	0.00	0.00	4.21	1.46
18	0	14	19.23	0.36	0.00	214.97	6.06	3.55

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	112.8	435.4
2	200.0	1.5	101.2	433.5
3	157.0	0.0	116.0	424.8
4	200.0	5.0	93.0	414.7
5	155.0	1.3	115.3	421.2
6	135.0	0.4	126.1	425.9
7	135.0	1.0	124.5	422.4
8	130.0	0.0	128.7	427.0
9	175.0	0.8	109.5	427.8
10	155.0	0.3	119.3	430.4
11	175.0	0.8	110.0	428.9
12	200.0	2.1	101.6	434.5
13	165.0	1.3	109.9	418.5
14	208.0	0.0	99.5	437.6

THE NET SYSTEM DEMAND = 14.484  
 SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)

PIPE NO.	FLOW
1	-4.74
18	19.23

SUMMARY OF PUMP OPERATION

PIPE NO.	PUMP TYPE	PUMP FLOW	PUMP HEAD	USEFUL POWER	EFFIC- IENCY	TOTAL KWH
18	1	19.23	214.97	725.50	0.80	676.53

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO. DEMAND  
 GLOBAL DEMAND FACTOR = .5  
 2 4.342  
 4 2.1

Max. Day Plus 2,000 GPM  
 Fire Flow at Node 2

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 2 - ACCURACY ATTAINED = .0033

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	-4.74	0.42	0.00	0.00	1.04	0.11
2	1	2	9.98	1.90	0.00	0.00	3.14	1.05
3	2	3	3.24	2.85	0.00	0.00	2.30	1.10
4	3	4	2.10	2.04	0.00	0.00	2.33	1.46
5	3	5	1.14	4.91	0.00	0.00	2.24	2.23
6	6	5	0.20	1.47	0.00	0.00	0.87	0.63
7	6	7	0.51	3.97	0.00	0.00	2.25	3.61
8	8	7	0.48	4.16	0.00	0.00	2.11	3.20
9	9	8	0.18	0.74	0.00	0.00	0.80	0.53
10	10	9	0.99	2.58	0.00	0.00	1.95	1.72
11	10	6	1.07	3.51	0.00	0.00	2.11	2.01
12	2	10	2.40	2.79	0.00	0.00	2.66	1.86
13	11	8	0.30	1.67	0.00	0.00	1.31	1.33
14	12	11	1.10	5.48	0.00	0.00	2.17	2.11
15	1	12	4.51	0.86	0.00	0.00	2.22	0.72
16	12	13	1.30	16.01	0.00	0.00	2.56	2.86
17	14	1	19.23	2.19	0.00	0.00	4.21	1.46
18	0	14	19.23	0.36	0.00	214.97	6.06	3.55

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	112.8	435.4
2	200.0	4.3	101.2	433.5
3	157.0	0.0	118.6	430.7
4	200.0	2.1	99.1	428.6
5	155.0	1.3	117.3	425.8
6	135.0	0.4	126.6	427.2
7	135.0	1.0	124.9	423.3
8	130.0	0.0	128.9	427.4
9	175.0	0.8	109.7	428.1
10	155.0	0.3	119.5	430.7
11	175.0	0.8	110.1	429.1
12	200.0	2.1	101.6	434.6
13	165.0	1.3	109.9	418.5
14	208.0	0.0	99.5	437.6

THE NET SYSTEM DEMAND = 14.484  
 SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)

PIPE NO.	FLOW
1	-4.74
18	19.23

SUMMARY OF PUMP OPERATION

PIPE NO.	PUMP TYPE	PUMP FLOW	PUMP HEAD	USEFUL POWER	EFFICIENCY	TOTAL KWH
18	1	19.23	214.97	725.50	0.80	676.53

THE FOLLOWING CHANGES ARE MADE

Max. Day Plus 2,000 GPM  
Fire Flow at Node 12

JUNCT. NO. DEMAND  
GLOBAL DEMAND FACTOR = .5  
12 4.98625  
4 2.1  
2 1.462

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 2 - ACCURACY ATTAINED = .001

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	-4.74	0.42	0.00	0.00	1.04	0.11
2	1	2	7.17	1.03	0.00	0.00	2.26	0.57
3	2	3	3.25	2.86	0.00	0.00	2.30	1.10
4	3	4	2.10	2.04	0.00	0.00	2.33	1.46
5	3	5	1.15	4.98	0.00	0.00	2.26	2.26
6	6	5	0.19	1.34	0.00	0.00	0.83	0.57
7	6	7	0.53	4.27	0.00	0.00	2.34	3.88
8	8	7	0.46	3.84	0.00	0.00	2.02	2.95
9	9	8	0.23	1.17	0.00	0.00	1.02	0.84
10	10	9	1.04	2.83	0.00	0.00	2.05	1.89
11	10	6	1.08	3.58	0.00	0.00	2.14	2.04
12	2	10	2.46	2.93	0.00	0.00	2.72	1.95
13	11	8	0.23	1.00	0.00	0.00	1.00	0.80
14	12	11	1.03	4.84	0.00	0.00	2.03	1.86
15	1	12	7.32	2.11	0.00	0.00	3.60	1.76
16	12	13	1.30	16.01	0.00	0.00	2.56	2.86
17	14	1	19.23	2.19	0.00	0.00	4.21	1.46
18	0	14	19.23	0.36	0.00	214.97	6.06	3.55

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	112.8	435.4
2	200.0	1.5	101.6	434.4
3	157.0	0.0	119.0	431.5
4	200.0	2.1	99.4	429.5
5	155.0	1.3	117.7	426.5
6	135.0	0.4	126.9	427.9
7	135.0	1.0	125.1	423.6
8	130.0	0.0	128.9	427.5
9	175.0	0.8	109.9	428.6
10	155.0	0.3	119.8	431.5
11	175.0	0.8	109.8	428.5
12	200.0	5.0	101.1	433.3
13	165.0	1.3	109.3	417.3
14	208.0	0.0	99.5	437.6

THE NET SYSTEM DEMAND = 14.484  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO. FLOW  
1 -4.74  
18 19.23

SUMMARY OF PUMP OPERATION

PIPE NO.	PUMP TYPE	PUMP FLOW	PUMP HEAD	USEFUL POWER	EFFIC- IENCY	TOTAL KWH
18	1	19.23	214.97	725.50	0.80	676.53

THE FOLLOWING CHANGES ARE MADE

Max. Day Plus 2,000 GPM  
Fire Flow at Node 13

JUNCT. NO. DEMAND  
GLOBAL DEMAND FACTOR = .5  
13 4.18  
4 2.1  
2 1.462  
12 2.10625

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 1 - ACCURACY ATTAINED = 0

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	-4.74	0.42	0.00	0.00	1.04	0.11
2	1	2	7.17	1.03	0.00	0.00	2.26	0.57
3	2	3	3.25	2.86	0.00	0.00	2.30	1.10
4	3	4	2.10	2.04	0.00	0.00	2.33	1.46
5	3	5	1.15	4.98	0.00	0.00	2.26	2.26
6	6	5	0.19	1.34	0.00	0.00	0.83	0.57
7	6	7	0.53	4.27	0.00	0.00	2.34	3.88
8	8	7	0.46	3.84	0.00	0.00	2.02	2.95
9	9	8	0.23	1.17	0.00	0.00	1.02	0.84
10	10	9	1.04	2.83	0.00	0.00	2.05	1.89
11	10	6	1.08	3.58	0.00	0.00	2.14	2.04
12	2	10	2.46	2.93	0.00	0.00	2.72	1.95
13	11	8	0.23	1.00	0.00	0.00	1.00	0.80
14	12	11	1.03	4.84	0.00	0.00	2.03	1.86
15	1	12	7.32	2.11	0.00	0.00	3.60	1.76
16	12	13	4.18	139.25	0.00	0.00	8.23	24.87
17	14	1	19.23	2.19	0.00	0.00	4.21	1.46
18	0	14	19.23	0.36	0.00	214.97	6.06	3.55

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	175.0	0.0	112.8	435.4
2	200.0	1.5	101.6	434.4
3	157.0	0.0	119.0	431.5
4	200.0	2.1	99.4	429.5
5	155.0	1.3	117.7	426.5
6	135.0	0.4	126.9	427.9
7	135.0	1.0	125.1	423.6
8	130.0	0.0	128.9	427.5
9	175.0	0.8	109.9	428.6
10	155.0	0.3	119.8	431.5
11	175.0	0.8	109.8	428.5
12	200.0	2.1	101.1	433.3
13	165.0	4.2	55.9	294.0
14	208.0	0.0	99.5	437.6

THE NET SYSTEM DEMAND = 14.484  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)

PIPE NO.	FLOW
1	-4.74
18	19.23

SUMMARY OF PUMP OPERATION

PIPE NO.	PUMP TYPE	PUMP FLOW	PUMP HEAD	USEFUL POWER	EFFIC- IENCY	TOTAL KWH
18	1	19.23	214.97	725.50	0.80	676.53

\*\*\*\*\* END OF THIS SIMULATION \*\*\*\*\*



**Addendum Report**  
**For the**  
**East Kapolei Potable Water Master Plan**

*Prepared for*

**Schuler Homes, Inc.**  
**828 Fort Street Mall - 4th Floor**  
**Honolulu, Hawaii 96813**

*Prepared by*

**Tom Nance Water Resource Engineering**  
**680 Ala Moana Boulevard - Suite 406**  
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**December 1995**

**Table of Contents**

	<u>Page</u>
Introduction .....	1
Project Site and Land Use Plan .....	1
Delineation of Service Pressure Zones .....	4
Projected Water Supply Requirements .....	4
Layout of the Proposed Potable Water System .....	4
Hydraulic Analysis of the 440-Foot Service Zone .....	10
Hydraulic Analysis of the 228-Foot Service Zone .....	10
EXHIBIT 1: <i>Hydraulic Analysis of the 440-Foot Service Zone</i>	
EXHIBIT 2: <i>Hydraulic Analysis of the 228-Foot Service Zone</i>	

**List of Figures**

<u>No.</u>	<u>T i t l e</u>	<u>Page</u>
1	Location of the Schuler Homes Projects in East Kapolei, Ewa Oahu .....	2
2	Preliminary Concept Plan - East Kapolei Project .....	3
3	Delineation of the 440- and 228-Foot Service Pressure Zones For the East Kapolei Project .....	5
4	Hydraulic Schematic of the 440-Foot Service Pressure Zone .....	8
5	Hydraulic Schematic of the 228-Foot Service Pressure Zone .....	9

**List of Tables**

<u>No.</u>	<u>T i t l e</u>	<u>Page</u>
1	Water Supply Requirements For Projects in the 440-Foot Service Zone .....	6
2	Water Supply Requirements For Projects in the 228-Foot Service Zone .....	7

## Introduction

The original potable water master plan for the East Kapolei area was prepared in October 1994 and subsequently revised in November 1994. Since that time, the Kapolei project site and land use plan of Schuler Homes, Inc. have been modified. This addendum report has been prepared to identify the potable water system components that would be required to serve Schuler's new land use plan. The comparison of the unit counts of the original and revised land use plans below shows a reduction in the total number of residential units:

	<u>Original Land Use Plan</u>	<u>New Land Use Plan</u>
Residential Units	10,000	8,000
Park (Acres)	20	32
Schools (Acres)	12	25*
Commercial (Acres)	20	16

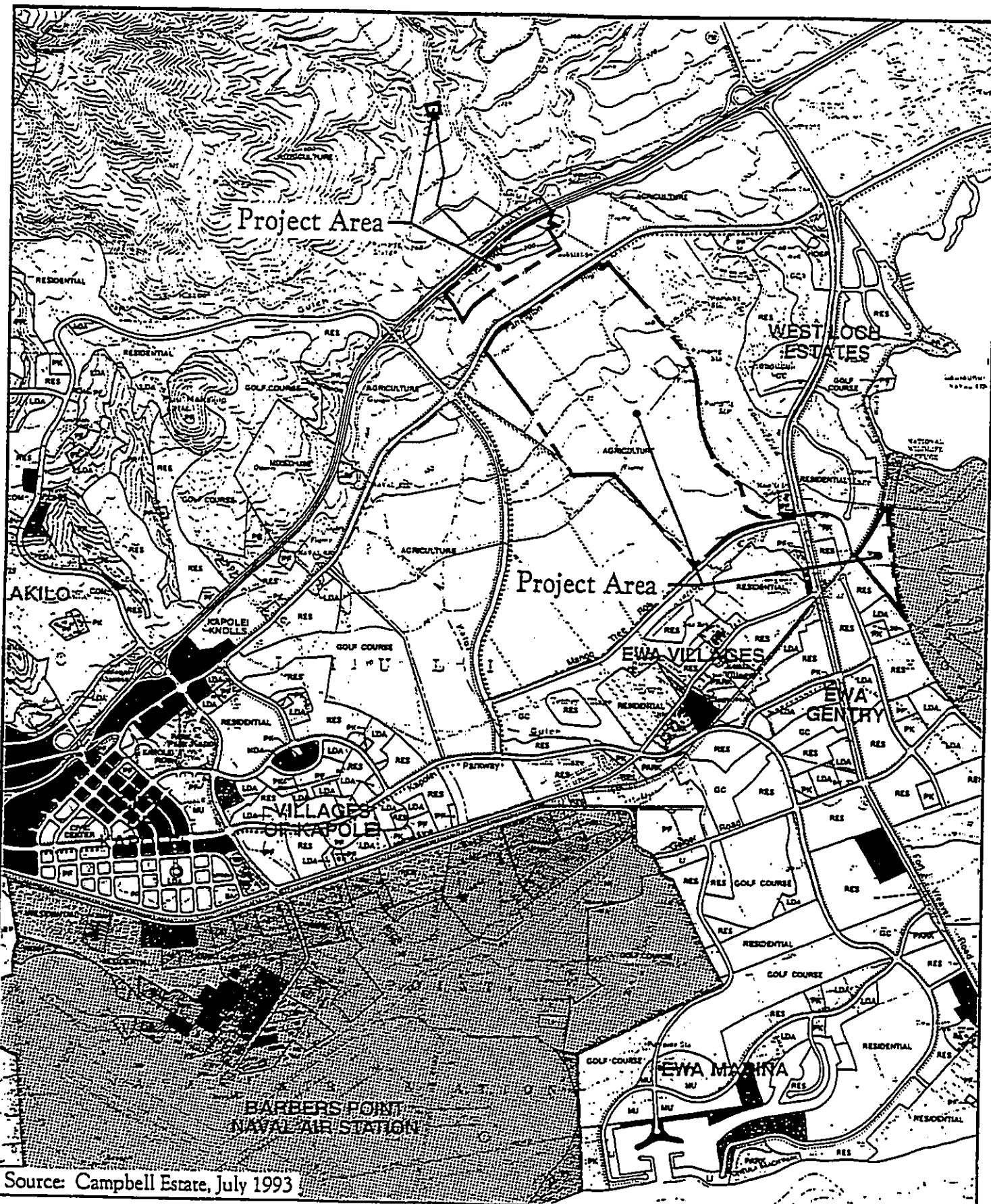
\* *Half of an 18-acre Intermediate School Site is in Schuler's East Kapolei project site.*

There is one other significant difference with this addendum report in comparison with the original potable water master plan. The addendum report addresses the water system requirements to serve the Schuler project exclusively. The original master plan also covered areas outside of the Schuler project, including the proposed University campus, a high school site, 170 acres for residential development by the Department of Hawaiian Home Lands, and 1,100 acres of mixed use development on Campbell Estate lands. None of these areas is included in this addendum report.

As with the original water master plan, this addendum report establishes the storage, transmission, and distribution requirements for all potable water system facilities. All of these would be new, stand-alone improvements and are analyzed as such in this report. The report does not deal with sources of supply for the Schuler project. It is assumed that the Board of Water Supply (BWS) will designate the source of supply for the project after the State Water Commission has reviewed and adjusted the Oahu Sugar Company groundwater allocations now held by Campbell Estate and Amfac. No wells or transmission pipeline from the wells to the Schuler potable water system are considered in this report.

### Project Site and Land Use Plan

Figures 1 and 2, which were prepared by the planning firm of Helber Hastert & Fee, depict the extent of the project site and its proposed land uses. Figure 2 includes a summary of land uses on the 742-acre site. The 649 acres of residential development will include a mix of single family and multi-family. For the purposes of this report, it is assumed that the 75 percent of the 8,000 residential



Source: Campbell Estate, July 1993

**Location of the Schuler Homes  
Projects in East Kapolei, Ewa, Oahu**

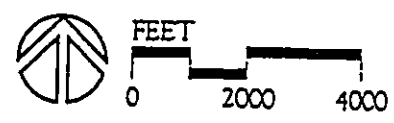
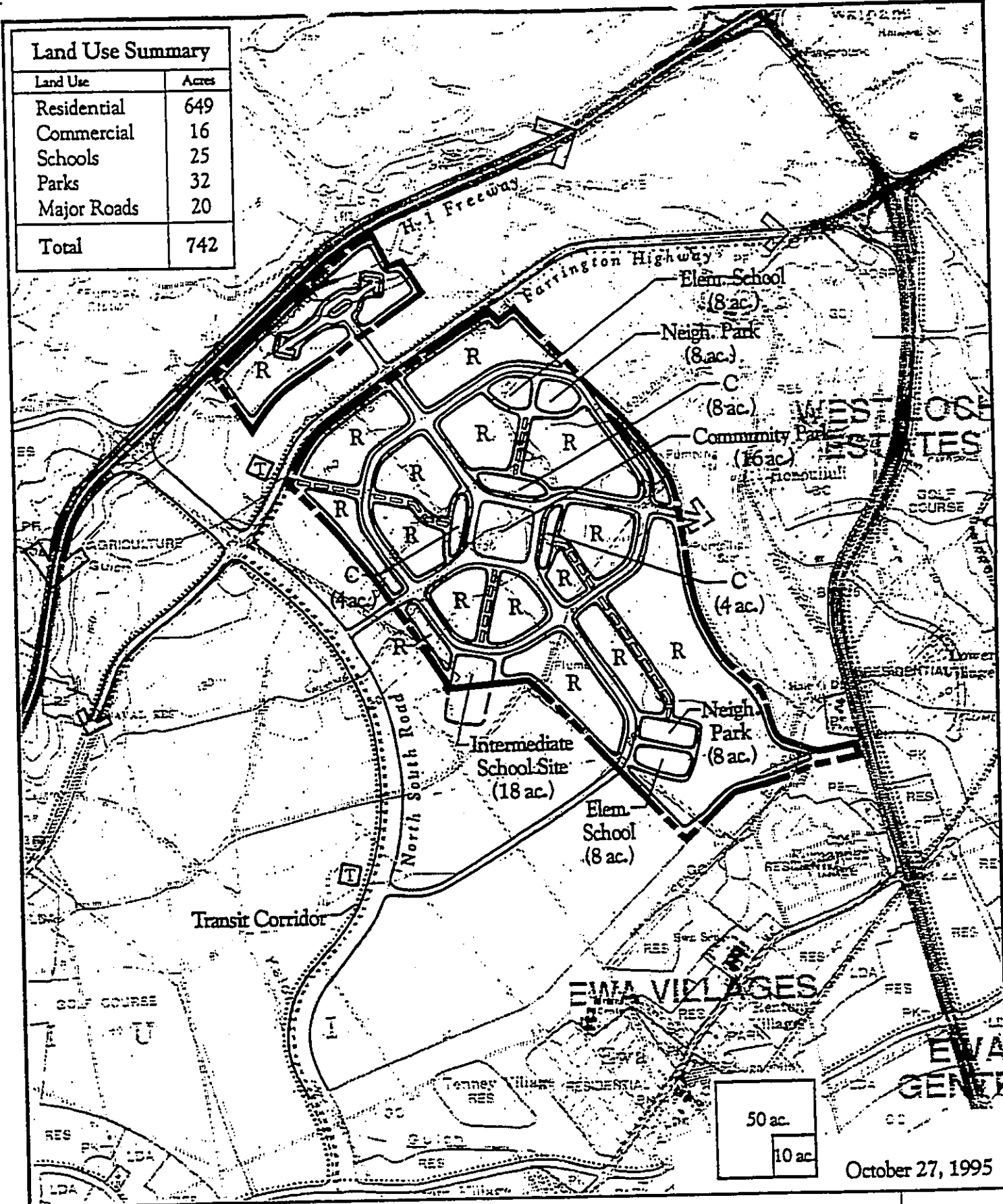


Figure  
**1**

Helber Hastert & Fee, Planners

Land Use Summary	
Land Use	Acres
Residential	649
Commercial	16
Schools	25
Parks	32
Major Roads	20
<b>Total</b>	<b>742</b>



October 27, 1995

**Preliminary Concept Plan**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.

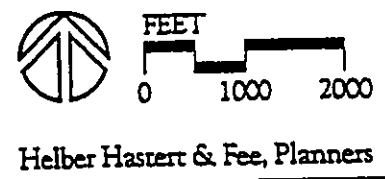


Figure  
**2**

units will be multi-family (i.e. 6,000 units) and the balance (2,000 units) will be single family. This single family/multi-family mix is expected to be distributed in residential parcels throughout the project site.

#### **Delineation of Service Pressure Zones**

Division of the project site into areas served by the 440-foot and 228-foot service pressure zones is illustrated on Figure 3. The division occurs at approximately 110-foot elevation. The storage tank for the 440-foot zone would be on the mauka side of H-1 Freeway at the location shown on Figure 1. The tank for the 228-foot service zone would be within the project site on the makai side of the freeway. About two-thirds of the project site is in the upper, 440-foot service zone.

#### **Projected Water Supply Requirements**

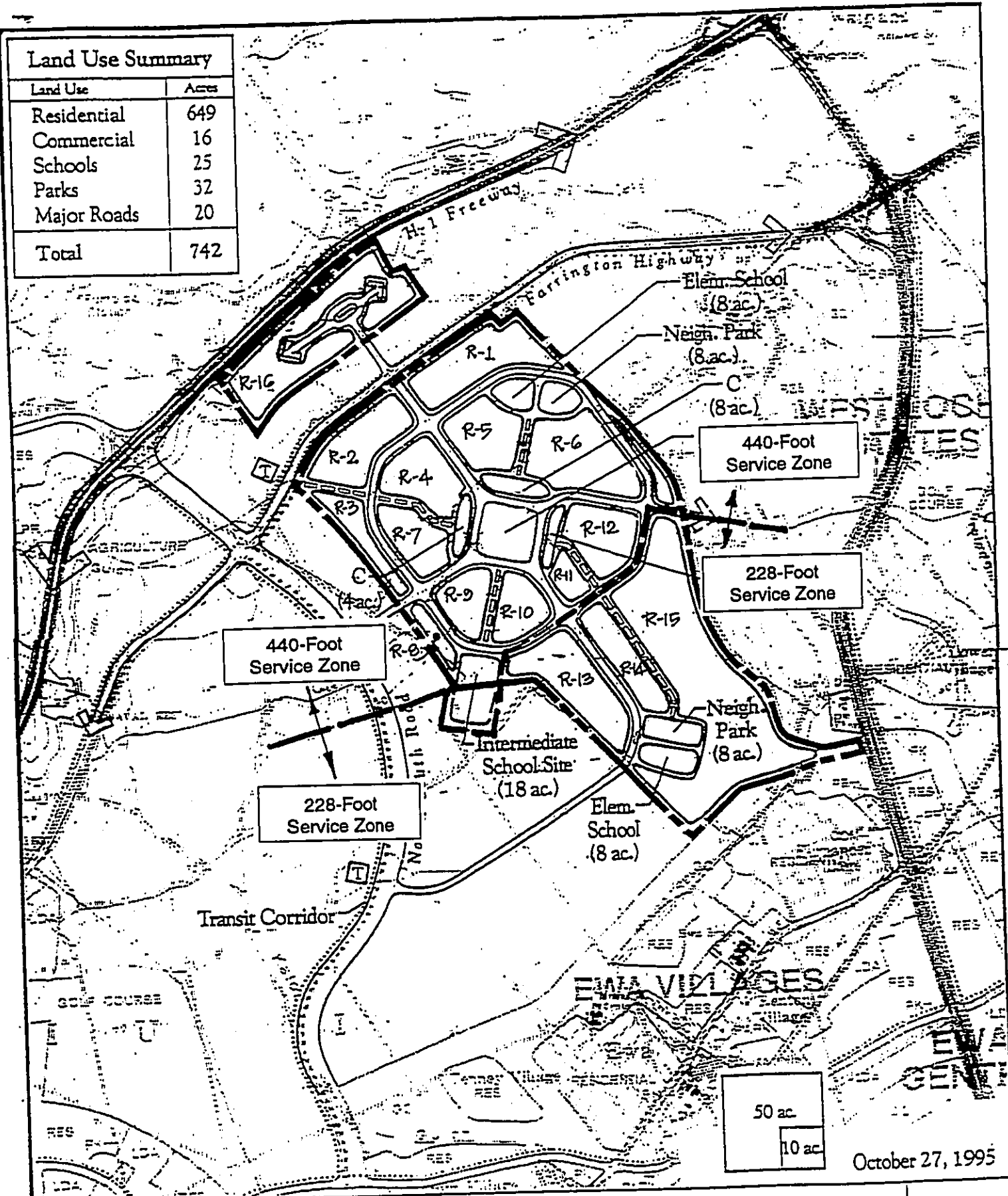
Tables 1 and 2 provide tabulations of the average, maximum day, and peak hour water supply requirements for the 440- and 228-foot zones. For each of the residential parcels, the 75/25 mix of multi-/single-family residential units translates to an average of 425 GPD per residential unit (based on 400 GPD for multi-family and 500 GPD for single family). With this mix, total supply requirements are as follows:

Service Zone	Average (MGD)	Maximum Day (MGD)	Peak (MGD)
228-Foot	1.3370	2.0053	4.0107
440-Foot	2.3911	3.5867	7.1734
Totals	3.7281	5.5920	11.1841

#### **Layout of the Proposed Potable Water System**

Figures 4 and 5 schematically depict the required tanks and pipelines for the 440- and 228-foot service zones, respectively. The 440-foot system features a tank (or tanks) on the mauka side of H-1 Freeway and a distribution main which would run beneath the freeway into the project site. Alternatively, this main could be routed to cross beneath the Honouliuli Gulch Bridge. Such a route would add approximately 3,200 feet of extra pipeline, but it would not require a larger diameter pipe. Required storage for this zone is 3.6 million gallons. It could be constructed in one or two increments. If the well supply (to be designated by BWS) feeds into the 228-foot service zone, a booster station which draws water from the 228-foot tank to deliver it into the 440-foot zone would be necessary. Figure 3 of the original master plan report illustrates a potential layout for such a booster station. To provide maximum day supply in 16 hours, the booster station would ultimately require a pumping capacity of 3,740 GPM plus a standby pump.

Land Use Summary	
Land Use	Acres
Residential	649
Commercial	16
Schools	25
Parks	32
Major Roads	20
<b>Total</b>	<b>742</b>



**Delineation of the 440- and 228-Foot Service Pressure Zones For the East Kapolei Project**

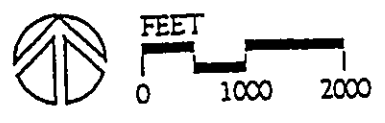


Figure  
**3**

Table 1

Water Supply Requirements For Projects In the 440-Foot Service Zone

Development Parcel	No. of Units	Area (Acres)	Unit Demand (GPD/Unit)	Water Demand (MGD)			Location of Demand on the Hydraulic Schematic (Figure 4)
				Average Day	Maximum Day	Peak	
Residential - 1	550	45	425	.2338	.3506	.7013	15
- 2	475	39	425	.2019	.3028	.6056	3
- 3	225	18	425	.0956	.1434	.2869	4
- 4	420	34	425	.1785	.2678	.5355	3
- 5	415	34	425	.1764	.2646	.5291	2, 14, & 15
- 6	710	58	425	.3018	.4526	.9053	12, 13, & 14
- 7	305	25	425	.1296	.1944	.3889	4
- 8	80	6	425	.0340	.0510	.1020	6
- 9	270	22	425	.1148	.1721	.3443	6 & 8
- 10	270	22	425	.1148	.1721	.3443	10
- 11	110	9	425	.0468	.0701	.1403	10
- 12	410	33	425	.1743	.2614	.5228	12
- 16	765	62	425	.3251	.4877	.9754	1
Elementary School		8	4,000	.0320	.0480	.0960	14
Intermediate School		18	4,000	.0720	.1080	.2160	7
Neighborhood Park		8	4,000	.0320	.0480	.0960	14
Commercial		16	4,000	.0640	.0960	.1920	8, 9, 10, & 11
Community Park		16	4,000	.0640	.0960	.1920	8, 9, 10, & 11
Totals	5,005	473	--	2.3911	3.5867	7.1734	--

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



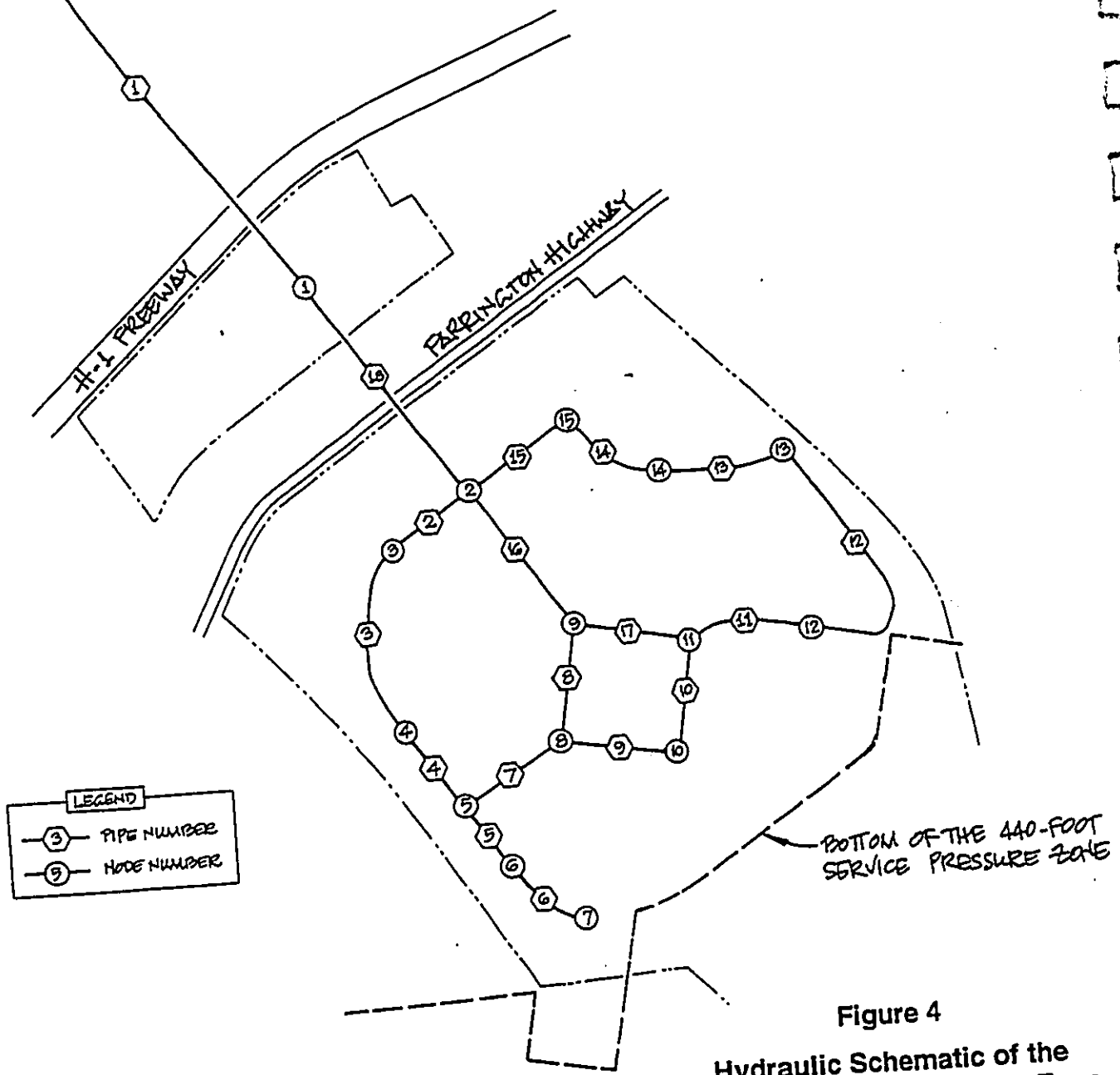
**Table 2**  
**Water Supply Requirements For Projects in the 228-Foot Service Zone**

Development Parcel	No. of Units	Area (Acres)	Unit Demand (GPD/Unit)	Water Demand (MGD)			Location of Demand on the Hydraulic Schematic (Figure 5)
				Average Day	Maximum Day	Peak	
Residential - 13	590	48	425	.2508	.3761	.7523	4
- 14	330	27	425	.1403	.2104	.4208	3
- 15	2,075	168	425	.8819	1.3228	2.6456	2, 6, & 7
Neighborhood Park		8	4,000	.0320	.0480	.0960	5
Elementary School		8	4,000	.0320	.0480	.0960	5
<b>Totals</b>	<b>2,995</b>	<b>259</b>	<b>--</b>	<b>1.3370</b>	<b>2.0053</b>	<b>4.0107</b>	<b>--</b>

Node Information		
Node No.	Elevation ( Feet )	Peak Draft ( MGD )
1	210	0.9754
2	175	0.1764
3	170	1.1411
4	160	0.6758
5	140	0.0000
6	125	0.2741
7	110	0.2160
8	135	0.2441
9	145	0.1200
10	125	0.5326
11	140	0.1440
12	130	0.8246
13	140	0.3018
14	160	0.6702
15	175	0.8777

Pipe Network Data				
Pipe No.	Upstream Node	Downstream Node	Pipe Diam. ( Inches )	Pipe Length ( Feet )
1	0	1	20	4,600
2	2	3	12	800
3	3	4	8	1,650
4	4	5	8	750
5	5	6	8	600
6	6	7	8	750
7	8	5	8	950
8	9	8	8	925
9	8	10	8	925
10	11	10	8	1,000
11	11	12	12	2,400
12	13	12	8	1,000
13	14	13	8	900
14	15	14	8	975
15	2	15	12	1,400
16	2	9	12	925
17	9	11	8	925
18	1	2	20	2,150

440-FOOT TANK(S)



**LEGEND**  
 —○— PIPE NUMBER  
 —●— NODE NUMBER

BOTTOM OF THE 440-FOOT SERVICE PRESSURE ZONE

**Figure 4**  
**Hydraulic Schematic of the 440-Foot Service Pressure Zone**

Node Information		
Node No.	Elevation ( Feet )	Peak Draft ( MGD )
1	100	0.0000
2	110	0.8819
3	95	0.4208
4	102	0.7523
5	77	0.1920
6	80	0.8819
7	95	0.8819

Pipe Network Data				
Pipe No.	Upstream Node	Downstream Node	Pipe Diam. ( Inches )	Pipe Length ( Feet )
1	0	1	20	8,350
2	1	2	16	650
3	2	3	12	1,200
4	3	4	12	350
5	4	5	8	1,700
6	5	6	8	900
7	7	6	8	950
8	2	7	12	950

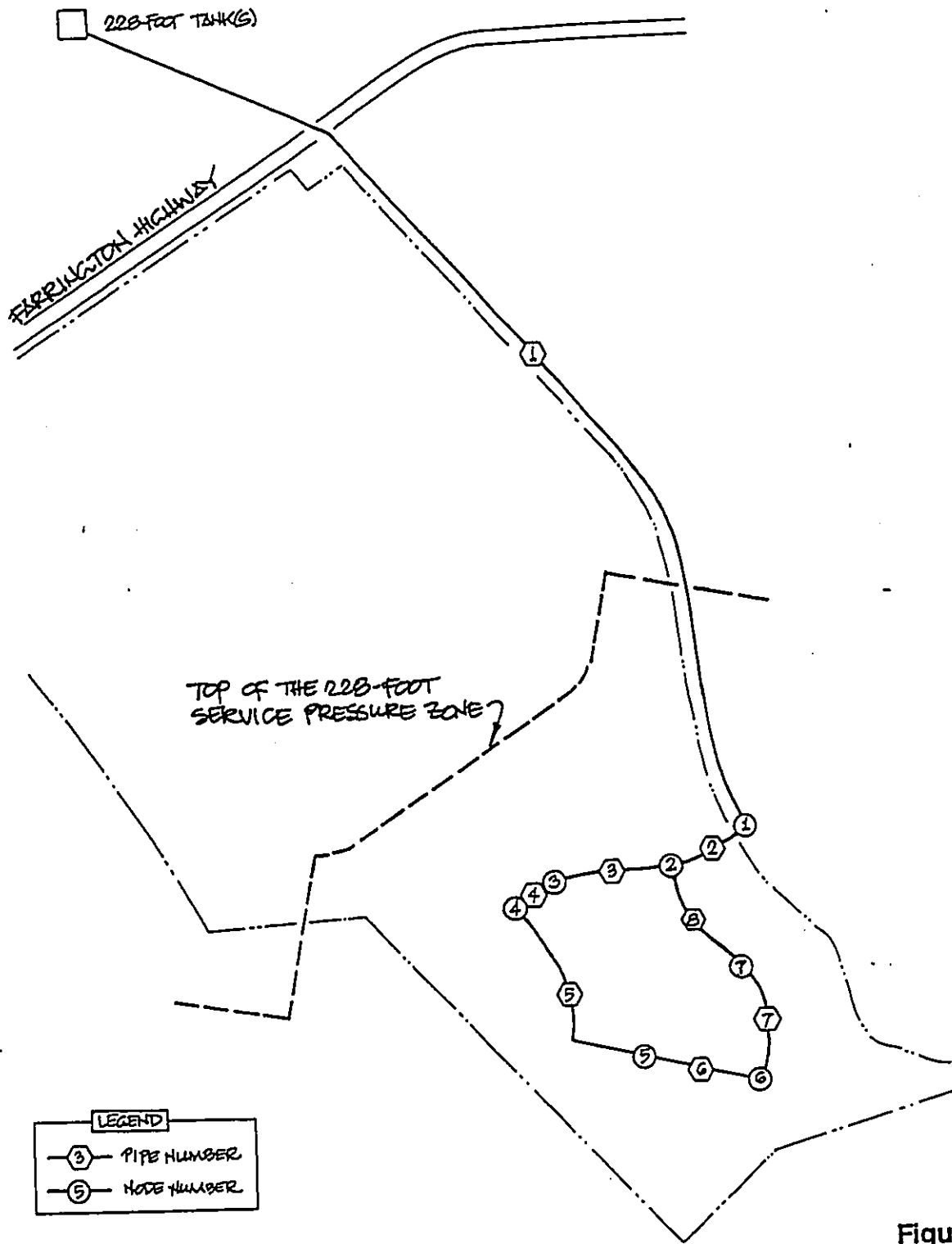


Figure 5

Hydraulic Schematic of the 228-Foot Service Pressure Zone

The 228-foot service zone requires a storage capacity of 2.0 million gallons. The tank (or tanks) would be located on the promontory on the makai side of the freeway. The primary distribution main for the 228-foot service zone shown on Figure 5 follows the "Pipeline Road" alignment along the eastern boundary of the Schuler site.

#### **Hydraulic Analysis of the 440-Foot Service Zone**

Exhibit 1 is a printout of the Hardy-Cross analysis (using the Kentucky Pipe Network program) of the distribution network of the 440-foot zone. All BWS criteria for maximum velocities and minimum pressures during peak and fire flow conditions are met with the pipe sizes shown on Figure 4. Elevations of the nodes used in the analysis are the highest points within the parcel(s) to be served from the particular node, not the elevation of the node itself. The analysis in Exhibit 1 is for gravity delivery from the 440-foot tank, assuming that the tank is 3/4-full. Gravity delivery is the critical operating condition. The original master plan also included a computer run with the booster station operating which demonstrated that residual pressures are slightly higher than for delivery entirely by gravity.

#### **Hydraulic Analysis of the 228-Foot Service Zone**

Exhibit 2 is the Kentucky Pipe Network printout of the hydraulic analysis for the 228-foot service zone. All BWS criteria for maximum velocities and minimum pressures during peak and fire flow conditions are met with the pipe sizes shown on Figure 5. Node elevations for this analysis also reflect the highest delivery point from the particular node. All delivery is by gravity from the 228-foot tank, assuming that it is 3/4 full.

**Exhibit 1**

**Hydraulic Analysis of the  
440-Foot Service Zone**

\*\*\* UNIVERSITY OF KENTUCKY PIPE NETWORK ANALYSIS PROGRAM - 1985 VERSION \*\*\*  
RESULTS TO OUTPUT FILE

INPUT DATA FILE NAME FOR THIS SIMULATION = SCH440.DAT  
OUTPUT DATA FILE NAME FOR THIS SIMULATION = SCH440.OUT

NUMBER OF PIPES = 18  
NUMBER OF JUNCTION NODES = 15  
FLOW UNITS = MILLION GALLONS / DAY  
PRESSURE UNITS = PSI

\*\*\*\* SUMMARY OF INPUT DATA \*\*\*\*

PIPE NO.	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	HW-C VALUE	SUM-M FACT.	PUMP TYPE	FGN GRADE
1	0	1	4600.0	20.0	120.0	0.0	0.0	435.0
2	2	3	800.0	12.0	110.0	0.0	0.0	
3	3	4	1650.0	8.0	110.0	0.0	0.0	
4	4	5	750.0	8.0	110.0	0.0	0.0	
5	5	6	600.0	8.0	110.0	0.0	0.0	
6	6	7	750.0	8.0	110.0	0.0	0.0	
7	8	5	950.0	8.0	110.0	0.0	0.0	
8	9	8	925.0	8.0	110.0	0.0	0.0	
9	8	10	925.0	8.0	110.0	0.0	0.0	
10	11	10	925.0	8.0	110.0	0.0	0.0	
11	11	12	1000.0	8.0	110.0	0.0	0.0	
12	13	12	2400.0	8.0	110.0	0.0	0.0	
13	14	13	1000.0	8.0	110.0	0.0	0.0	
14	15	14	900.0	8.0	110.0	0.0	0.0	
15	2	15	975.0	12.0	110.0	0.0	0.0	
16	2	9	1400.0	12.0	110.0	0.0	0.0	
17	9	11	925.0	8.0	110.0	0.0	0.0	
18	1	2	2150.0	20.0	120.0	0.0	0.0	

JUNCT. NO.	DEMAND	ELEVATION
1	1.0	210.0
2	0.2	175.0
3	1.1	170.0
4	0.7	160.0
5	0.0	140.0
6	0.3	125.0
7	0.2	110.0
8	0.2	135.0
9	0.1	145.0
10	0.5	125.0
11	0.1	140.0
12	0.8	130.0
13	0.3	140.0
14	0.7	160.0
15	0.9	175.0

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

**PEAK FLOWRATES**

NO. OF TRIALS = 5 - ACCURACY ATTAINED = 0

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
----------	---------	---------	-----------	-----------	------------	-----------	---------------	---------

1	0	1	7.17	22.00	0.00	0.00	5.09	4.78
2	2	3	1.98	4.99	0.00	0.00	3.90	6.24
3	3	4	0.84	15.15	0.00	0.00	3.72	9.18
4	4	5	0.16	0.34	0.00	0.00	0.73	0.45
5	5	6	0.49	2.03	0.00	0.00	2.17	3.38
6	6	7	0.22	0.56	0.00	0.00	0.96	0.74
7	8	5	0.33	1.51	0.00	0.00	1.44	1.59
8	9	8	0.92	9.99	0.00	0.00	4.07	10.81
9	8	10	0.35	1.66	0.00	0.00	1.54	1.79
10	11	10	0.18	0.51	0.00	0.00	0.82	0.55
11	11	12	0.64	5.62	0.00	0.00	2.86	5.62
12	13	12	0.18	1.27	0.00	0.00	0.80	0.53
13	14	13	0.48	3.28	0.00	0.00	2.14	3.28
14	15	14	1.15	14.82	0.00	0.00	5.11	16.47
15	2	15	2.03	6.36	0.00	0.00	4.00	6.53
16	2	9	2.01	8.98	0.00	0.00	3.96	6.41
17	9	11	0.97	11.14	0.00	0.00	4.31	12.04
18	1	2	6.20	7.84	0.00	0.00	4.40	3.65

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	210.0	1.0	88.0	413.0
2	175.0	0.2	99.7	405.2
3	170.0	1.1	99.7	400.2
4	160.0	0.7	97.5	385.0
5	140.0	0.0	106.0	384.7
6	125.0	0.3	111.6	382.6
7	110.0	0.2	117.9	382.1
8	135.0	0.2	108.8	386.2
9	145.0	0.1	108.8	396.2
10	125.0	0.5	112.5	384.5
11	140.0	0.1	106.2	385.0
12	130.0	0.8	108.1	379.4
13	140.0	0.3	104.3	380.7
14	160.0	0.7	97.1	384.0
15	175.0	0.9	97.0	398.8

THE NET SYSTEM DEMAND = 7.1738  
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-)  
PIPE NO.            FLOW  
1                    7.17

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO.        DEMAND  
GLOBAL DEMAND FACTOR = .5  
13                    3.0309

\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*

NO. OF TRIALS = 5 - ACCURACY ATTAINED = .0002

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	6.47	18.15	0.00	0.00	4.59	3.95
2	2	3	1.29	2.25	0.00	0.00	2.54	2.81
3	3	4	0.72	11.28	0.00	0.00	3.18	6.83
4	4	5	0.38	1.57	0.00	0.00	1.68	2.10
5	5	6	0.25	0.56	0.00	0.00	1.09	0.94

2000 GPM FIRE  
FLOWRATE AT NODE 13

6	6	7	0.11	0.15	0.00	0.00	0.48	0.21
7	8	5	-0.13	0.29	0.00	0.00	0.59	0.30
8	9	8	0.73	6.58	0.00	0.00	3.25	7.12
9	8	10	0.74	6.78	0.00	0.00	3.30	7.33
10	11	10	-0.48	2.98	0.00	0.00	2.12	3.23
11	11	12	1.60	30.35	0.00	0.00	7.10	30.35
12	13	12	-1.19	41.99	0.00	0.00	5.28	17.50
13	14	13	1.84	39.21	0.00	0.00	8.16	39.21
14	15	14	2.18	48.11	0.00	0.00	9.64	53.45
15	2	15	2.61	10.17	0.00	0.00	5.15	10.43
16	2	9	1.99	8.80	0.00	0.00	3.92	6.29
17	9	11	1.20	16.35	0.00	0.00	5.30	17.67
18	1	2	5.98	7.34	0.00	0.00	4.24	3.41

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	210.0	0.5	89.6	416.8
2	175.0	0.1	101.6	409.5
3	170.0	0.6	102.8	407.3
4	160.0	0.3	102.3	396.0
5	140.0	0.0	110.2	394.4
6	125.0	0.1	116.5	393.8
7	110.0	0.1	122.9	393.7
8	135.0	0.1	112.3	394.1
9	145.0	0.1	110.8	400.7
10	125.0	0.3	113.7	387.3
11	140.0	0.1	105.9	384.4
12	130.0	0.4	97.1	354.0
13	140.0	3.0	74.5	312.0
14	160.0	0.3	82.9	351.2
15	175.0	0.4	97.2	399.3

THE NET SYSTEM DEMAND = 6.4669  
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-)  
PIPE NO.           FLOW  
1                   6.47

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO.    DEMAND  
GLOBAL DEMAND FACTOR = .5  
9               2.94  
13              .1509

2000 GPM FIRE  
FLOWRATE AT NODE 9

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 6 - ACCURACY ATTAINED = 0

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	6.47	18.15	0.00	0.00	4.59	3.95
2	2	3	1.40	2.63	0.00	0.00	2.76	3.29
3	3	4	0.83	14.83	0.00	0.00	3.68	8.99
4	4	5	0.49	2.56	0.00	0.00	2.19	3.42
5	5	6	0.25	0.56	0.00	0.00	1.09	0.94
6	6	7	0.11	0.15	0.00	0.00	0.48	0.21
7	8	5	-0.25	0.91	0.00	0.00	1.10	0.96
8	9	8	0.06	0.06	0.00	0.00	0.26	0.07
9	8	10	0.18	0.51	0.00	0.00	0.82	0.55



10	11	10	0.08	0.11	0.00	0.00	0.36	0.12
11	11	12	0.02	0.01	0.00	0.00	0.08	0.01
12	13	12	0.39	5.40	0.00	0.00	1.74	2.25
13	14	13	0.54	4.10	0.00	0.00	2.41	4.10
14	15	14	0.88	8.98	0.00	0.00	3.90	9.98
15	2	15	1.32	2.86	0.00	0.00	2.60	2.93
16	2	9	3.17	20.88	0.00	0.00	6.25	14.91
17	9	11	0.17	0.46	0.00	0.00	0.77	0.49
18	1	2	5.98	7.34	0.00	0.00	4.24	3.41

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	210.0	0.5	89.6	416.8
2	175.0	0.1	101.6	409.5
3	170.0	0.6	102.6	406.9
4	160.0	0.3	100.6	392.0
5	140.0	0.0	108.1	389.5
6	125.0	0.1	114.4	388.9
7	110.0	0.1	120.8	388.8
8	135.0	0.1	109.9	388.6
9	145.0	2.9	105.6	388.6
10	125.0	0.3	114.0	388.1
11	140.0	0.1	107.5	388.2
12	130.0	0.4	111.9	388.2
13	140.0	0.2	109.9	393.6
14	160.0	0.3	103.0	397.7
15	175.0	0.4	100.4	406.6

THE NET SYSTEM DEMAND = 6.466901  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO.            FLOW  
1                    6.47

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO.    DEMAND  
GLOBAL DEMAND FACTOR = .5  
7                2.988  
9                .06

2000 GPM FIRE  
FLOWRATE AT NODE 7

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 3 - ACCURACY ATTAINED = .001

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	6.47	18.15	0.00	0.00	4.59	3.95
2	2	3	2.19	5.99	0.00	0.00	4.31	7.49
3	3	4	1.62	50.84	0.00	0.00	7.16	30.81
4	4	5	1.28	14.97	0.00	0.00	5.66	19.96
5	5	6	3.13	62.72	0.00	0.00	13.85	104.53
6	6	7	2.99	72.15	0.00	0.00	13.24	96.20
7	8	5	1.85	37.50	0.00	0.00	8.19	39.47
8	9	8	1.41	22.08	0.00	0.00	6.24	23.87
9	8	10	-0.56	4.02	0.00	0.00	2.49	4.35
10	11	10	0.83	8.26	0.00	0.00	3.67	8.93
11	11	12	0.01	0.00	0.00	0.00	0.04	0.00
12	13	12	0.40	5.68	0.00	0.00	1.79	2.37
13	14	13	0.55	4.26	0.00	0.00	2.46	4.26

14	15	14	0.89	9.19	0.00	0.00	3.94	10.21
15	2	15	1.33	2.90	0.00	0.00	2.62	2.98
16	2	9	2.38	12.23	0.00	0.00	4.68	8.73
17	9	11	0.91	9.80	0.00	0.00	4.02	10.59
18	1	2	5.98	7.34	0.00	0.00	4.24	3.41

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	210.0	0.5	89.6	416.8
2	175.0	0.1	101.6	409.5
3	170.0	0.6	101.2	403.5
4	160.0	0.3	83.5	352.7
5	140.0	0.0	85.7	337.7
6	125.0	0.1	65.0	275.0
7	110.0	3.0	40.2	202.8
8	135.0	0.1	104.1	375.2
9	145.0	0.1	109.3	397.3
10	125.0	0.3	110.2	379.2
11	140.0	0.1	107.2	387.5
12	130.0	0.4	111.6	387.5
13	140.0	0.2	109.7	393.2
14	160.0	0.3	102.9	397.4
15	175.0	0.4	100.4	406.6

THE NET SYSTEM DEMAND = 6.466901  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
PIPE NO.           FLOW  
1                   6.47

\*\*\*\*\* END OF THIS SIMULATION \*\*\*\*\*

**Exhibit 2**

**Hydraulic Analysis of the  
228-Foot Service Zone**

\*\*\* UNIVERSITY OF KENTUCKY PIPE NETWORK ANALYSIS PROGRAM - 1985 VERSION \*\*\*  
 RESULTS TO OUTPUT FILE

INPUT DATA FILE NAME FOR THIS SIMULATION = SCH228.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = SCH228.OUT

NUMBER OF PIPES = 8  
 NUMBER OF JUNCTION NODES = 7  
 FLOW UNITS = MILLION GALLONS / DAY  
 PRESSURE UNITS = PSI

\*\*\*\* SUMMARY OF INPUT DATA \*\*\*\*

PIPE NO.	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	HW-C VALUE	SUM-M FACT.	PUMP TYPE	FGN GRADE
1	0	1	8350.0	20.0	120.0	0.0	0.0	223.0
2	1	2	650.0	16.0	120.0	0.0	0.0	
3	2	3	1200.0	12.0	110.0	0.0	0.0	
4	3	4	350.0	12.0	110.0	0.0	0.0	
5	4	5	1700.0	8.0	110.0	0.0	0.0	
6	5	6	900.0	8.0	110.0	0.0	0.0	
7	7	6	950.0	8.0	110.0	0.0	0.0	
8	2	7	950.0	12.0	110.0	0.0	0.0	

JUNCT. NO.	DEMAND	ELEVATION
1	0.0	100.0
2	0.9	110.0
3	0.4	95.0
4	0.8	102.0
5	0.2	77.0
6	0.9	80.0
7	0.9	95.0

**PEAK FLOWRATE**

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*

NO. OF TRIALS = 3 - ACCURACY ATTAINED = .0027

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	4.01	13.60	0.00	0.00	2.84	1.63
2	1	2	4.01	3.14	0.00	0.00	4.44	4.83
3	2	3	1.56	4.81	0.00	0.00	3.07	4.01
4	3	4	1.14	0.78	0.00	0.00	2.24	2.24
5	4	5	0.39	3.71	0.00	0.00	1.71	2.18
6	5	6	0.19	0.55	0.00	0.00	0.86	0.61
7	7	6	0.69	6.01	0.00	0.00	3.05	6.32
8	2	7	1.57	3.85	0.00	0.00	3.09	4.05

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	47.4	209.4
2	110.0	0.9	41.7	206.3
3	95.0	0.4	46.1	201.4
4	102.0	0.8	42.8	200.7
5	77.0	0.2	52.0	197.0
6	80.0	0.9	50.4	196.4
7	95.0	0.9	46.5	202.4

THE NET SYSTEM DEMAND = 4.0108  
 SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
 PIPE NO. FLOW  
 1 4.01

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO. DEMAND  
 GLOBAL DEMAND FACTOR = .5  
 5 2.976

2000 GPM FIRE  
 FLOWRATE AT NODE 5

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*  
 NO. OF TRIALS = 2 - ACCURACY ATTAINED = .0001

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	4.89	19.60	0.00	0.00	3.46	2.35
2	1	2	4.89	4.52	0.00	0.00	5.41	6.96
3	2	3	2.20	9.09	0.00	0.00	4.33	7.58
4	3	4	1.99	2.20	0.00	0.00	3.92	6.29
5	4	5	1.61	52.25	0.00	0.00	7.15	30.74
6	5	6	-1.36	20.21	0.00	0.00	6.04	22.46
7	7	6	1.80	35.87	0.00	0.00	7.99	37.75
8	2	7	2.24	7.47	0.00	0.00	4.42	7.86

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	44.8	203.4
2	110.0	0.4	38.5	198.9
3	95.0	0.2	41.1	189.8
4	102.0	0.4	37.1	187.6
5	77.0	3.0	25.3	135.3
6	80.0	0.4	32.7	155.5
7	95.0	0.4	41.8	191.4

THE NET SYSTEM DEMAND = 4.8854  
 SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)  
 PIPE NO. FLOW  
 1 4.89

THE FOLLOWING CHANGES ARE MADE

JUNCT. NO. DEMAND  
 GLOBAL DEMAND FACTOR = .5  
 5 .096  
 3 2.3704

1500 GPM FIRE  
 FLOWRATE AT NODE 3

\*\*\*\* THE RESULTS FOR THIS SIMULATION FOLLOW \*\*\*\*  
 NO. OF TRIALS = 4 - ACCURACY ATTAINED = .0012

PIPE NO.	NODE #1	NODE #2	FLOW RATE	HEAD LOSS	MINOR LOSS	PUMP HEAD	LINE VELOCITY	HL 1000
1	0	1	4.17	14.59	0.00	0.00	2.95	1.75
2	1	2	4.17	3.37	0.00	0.00	4.62	5.18
3	2	3	2.53	11.82	0.00	0.00	4.99	9.85

4	3	4	0.16	0.02	0.00	0.00	0.32	0.06
5	4	5	-0.21	1.21	0.00	0.00	0.94	0.71
6	5	6	-0.31	1.28	0.00	0.00	1.36	1.43
7	7	6	0.75	7.04	0.00	0.00	3.32	7.41
8	2	7	1.19	2.30	0.00	0.00	2.34	2.43

JUNCTION NO.	ELEVATION (FT.)	DEMAND	PRESSURE (PSI)	HYDRAULIC GRADE
1	100.0	0.0	47.0	208.4
2	110.0	0.4	41.2	205.0
3	95.0	2.4	42.6	193.2
4	102.0	0.4	39.5	193.2
5	77.0	0.1	50.9	194.4
6	80.0	0.4	50.1	195.7
7	95.0	0.4	46.7	202.7

THE NET SYSTEM DEMAND = 4.1654  
SUMMARY OF INFLOWS (+) AND OUTFLOWS (-)

PIPE NO.	FLOW
1	4.17

\*\*\*\*\* END OF THIS SIMULATION \*\*\*\*\*

K

TRAFFIC IMPACT ASSESSMENT REPORT FOR EAST KAPOLEI PROJECT,  
OCTOBER 1994;  
UPDATED TRAFFIC IMPACT ASSESSMENT REPORT FOR EAST KAPOLEI PROJECT,  
DECEMBER 11, 1995

PACIFIC PLANNING AND ENGINEERING, INC.

**TRAFFIC IMPACT ASSESSMENT REPORT**

**FOR**

**EAST KAPOLEI PROJECT**

**17 October 1994**

**Honolulu, Oahu, Hawaii**

**Prepared for:**

**Schuler Homes, Inc. and Hawaiian Trust Co., Ltd.**

**Prepared By:**

**Pacific Planning & Engineering, Inc.  
1221 Kapiolani Boulevard, Suite 6D  
Honolulu, Hawaii 96814**



## FOREWORD

The traffic forecasts shown within this report's figures and tables are the direct result of Pacific Planning & Engineering, Inc.'s proprietary analytical tools. For report editing and review purposes, the forecast values have been rounded to the nearest five vehicles from our mathematical results, although we do not imply this level of accuracy can exist in any forecast method. The rounded values, however, reasonably quantify the forecasted traffic volumes for the purposes of this study.

## TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY . . . . .	1
	Project Description . . . . .	1
	Study Methodology . . . . .	2
	Conclusions and Recommendations . . . . .	3
II.	PROJECT DESCRIPTION . . . . .	6
III.	EXISTING TRAFFIC CONDITIONS . . . . .	9
	Land Uses . . . . .	9
	Roadway Facilities . . . . .	9
	Traffic Conditions . . . . .	9
IV.	FUTURE TRAFFIC CONDITIONS . . . . .	10
	Land Uses . . . . .	10
	Roadway Facilities . . . . .	12
V.	PROJECTED TRAFFIC CONDITIONS . . . . .	16
	Future Traffic Without Project . . . . .	16
	Future Traffic With Project . . . . .	24
VI.	TRAFFIC IMPACT ANALYSIS . . . . .	30
	Project Impact Analysis . . . . .	30
	Analysis Methods . . . . .	31
	Analysis Results . . . . .	35
VII.	MITIGATION MEASURES . . . . .	37
	Year 2005 (Phase 1) . . . . .	37
	Year 2011 (Phase 2) . . . . .	38
VIII.	CONCLUSIONS AND RECOMMENDATIONS . . . . .	39

## APPENDICES

Appendix A. Definition of: Planning Analysis  
Multilane Highway Analysis  
On-Ramp and Off-Ramp Analysis

## LIST OF FIGURES

Figure 1.	Project Location Map . . . . .	7
Figure 2.	Project Site Plan . . . . .	8
Figure 3.	2005 Roadway Network . . . . .	14
Figure 4.	2011 Roadway Network . . . . .	15
Figure 5.	2005 Morning Peak Hour Forecast Traffic Without Project . . . . .	20
Figure 6.	2005 Afternoon Peak Hour Forecast Traffic Without Project . . . . .	21
Figure 7.	2011 Morning Peak Hour Forecast Traffic With Project . . . . .	22
Figure 8.	2011 Afternoon Peak Hour Forecast Traffic Without Project . . . . .	23
Figure 9.	2005 Morning Peak Hour Forecast Traffic With Project . . . . .	26
Figure 10.	2005 Afternoon Peak Hour Forecast Traffic With Project . . . . .	27
Figure 11.	2011 Morning Peak Hour Forecast Traffic With Project . . . . .	28
Figure 12.	2011 Afternoon Peak Hour Forecast Traffic With Project . . . . .	29

## LIST OF TABLES

Table 1.	Land Use Summary (Acres) . . . . .	2
Table 2.	Land Use Summary (Acres) . . . . .	6
Table 3.	Trip Generation For Other Adjacent Projects . . . . .	18
Table 4.	2005 Trip Generation For East Kapolei Project . . . . .	24
Table 5.	Project Trip Distribution . . . . .	25
Table 6.	Planning Analysis . . . . .	32
Table 7.	Level-of-Service - 2005 Morning Peak Hour . . . . .	33
Table 8.	Level-of-Service - 2005 Afternoon Peak Hour . . . . .	33
Table 9.	Level-of-Service - 2011 Morning Peak Hour . . . . .	34
Table 10.	Level-of-Service - 2011 Afternoon Peak Hour . . . . .	34

## EXECUTIVE SUMMARY

Pacific Planning & Engineering, Inc. (PPE) was engaged to undertake a study to identify and assess future traffic impacts caused by the proposed East Kapolei Project.

This report describes the methodology and guidelines used to address the above concerns and presents the findings and recommendations from the study.

### Project Description

Schuler Homes, Inc. and Hawaiian Trust Co., Ltd. are proposing to construct the East Kapolei Project in Honolulu, Oahu, Hawaii.

The project is divided into two phases. The first phase includes development of 500 acres by year 2005, and the second phase 522 acres by year 2011. The project is located west of Fort Weaver Road in Ewa, south of existing Farrington Highway, and just east of the proposed North-South Road. The area is currently agricultural, with no existing traffic. The table below summarizes the proposed land uses by phase.

Vehicular access to the Project will be provided by three intersections. The first intersection will be located on Farrington Highway when a major spine road is constructed. Two other intersections will be connected to the proposed North-South Road at points serving the proposed University site forming four-legged intersections. Direct connection to Fort Weaver Road was discouraged by the State Highways Division due to the traffic conditions on that roadway.

Land Use	Phase 1	Phase 2	Total
Residential	458	490	948
Commercial	10	10	20
School	12	0	12
Parks	10	10	20
Circulation	10	12	22
<b>Total</b>	<b>500</b>	<b>522</b>	<b>1,022</b>

### Study Methodology

This Report identifies and describes the probable impact of the traffic generated by the proposed development in the year 2005 and 2011 when the project is expected to be completed in two phases. The analysis primarily focuses on the following intersections:

- Farrington Highway and Project Spine Road
- Proposed North-South Road at Secondary Project Road
- Proposed North-South Road at Project Spine Road
- Ramps at H-1 Interchange with Proposed North-South Road

Traffic was forecasted for the years 2005 and 2011 at the study intersections and ramps by:

- adjusting trips for current development absorption rates as calculated based on the City Planning Department preliminary population estimates<sup>1</sup> for areas within the Ewa region,
- updating land uses and roadway plans for 2005 and 2010 prepared for

<sup>1</sup> Draft values for possible adoption in the OMPO planning process. The process is undergoing updating of models and plans. This study and results are intended solely for assessing the traffic impact on relevant roadways by the East Kapolei Project. Forecast values are not intended as a substitute for the formal OMPO planning results.

EXECUTIVE SUMMARY

- the Ewa Region Highway Master Plan,
- preparing aggregated zonal trip tables for the years 2005 and 2011 for the morning and afternoon peak hours,
  - estimating traffic assignments to study roadways and balancing volumes for capacity restraints,
  - forecast traffic generated by the proposed commercial project, University, High School and housing development of the Department of Hawaiian Home Lands,
  - estimating traffic generated by the project and assigning traffic to the study roadways, and
  - adding the traffic forecasts for the project and other developments.

The Report describes the impacts on each study roadway segment by the *level-of-service* (LOS) and *capacity levels* for years 2005 and 2011 traffic conditions "without project" and years 2005 and 2011 traffic conditions "with" Project.

**Conclusions & Recommendations**

---

The results of the traffic operations analysis indicate that the proposed East Kapolei Project will significantly change the traffic flow quality at the study intersections when the project is completed in two phases. Major road improvements have already been identified in the Ewa Region Highway Master Plan and adopted by the Oahu Metropolitan Planning Organization (OMPO). These improvements are assumed as part of the roadway network in 2005 and 2011 in the assessment of the traffic impacts.

For the year 2005 (Phase 1), in order to minimize the impact of the project and provide for smoother traffic operating conditions, we recommend the following:

EXECUTIVE SUMMARY

- Two left-turn lanes northbound exiting the project driveway onto Farrington Highway.
- Two left-turn lanes westbound at the intersection of Farrington Highway and the North-South Road.
- Addition of an extra through lane from about 1000' west of the intersection of Farrington Highway and the North-South Road to Project Driveway C, east of the intersection.
- A project connection to the North-South Road would relieve traffic at other intersections. If a connection is made, the two-left-turn lanes at the intersections of Farrington Highway with the North-South Road and Project Driveway C may not be required to handle makai-bound traffic volumes. However, makai-bound traffic would shift to the North-South Road connection and thus this intersection would require two left turn lanes exiting the project.

For the year 2011 (Phase 2), mitigative measures to the study intersections would be more involved because of the level of traffic volumes during the peak hours.

The possibility of a grade separation at the intersection of Farrington Highway and the North-South Road would increase capacity through the area. However, alternate methods of transportation actions should be investigated. A comprehensive plan that includes both Transportation System Management and Transportation Demand Management concepts should be developed for the area which would include the Project. The future traffic levels have regional sources that are undergoing current development. Integrated transit services, roadway plans and construction schedules, computer controlled traffic lights, remote parking areas, shuttle services, paratransit, bicycle and pedestrian ways, and some form of exclusive way transit should be considered in a comprehensive plan. Beyond transportation actions, the need for integrated land use planning



EXECUTIVE SUMMARY

for all the major parcels will aid in reducing the need for vehicle trips.

From a planning perspective, OMPO's current efforts to update its Long Range Plan will institute new population and traffic forecast values for the Ewa Region. The results reported herein pertain specifically to the East Kapolei Project in addition to current preliminary population estimates. This assessment approach is conservative in that the impact is greater than would be expected, as population exceeds what is set forth in preliminary figures. The OMPO's new region-wide forecasts will likely result in less impacts and roadway needs than indicated herein due to smaller values of population. A major roadway needs study is needed to update the previous study for the Ewa Region.

An example of a potentially major change that should be included in the update study is the final version of the BPNAS Reuse Plan. This and other major land use proposals in the Ewa Region should be evaluated for traffic impact on a region-wide basis, and their mitigating actions included in the afore-mentioned comprehensive transportation plan. Thus, 2011 (Phase 2) impacts should be re-evaluated when those forecasts are available, and a plan be developed that not only addresses highway projects but land use planning (to obviate the need for vehicle trips) transit, and other modes and services as well.

## PROJECT DESCRIPTION

Schuler Homes, Inc. and Hawaiian Trust Co., Ltd. are proposing to construct the East Kapolei Project in Ewa, Oahu. Figure 1 shows the project location and roadway network in the vicinity.

### Project Land Uses

The project is divided into two phases. The first phase includes development of 500 acres by year 2005, and the second phase 522 acres by year 2011. The project is located west of Fort Weaver Road in Ewa, south of existing Farrington Highway, and just east of the proposed North-South Road. The area is currently agricultural, with no existing traffic. Table 2 below summarizes the proposed land uses by phase. Figure 2 shows the Project Site Plan.

Table 2. Land Use Summary (Acres)			
Land Use	Phase 1	Phase 2	Total
Residential	458	490	948
Commercial	10	10	20
School	12	0	12
Parks	10	10	20
Circulation	10	12	22
<b>Total</b>	<b>500</b>	<b>522</b>	<b>1,022</b>

Vehicular access to the Project will be provided by three intersections. The first intersection will be located on Farrington Highway when a major spine road is constructed. The other two intersections will be connected to the proposed North-South Road at points serving the proposed University site forming four-legged intersections.

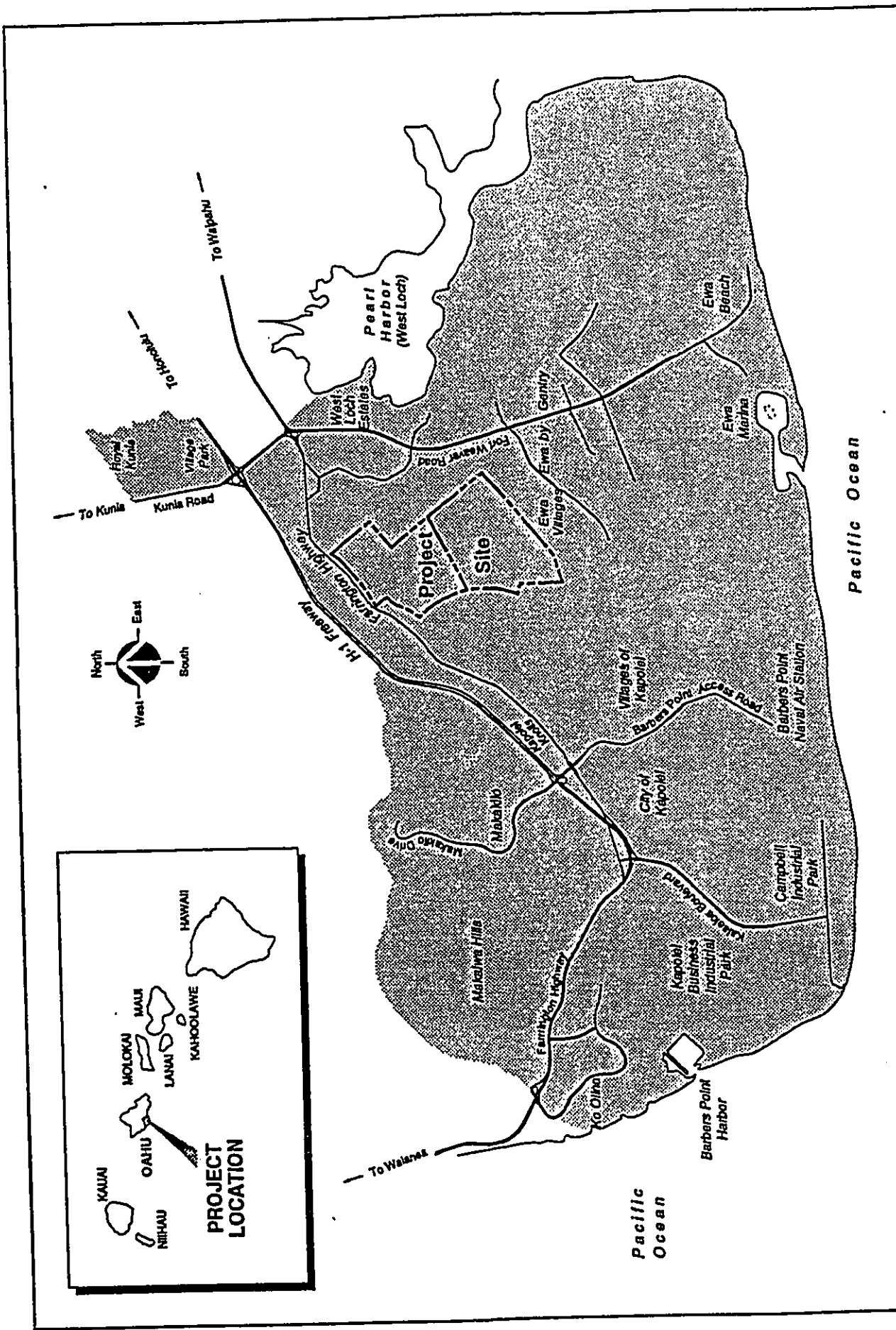
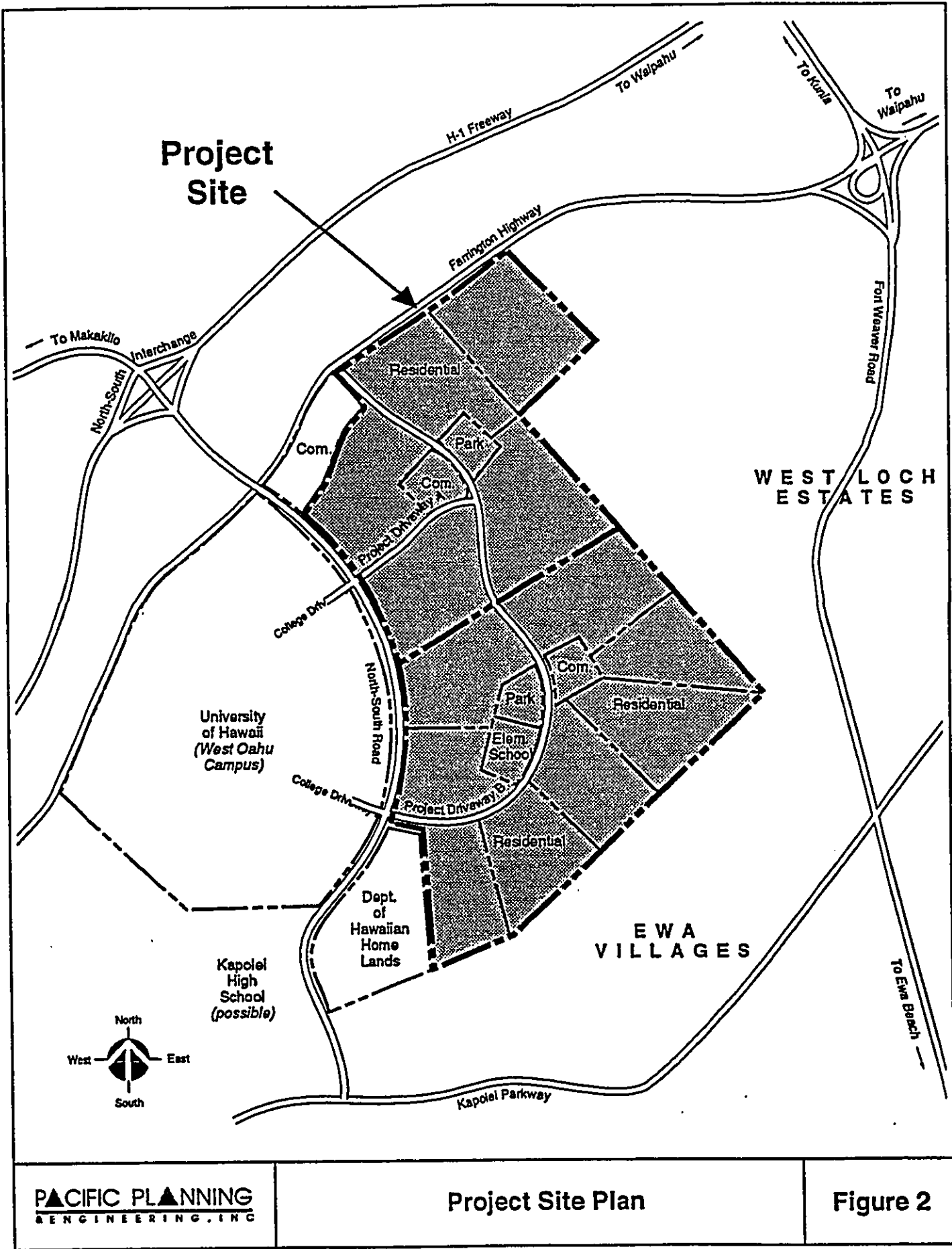


Figure 1

Project Location Map

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**PACIFIC PLANNING**  
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**Project Site Plan**

**Figure 2**

THE UNIVERSITY OF HAWAII LIBRARY SYSTEMS  
 100 EAST WILSON AVENUE  
 HONOLULU, HAWAII 96826-1601  
 TEL: 808/957-2100  
 FAX: 808/957-2101  
 WWW: WWW.UH.HI.EDU

## EXISTING CONDITIONS

### Land Uses

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The existing land is in agriculture. There are no vehicle trips generated in the project site.

### Roadway Facilities

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The site is currently served by Farrington Highway, a two-lane highway connecting Waipahu and Kapolei. Just north of Farrington Highway, H-1 freeway serves major east-west traffic demand.

### Traffic Conditions

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Existing conditions are not relevant for estimating the potential traffic impact of the proposed project since the Ewa region itself is planned for major growth in population and infrastructure. These changes by Years 2005 and 2011 will form the bases of the analysis for the "without project" scenario.

## FUTURE CONDITIONS

The future conditions were based on the current schedule of proposed developments in the Ewa Region. Research of planned developments and improvements to transportation facilities was conducted to estimate future traffic conditions at the study road segments. Adjustments were made to previously calculated trip tables for the Ewa Region highway study to update the vehicle trips during the morning and afternoon peak hours in the years 2005 and 2011.

Year 2011 trips were derived by interpolation of most current Planning Department estimates for year 2010 and 2020. These population forecasts are preliminary and are used to reflect the current planning approach to include recent historical trends in absorption rates. While these estimates are used in this study, the forecasts are intended solely for deriving traffic impacts for the East Kapolei project and are not meant to be used for other regional forecast analysis.

### Land Uses

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In deriving the 2005 trip table, the Ewa region land uses (i.e. housing and employment) for the projects included in the Ewa Region highway study were based on the individual developer projections of land uses and completion schedules and adjusted for the planning department estimates. Estimates of *existing* land uses were based on available data. These land uses were updated for this traffic study.

The Planning Department land use forecasts and HALI 2005 traffic forecasts include construction employment and work trips. To maintain consistency with these forecasts, construction jobs are added to employment

#### FUTURE CONDITIONS

estimates of the Ewa developers for the Master Plan area.

The land use data for existing areas, such as Barbers Point Naval Air Station (BPNAS), Honokai Hale, Nanakai Gardens, Ewa Beach and Iroquois Point, were based on various sources, including planning department estimates, tax maps and other research. However, the land use information obtained for these areas, especially the military bases, was difficult to confirm and could not be as detailed as the developer land use projections. Current plans for the reuse of BPNAS are still in development and no special adjustment was made to existing forecasts.

Projects which are handled separately are:

- commercial development of about 27 acres,
- University of Hawaii, located directly across of the Project and on the west side of the proposed North-South Road,
- Kapolei High School<sup>2</sup> (originally sited at Kapolei Villages), and
- Department of Hawaiian Home Lands (DHHL) project.

The commercial development was not included in the Ewa Region highway study. Traffic from this development is assumed to occur by 2005. The University is currently in initial planning stages and traffic forecasts are very preliminary in nature. The high school might not be located in the immediate area, since DOE is also in its early stages of reviewing the project. Similarly, the DHHL project is still in its earliest stages of planning. It is unclear as to when and how much of the above project's will actually be developed. However, for the purposes of this impact study, they are all included as being developed and operating.

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<sup>2</sup> While the State Department of Education has not made an official decision to site the high school in this specific area, current proposals include this location. For analysis purposes, the high school is included to ensure a conservative estimate of traffic volumes on the study roadways.

## Roadway Facilities

---

The road network for the years 2005 and 2011 in the immediate area are shown in Figure 3 and 4, respectively. The major road changes planned in the Project area will include the following.

### North-South Road

The four-lane North-South Road provides an alternative route to/from the H-1 Freeway for the projects along the Fort Weaver Road corridor. With its link to Farrington Highway and Kapolei Parkway, the North-South Road would also serve to connect Ewa Beach and new residential projects in this vicinity with the employment in the Kapolei area.

### North-South Interchange

Along with the North-South Road, the new North-South Interchange with H-1 freeway will improve access to several areas within the Ewa region. The North-South Road will provide an alternative route to the Fort Weaver Road corridor and the H-1 Freeway. The North-South Interchange will also serve as a secondary access to the Makakilo development, the Villages of Kapolei, and the City of Kapolei.

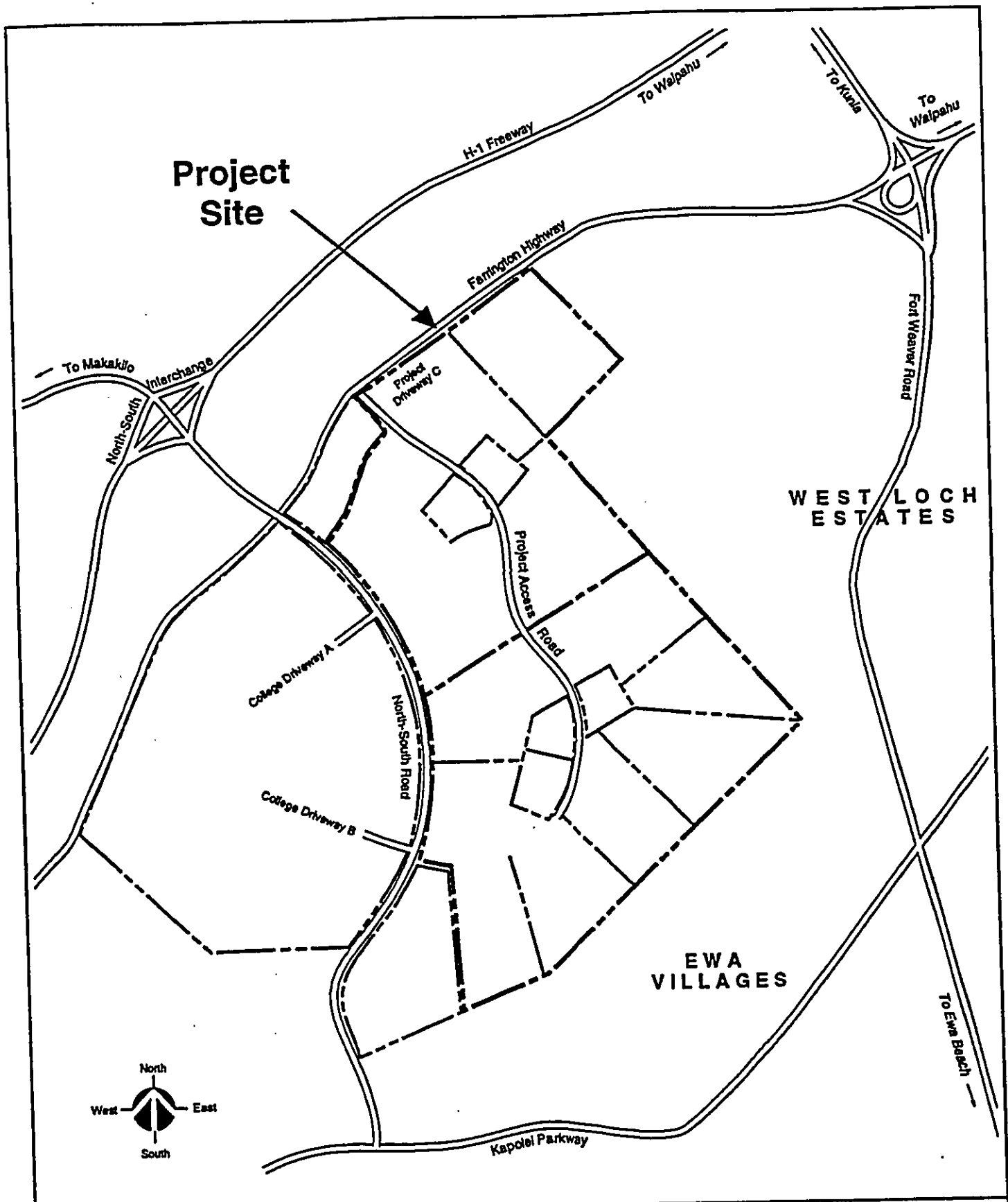
### Farrington Highway

Farrington Highway, between Barbers Point Access Road and the access to Kapolei Knolls and the Villages of Kapolei, would be widened to provide two travel lanes in each direction with a median turning lane. The widening would increase the capacity of this roadway to accommodate the new developments in this area.



Kapolei Parkway

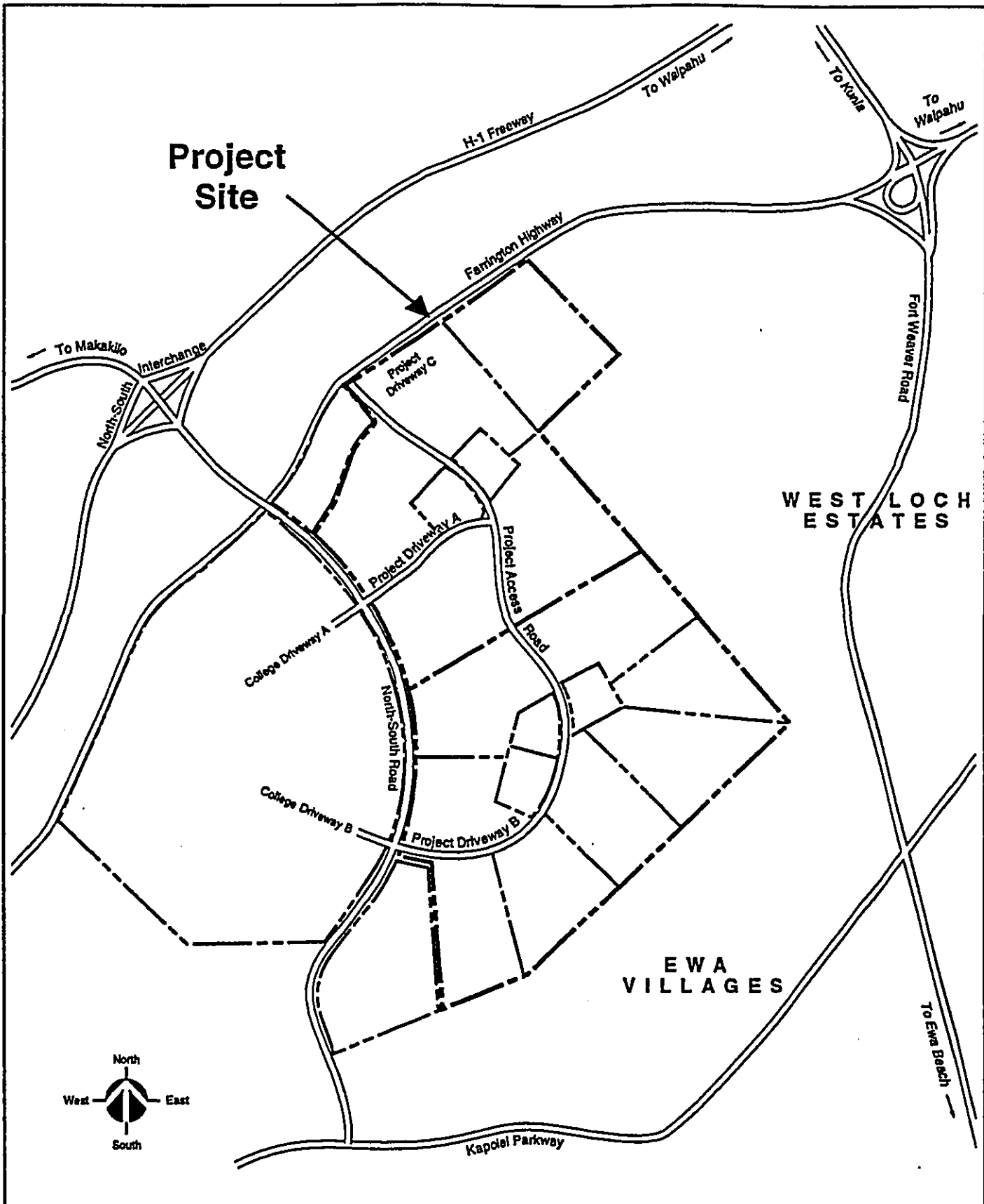
The proposed four- and six-lane Kapolei Parkway provides a new east-west link in the Ewa region between Kalaeloa Boulevard and the North-South Road; this roadway provides additional capacity for vehicles travelling between the residential areas in the east and the employment areas in the west. The provision of Kapolei Parkway will divert traffic that would otherwise need to travel on Farrington Highway or the H-1 Freeway. While this roadway is not a study segment, it is described here since it will be a new facility that will carry a significant amount of regional traffic.



**PACIFIC PLANNING**  
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**2005 Roadway Network**

**Figure 3**



**PACIFIC PLANNING**  
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**2011 Roadway Network**

**Figure 4**

## PROJECTED TRAFFIC CONDITIONS

Future traffic was forecasted for the "without project" and "with project" conditions. Traffic forecasts were developed for the years 2005 and 2011 when the project is expected to be completed in two phases. As can be seen, the roads and therefore, the traffic volume distribution throughout the area will bear little relationship to existing patterns.

### Future Traffic Without Project

This component of the future traffic might be considered as the ambient traffic volumes. Future traffic is estimated by identifying all other land uses and forecasting traffic from those land uses.

In total, traffic was forecasted for the years 2005 and 2011 at the study intersections and ramps by:

- updating land uses and roadway plans for 2005 and 2010 prepared for the Ewa Region Highway Master Plan,
- adjusting trips forecasted by the Ewa Region Highway study for current development absorption rates as calculated based on the City Planning Department preliminary population estimates<sup>3</sup> for areas within the Ewa region,
- preparing aggregated zonal trip tables for the years 2005 and 2011 for the morning and afternoon peak hours,
- estimating traffic assignments to study roadways and balancing volumes for capacity restraints,

<sup>3</sup> Draft values for possible adoption in the OMPO planning process. The process is undergoing updating of models and plans. This study and results are intended solely for assessing the traffic impact on relevant roadways by the East Kapolei Project. Forecast values are not intended as a substitute for the formal OMPO planning results.

#### PROJECTED TRAFFIC CONDITIONS

- forecast traffic generated by the commercial development, proposed University, High School and housing development the Department of Hawaiian Home Lands,
- estimating traffic generated by the project and assigning traffic to the study roadways, and
- adding the traffic forecasts for the project and other developments.

These values are used to calculate the impacts on each study roadway segment by determining the *level-of-service* (LOS) and *capacity levels* for years 2005 and 2011 traffic conditions without project, and years 2005 and 2011 traffic conditions with the Project.

Traffic forecasts are needed in the analysis to determine the LOS for each road segment of interest by specific time periods. The forecasts for the study roadways are shown in the following figures.

#### Traffic From Other Developments

In addition to the trips from the major project developments in the Ewa and Kunia areas, three major parcel developments adjacent to the East Kapolei Project will occur in the study time frame. For analysis purposes only, these are :

- commercial development of about 27 acres,
- University of Hawaii, located directly across from the Project and on the west side of the proposed North-South Road,
- Kapolei High School<sup>4</sup> (originally sited at Kapolei Villages), and
- Department of Hawaiian Home Lands (DHHL) project.

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<sup>4</sup> While the State Department of Education has not made an official decision to site the high school in this specific area, current proposals include this location. For analysis purposes, the high school is included to ensure a conservative estimate of traffic volumes on the study roadways.

PROJECTED TRAFFIC CONDITIONS

The Ewa Region highway study did not include the commercial development and DHHL development. The high school was included in Kapolei Villages. In this analysis, all of the high school traffic and DHHL development are assumed to be directly accessing the study roadways. Trips were deleted from the trip table and manually added on to the roadways for more direct analysis of its effect.

The three-step procedure of trip generation, trip distribution, and traffic assignment was used to estimate peak hour traffic for 2005 and 2011 for these four major parcel uses.

The trip generation step estimates the number of trips which would be generated by the proposed project. The number of trips generated by the projects was estimated based upon trip generation rates, which were obtained from the manual on Trip Generation, by the Institute of Transportation Engineers. Table 3 shows the estimated number of trips generated by the three projects when they are completed.

<b>Table 3. Trip Generation For Other Adjacent Projects</b>				
<b>Land Use</b>	<b>Morning</b>		<b>Afternoon</b>	
	<b>Enter</b>	<b>Exit</b>	<b>Enter</b>	<b>Exit</b>
<b>University</b>	437	96	189	462
<b>High School</b>	470	253	28	47
<b>DHHL Project</b>	125	445	479	260
<b>Commercial</b>	149	88	494	494

The trip distribution step assigns trips to their expected origins and destinations. Trip distribution for the project was estimated based on development of the Ewa Region as the Second City of Oahu.

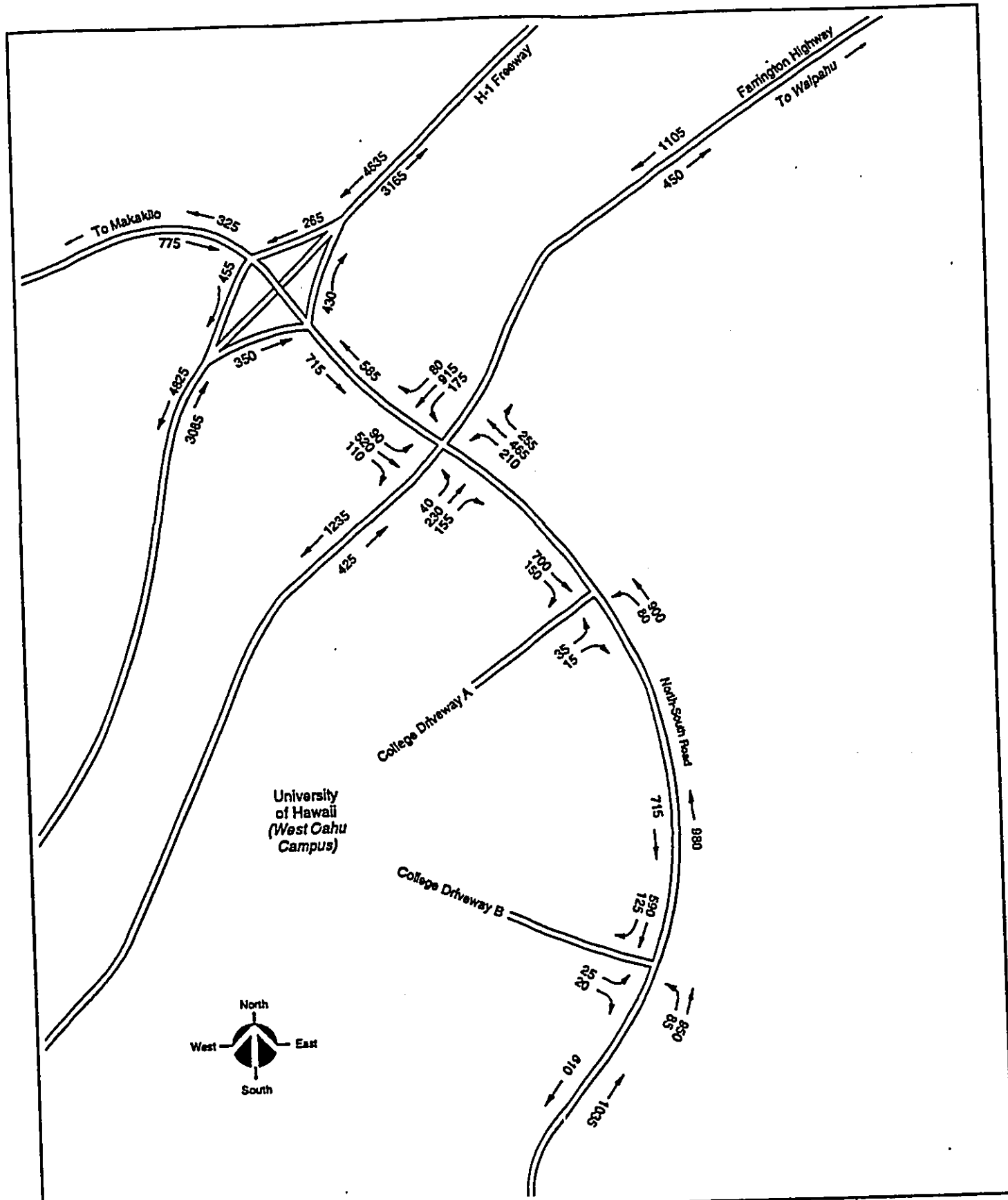
The traffic assignment step assign trips to a specific route on the roadway network that will take the driver from origin to destination.

PROJECTED TRAFFIC CONDITIONS

Traffic was assigned based on the estimated shortest path or travel time from origins to destinations.

For Phase I of the Project, Figure 5 displays the forecasts for the morning peak hour in 2005 without the Project. Figure 6 displays the forecasts for the afternoon peak hour in 2005 without the Project.

For Phase II of the Project, Figure 7 displays the forecasts for the morning peak hour in 2011 without the Project. Figure 8 displays the forecasts for the afternoon peak hour in 2011 without the Project.

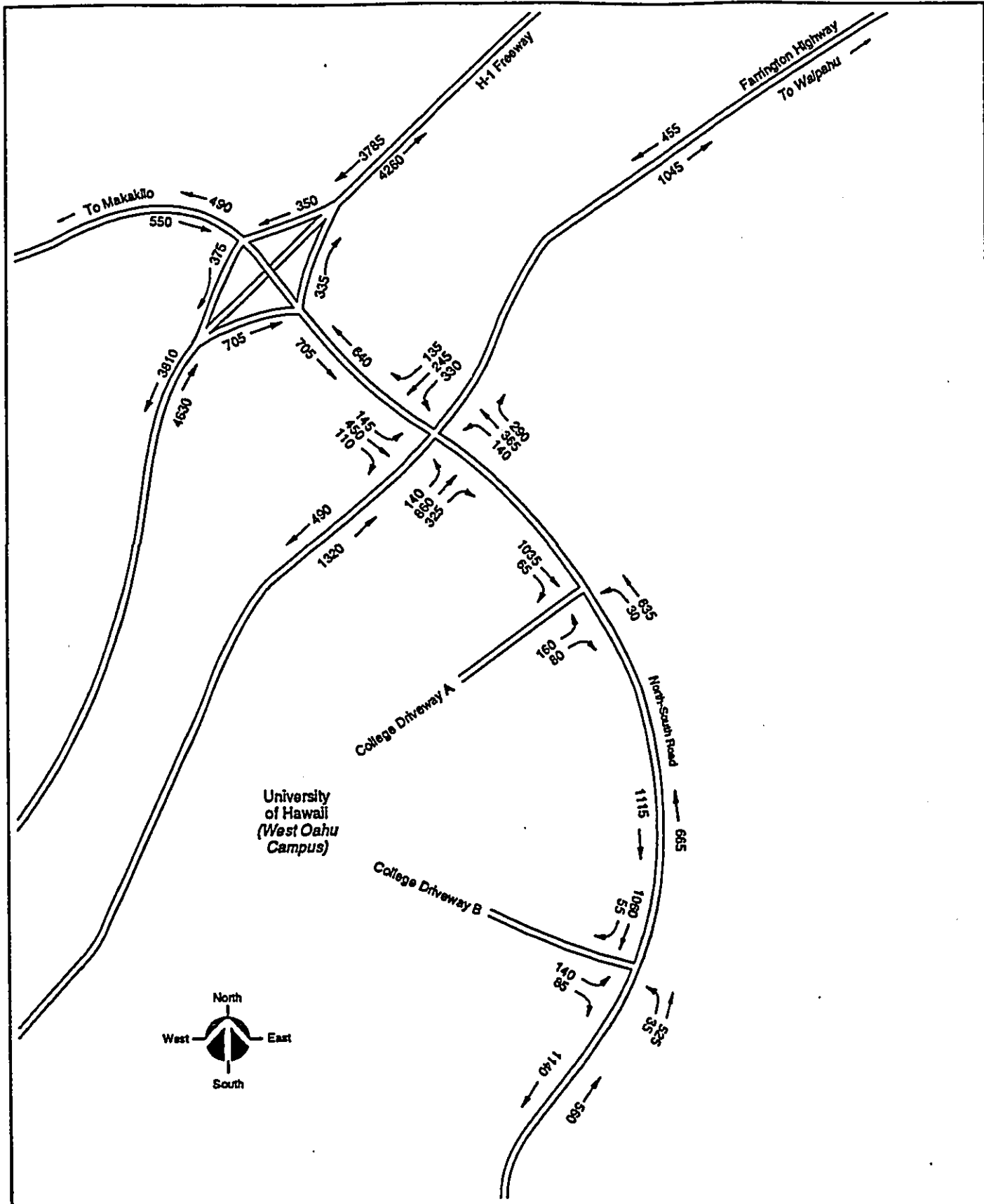


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**2005 Morning Peak Hour  
Forecast Traffic Without Project**

**Figure 5**

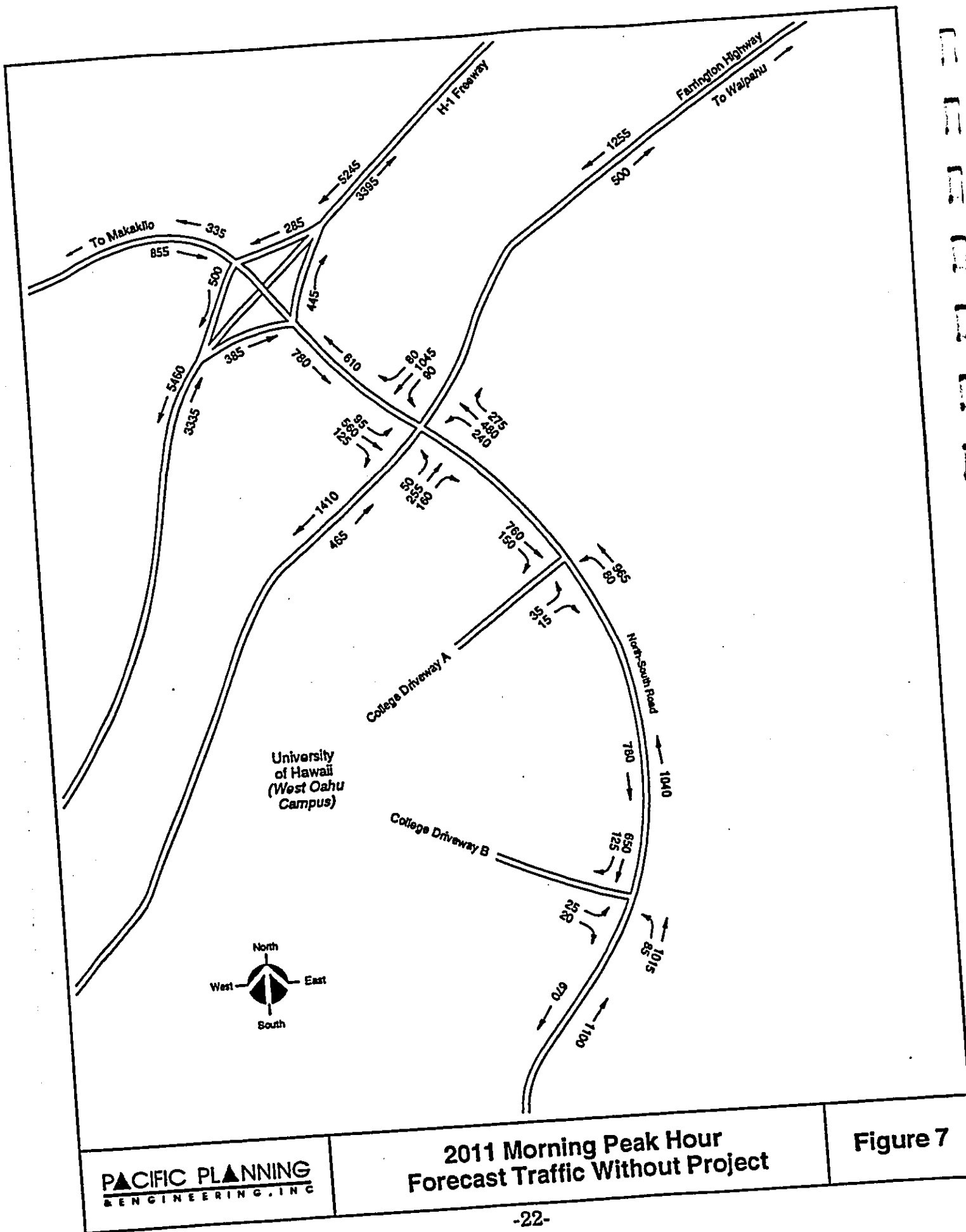




**PACIFIC PLANNING**  
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**2005 Afternoon Peak Hour  
Forecast Traffic Without Project**

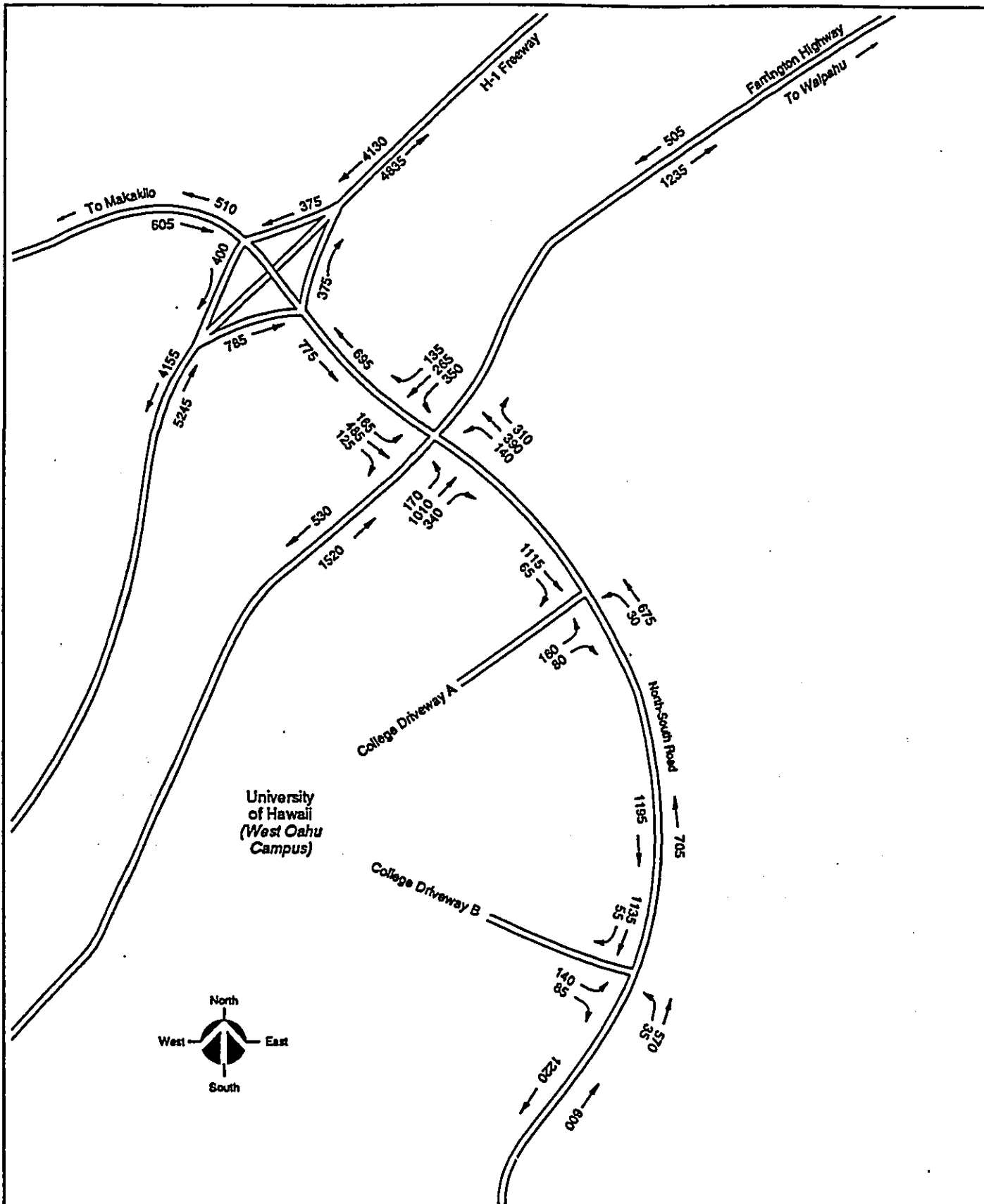
**Figure 6**



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2011 Morning Peak Hour  
Forecast Traffic Without Project

Figure 7



**PACIFIC PLANNING**  
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**2011 Afternoon Peak Hour  
Forecast Traffic Without Project**

**Figure 8**

**PROJECTED TRAFFIC CONDITIONS**

**Future Traffic With Project**

Future traffic with the East Kapolei Project included in the land uses is calculated by adding the without project traffic to the traffic generated by the proposed Project. The method of determining the number of vehicle trips assigned to the roadways is described in the following sections.

As in the calculation of vehicle trips from other developments, the Project trip generation step estimates the number of trips generated by the proposed project. This estimate is based on rates obtained from the manual on Trip Generation, by the Institute of Transportation Engineers. Table 4 shows the estimated number of trips generated by the Project for years 2005 and 2011.

<b>Table 4. 2005 - Trip Generation For East Kapolei Project</b>				
<b>PHASE 1 (2005)</b>				
<b>Land Use</b>	<b>Morning</b>		<b>Afternoon</b>	
	<b>Enter</b>	<b>Exit</b>	<b>Enter</b>	<b>Exit</b>
Single Family Homes	347	935	1076	632
Multi-Family Homes	181	956	959	472
Elementary School	110	74	8	8
Commercial	184	79	487	487
<b>PHASE 2 (2011)</b>				
<b>Land Use</b>	<b>Morning</b>		<b>Afternoon</b>	
	<b>Enter</b>	<b>Exit</b>	<b>Enter</b>	<b>Exit</b>
Single Family Homes	755	2035	2342	1375
Multi-Family Homes	394	2081	2087	1027
Elementary School	220	148	16	16
Commercial	268	158	874	874

PROJECTED TRAFFIC CONDITIONS

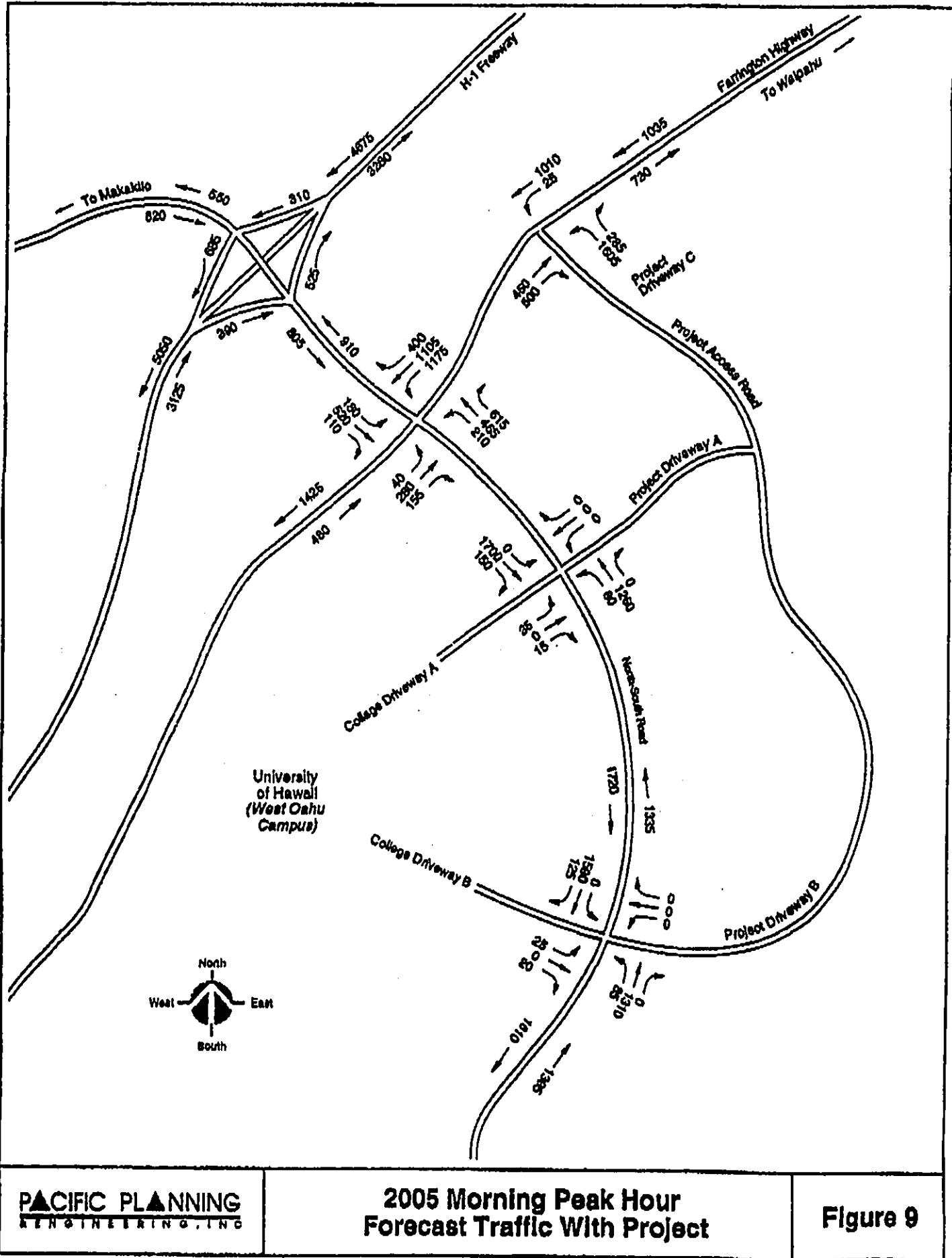
For Phase I (2005) of the Project, Figures 9 and 10 displays the "with Project" forecasts for the morning and afternoon peak hour, respectively.

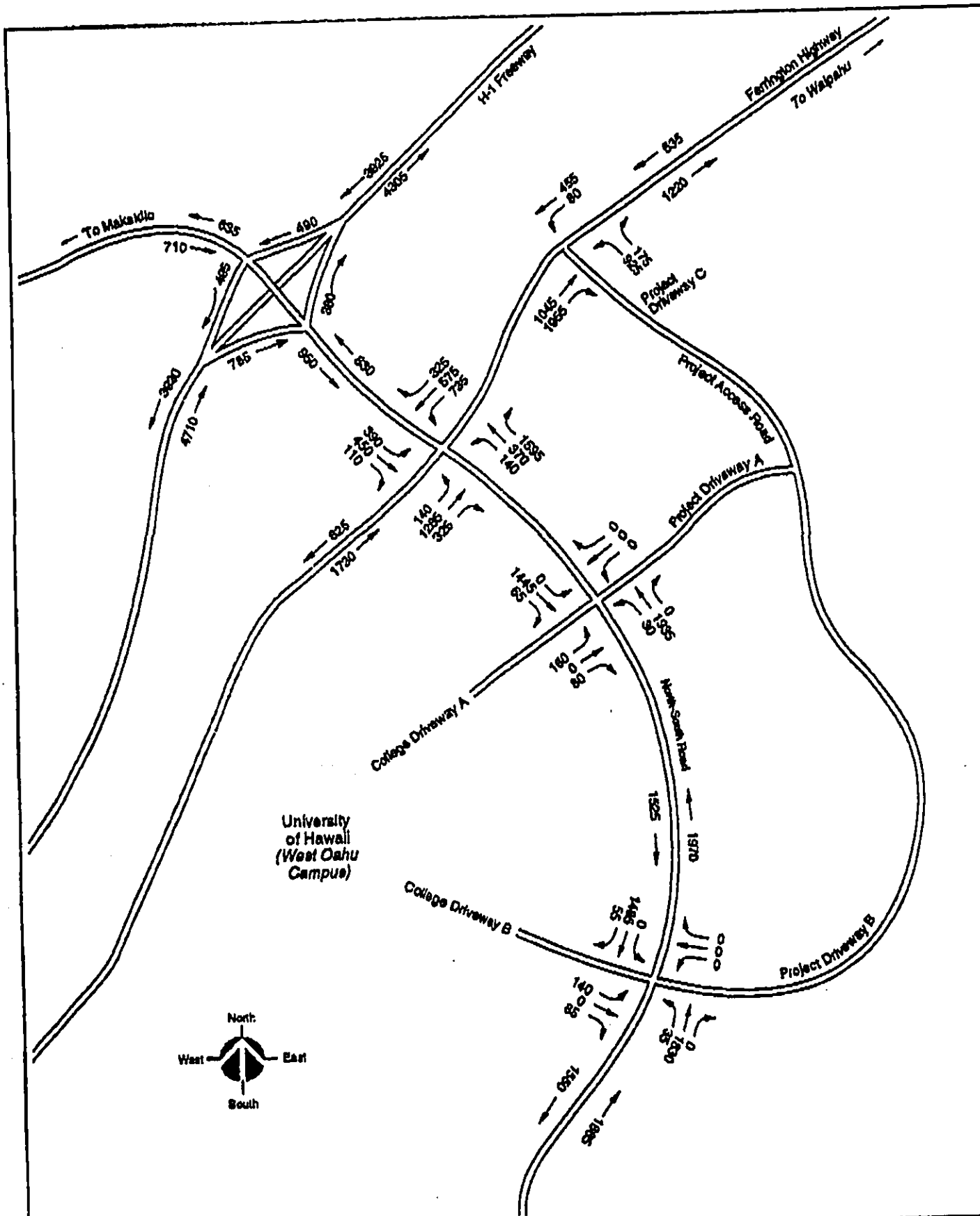
For Phase II (2011) of the Project, Figures 11 and 12 displays the "with Project" forecasts for the morning and afternoon peak hour, respectively.

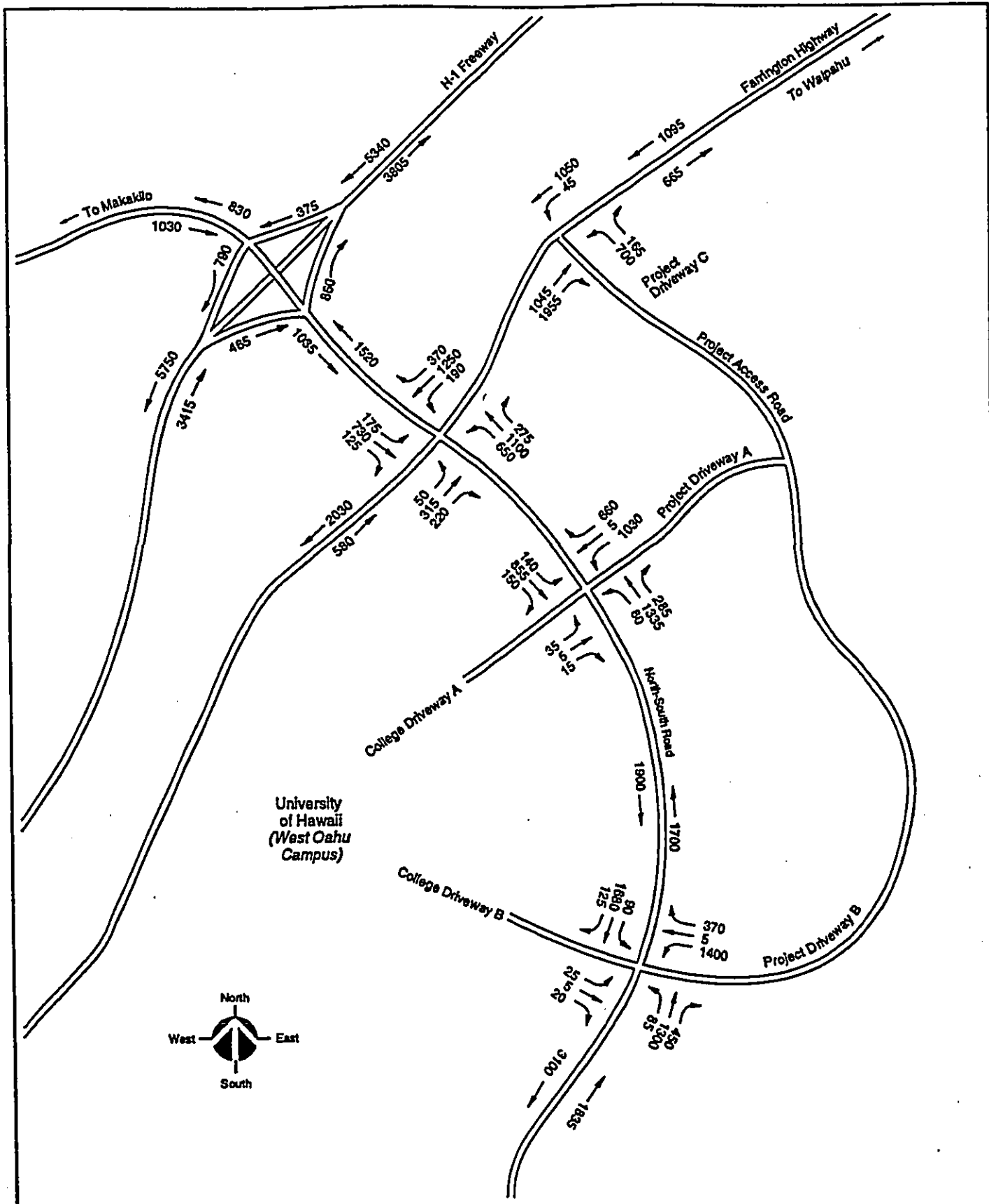
The trip distribution step assigns trips to their expected origins and destinations. Trip distribution for the project was estimated based on development of the Ewa Region as the Second City of Oahu. The trips were generally distributed as shown in Table 5.

Table 5. Project Trip Distribution				
	Morning		Afternoon	
	Enter	Exit	Enter	Exit
West of Project	57	72	72	63
South of Project	30	15	18	25
East of Project	11	13	9	10
North of Project	2	0	1	2
Total	100%	100%	100%	100%

The traffic assignment step assigns trips to a specific route on the roadway network that will take the driver from origin to destination. Traffic was assigned based on the estimated shortest path or travel time from origins to destinations.





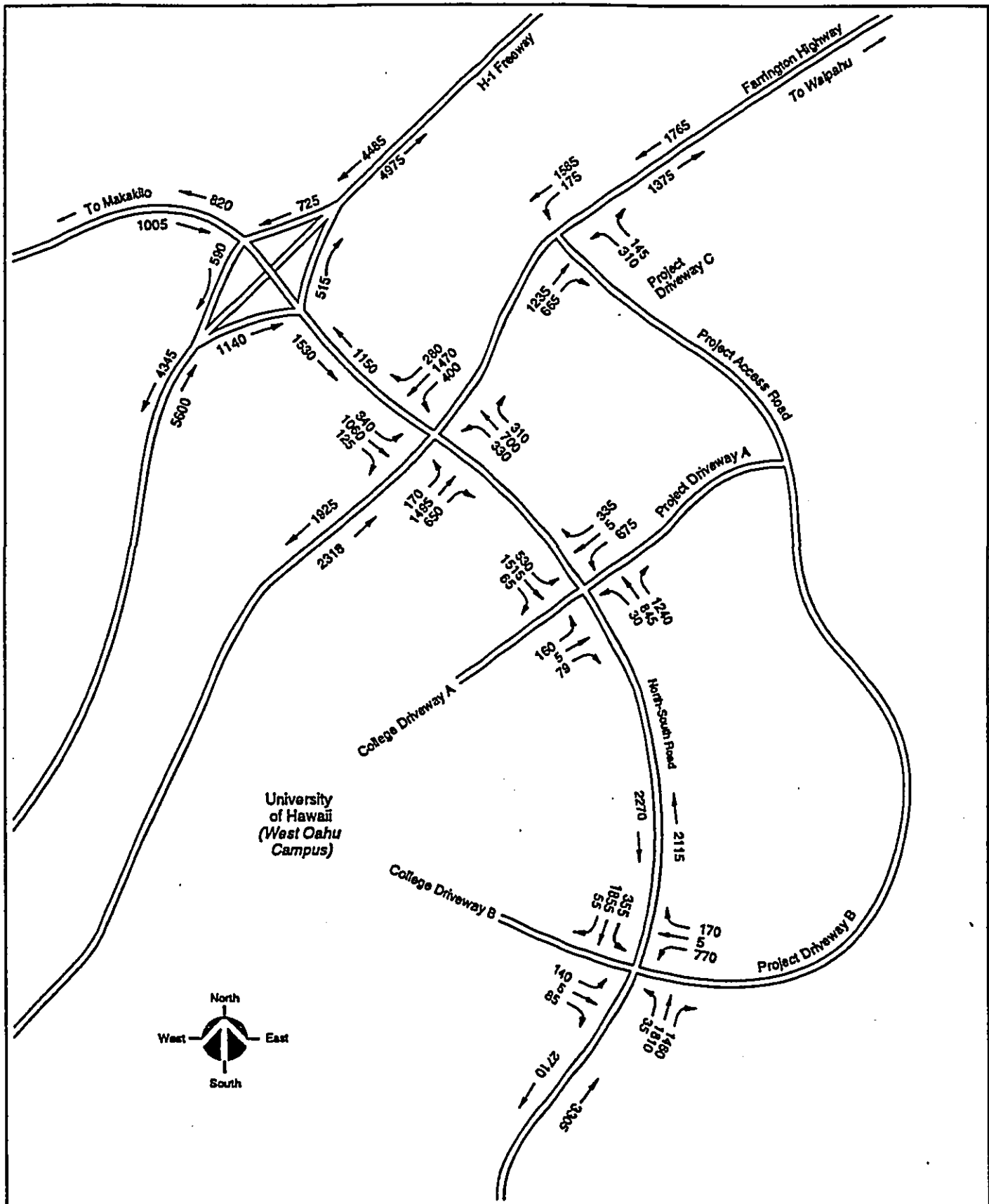


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**2011 Morning Peak Hour  
 Forecast Traffic With Project**

**Figure 11**





**PACIFIC PLANNING**  
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**2011 Afternoon Peak Hour  
Forecast Traffic With Project**

**Figure 12**

## TRAFFIC IMPACT ANALYSIS

Analyses were conducted on the study roadway facilities to determine the relative impact of the proposed project on the local roadway system and to determine improvements to mitigate the impact of the project, if necessary.

### Project Impact Analysis

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Analyses were conducted on the study roadway facilities to determine the relative impact of the proposed project on the roadway system. The analyses were conducted for the existing, years 2005 and 2011 forecasts "without project" and forecasts "with project" traffic conditions for the morning and afternoon peak hours.

The roadway facilities were analyzed based on the existing roadway geometrics and planned improvements. All known approved planned transportation improvements to the study facilities by the year 2005 and 2011 have been included. The major roadway additions are widening Farrington Highway to four lanes, completion of the future North-South Road, a new H-1 interchange with the future North-South Road, and addition of a lane to H-1 freeway. These major projects were identified in previous analyses conducted for the Ewa Region highway study. As noted, the current Planning Department forecasts call for lower densities than used in the aforementioned study. Thus, it is possible that not all of the above projects are needed for 2005 or 2011. A major regional study is needed to update the roadway needs for the Ewa Region.

## Analysis Methods

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The study roadway facilities were analyzed using methods contained in the Highway Capacity Manual (HCM). Appendix A describes in more detail the various methods of analysis used in the study.

For the study intersections, Planning Analysis was used to estimate the impact of the Project. Planning analysis is a broad evaluation of the capacity of an intersection without considering the details of signalization. It provides a basic assessment of whether or not capacity is likely to be exceeded for a given set of demand volumes and geometrics. The analysis determines whether an intersection is under, near, or over capacity.

The new H-1 interchange with the future North-South Road was analyzed using Ramp analyses methods. This method provides a Level-of-Service (LOS) which measures traffic operational conditions ranging from LOS A, good operating conditions, to LOS F, poor operating conditions.

Multilane Highway Analysis was performed on Farrington Highway east of the project site. Like Ramp analysis, a Level-of-Service (LOS) is determined.

The analyses results pertain to the following roadways:

- Farrington Highway - four lanes by year 2005.
- H-1 Freeway - eight lanes by year 2005.
- North-South Road - four lanes by year 2005

Tables 6, 7, 8, 9 and 10 summarize the results of the analysis for the "without project" and "with" project scenarios for the years 2005 and 2011.

**Table 6. Planning Analysis**

<b>2005 - MORNING PEAK HOUR</b>				
<b>Intersection</b>	<b>Without Project</b>		<b>With Project</b>	
	<b>Capacity Level</b>	<b>Critical Volume</b>	<b>Capacity Level</b>	<b>Critical Volume</b>
Farrington Highway / North-South Rd.	Under	971	Over	1789
North-South Rd. / Project Driveway A	Under	483	Under	963
North-South Rd. / Project Driveway B	Under	503	Under	906
North-South Rd. / Project Driveway C	n/a	n/a	Over	2112
<b>2005 - AFTERNOON PEAK HOUR</b>				
<b>Intersection</b>	<b>Without Project</b>		<b>With Project</b>	
	<b>Capacity Level</b>	<b>Critical Volume</b>	<b>Capacity Level</b>	<b>Critical Volume</b>
Farrington Highway / North-South Rd.	Under	1120	Over	1942
North-South Rd. / Project Driveway A	Under	713	Under	917
North-South Rd. / Project Driveway B	Under	703	Under	1054
North-South Rd. / Project Driveway C	n/a	n/a	Over	1530
<b>2011 - MORNING PEAK HOUR</b>				
<b>Intersection</b>	<b>Without Project</b>		<b>With Project</b>	
	<b>Capacity Level</b>	<b>Critical Volume</b>	<b>Capacity Level</b>	<b>Critical Volume</b>
Farrington Highway / North-South Rd.	Under	1092	Over	1692
North-South Rd. / Project Driveway A	Under	515	Over	1850
North-South Rd. / Project Driveway B	Under	535	Over	2340
North-South Rd. / Project Driveway C	n/a	n/a	Near	1224
<b>2011 - AFTERNOON PEAK HOUR</b>				
<b>Intersection</b>	<b>Without Project</b>		<b>With Project</b>	
	<b>Capacity Level</b>	<b>Critical Volume</b>	<b>Capacity Level</b>	<b>Critical Volume</b>
Farrington Highway / North-South Rd.	Near	1238	Over	2010
North-South Rd. / Project Driveway A	Under	751	Over	1705
North-South Rd. / Project Driveway B	Under	741	Over	2110
North-South Rd. / Project Driveway C	n/a	n/a	Under	1106

TRAFFIC IMPACT ANALYSIS

Table 7. Level of Service - 2005 Morning Peak Hour			
H-1/North-South Road Interchange			
	Study Segment	LOS without Project	LOS with Project
Eastbound	Off Ramp - Diverge Area	B	B
	Freeway Lanes Adjacent	B	B
	On Ramp - Merge Area	B	C
	Freeway Lanes Adjacent	B	B
Westbound	Off Ramp - Diverge Area	B	C
	Freeway Lanes Adjacent	C	C
	On Ramp - Merge Area	C	D
	Freeway Lanes Adjacent	C	C
Farrington Highway East of Project Driveway			
	Eastbound lanes	A	A
	Westbound lanes	B	B

Table 8. Level of Service - 2005 Afternoon Peak Hour			
H-1/North-South Road Interchange			
	Study Segment	LOS without Project	LOS with Project
Eastbound	Off Ramp - Diverge Area	C	C
	Freeway Lanes Adjacent	C	C
	On Ramp - Merge Area	B	B
	Freeway Lanes Adjacent	C	C
Westbound	Off Ramp - Diverge Area	B	B
	Freeway Lanes Adjacent	C	C
	On Ramp - Merge Area	B	C
	Freeway Lanes Adjacent	B	B
Farrington Highway East of Project Driveway			
	Eastbound lanes	B	B
	Westbound lanes	A	A

Table 9. Level of Service - 2011 Morning Peak Hour			
<b>H-1/North-South Road Interchange</b>			
	<b>Study Segment</b>	<b>LOS without Project</b>	<b>LOS with Project</b>
<b>Eastbound</b>	Off Ramp - Diverge Area	B	B
	Freeway Lanes Adjacent	B	C
	Freeway Lanes Adjacent	B	C
	Freeway Lanes Adjacent	B	B
<b>Westbound</b>	Off Ramp - Diverge Area	C	C
	Freeway Lanes Adjacent	D	D
	On Ramp - Merge Area	C	D
	Freeway Lanes Adjacent	C	C
<b>Farrington Highway East of Project Driveway</b>			
	Eastbound lanes	A	A
	Westbound lanes	B	B

Table 10. Level of Service - 2011 Afternoon Peak Hour			
<b>H-1/North-South Road Interchange</b>			
	<b>Study Segment</b>	<b>LOS without Project</b>	<b>LOS with Project</b>
<b>Eastbound</b>	Off Ramp - Diverge Area	D	D
	Freeway Lanes Adjacent	C	C
	On Ramp - Merge Area	C	C
	Freeway Lanes Adjacent	C	C
<b>Westbound</b>	Off Ramp - Diverge Area	B	C
	Freeway Lanes Adjacent	C	C
	On Ramp - Merge Area	B	C
	Freeway Lanes Adjacent	C	C
<b>Farrington Highway East of Project Driveway</b>			
	Eastbound lanes	B	B
	Westbound lanes	A	C

## Analysis Results

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The following is a summary based on the analysis results:

### 2005 Without Project

- The intersections of Farrington Highway with the North-South Road and North-South Road with College Driveways A and B all operate under capacity for the morning and afternoon peak hours.
- The planned H-1/North-South Road Interchange operates at LOS C or better during the peak hours.
- Farrington Highway east of the project operates at LOS B or better during the peak hours.

### 2011 Without Project

- The intersections of the North-South Road with College Driveways A and B continue to operate under capacity for the morning and afternoon peak hours. However, the intersection of Farrington Highway with the North-South Road worsens to near capacity conditions in the afternoon peak hour.
- The planned H-1/North-South Road Interchange operates at LOS D or better during the peak hours.
- Farrington Highway east of the project operates at LOS B or better during the peak hours.

### 2005 With Project

- The intersections of Farrington Highway with the North-South Road and Project Driveway C would be over capacity during the peak hours. The intersections of the North-South Road with Project Driveways A and B are both under capacity.
- The planned H-1/North-South Road Interchange operates at LOS D or

- better during the peak hours.
- Farrington Highway east of the project operates at LOS B or better during the peak hours.

2011 With Project

- The intersections of Farrington Highway with the North-South Road and North-South Road with Project Driveways A and B would be over capacity for the morning and afternoon peak hours. The intersection of Farrington Highway with Project Driveway C would operate at near capacity conditions in the morning peak hour and under capacity during the afternoon peak hour.
- The planned H-1/North-South Road Interchange operates at LOS D or better during the peak hours.
- Farrington Highway east of the project operates at LOS C or better during the peak hours.



## MITIGATION MEASURES

The intersection analyses indicate that the future traffic volumes at the study intersections will exceed planned capacity if improvements are not made. Sufficient right-of-way should be set aside to provide for future widening as development and traffic warrants. Traffic signals should be planned. Exact implementation dates depend on when traffic volumes meet established signal warrants.

### Year 2005 (Phase 1)

---

For this scenario year, the intersections of Farrington Highway with the North-South Road and Project Driveway would need the following lanes in order to operate under or near capacity during the peak hours.

- Two left-turn lanes northbound exiting the project driveway onto Farrington Highway.
- Two left-turn lanes westbound at the intersection of Farrington Highway and the North-South Road.
- Addition of an extra through lane from about 1000' west of the intersection of Farrington Highway and the North-South Road to Project Driveway C, east of the intersection.

A road connection from the project to the planned North-South Road would mitigate traffic problems at other intersections by using all available capacity. This would relieve traffic entering and exiting the project driveway onto Farrington Highway as well as at the intersection of Farrington Highway with the North-South Road. If a connection is made, the two-left-turn lanes at the intersections of Farrington Highway with the North-South Road and Project Driveway C may not be required to handle

MITIGATION MEASURES

makai-bound traffic volumes. However, makai-bound traffic would shift to the North-South Road connection and thus this intersection would require two left turn lanes exiting the project.

Year 2011 (Phase 2)

---

For Phase 2, mitigative measures to the study intersections would be more involved because of the level of traffic volumes during the peak hours.

The possibility of a grade separation at the intersection of Farrington Highway and the North-South Road would increase capacity through the area. However, alternate methods of transportation should be investigated such as;

- Usage of carpools and bus service. City bus services would reduce the number of vehicles.
- Shuttle services to and from the development to areas such as Kapolei City given the relatively close proximity.
- Encouragement of other types of travel if possible (bicycles, walking, etc.) to nearby trip generators such as the college.
- Parking management strategies at major employment sites discourage use of private vehicles for commuting and encourage it for recreation, retail and service type purposes.

These type of measures would reduce the project traffic to a level that might allow for smoother traffic flow through the study intersections.

## CONCLUSIONS AND RECOMMENDATIONS

The results of the traffic operations analysis indicate that the proposed East Kapolei Project will significantly change the traffic flow quality at the study intersections when the project is completed in two phases. Major road improvements have already been identified in the Ewa Region Highway Master Plan and adopted by the Oahu Metropolitan Planning Organization (OMPO). These improvements are assumed as part of the roadway network in 2005 and 2011 in the assessment of the traffic impacts.

For the year 2005 (Phase 1), in order to minimize the impact of the project and provide for smoother traffic operating conditions, we recommend the following:

- Two left-turn lanes northbound exiting the project driveway onto Farrington Highway.
- Two left-turn lanes westbound at the intersection of Farrington Highway and the North-South Road.
- Addition of an extra through lane from about 1000' west of the intersection of Farrington Highway and the North-South Road to Project Driveway C, east of the intersection.
- A project connection to the North-South Road would relieve traffic at other intersections. If a connection is made, the two-left-turn lanes at the intersections of Farrington Highway with the North-South Road and Project Driveway C may not be required to handle makai-bound traffic volumes. However, makai-bound traffic would shift to the North-South Road connection and thus this intersection would require two left turn lanes exiting the project.

## CONCLUSIONS AND RECOMMENDATIONS

For the year 2011 (Phase 2), mitigative measures to the study intersections would be more involved because of the level of traffic volumes during the peak hours.

The possibility of a grade separation at the intersection of Farrington Highway and the North-South Road would increase capacity through the area. However, alternate methods of transportation actions should be investigated. A comprehensive plan that includes both Transportation System Management and Transportation Demand Management concepts should be developed for the area which would include the Project. The future traffic levels have regional sources that are undergoing current development. Integrated transit services, roadway plans and construction schedules, computer controlled traffic lights, remote parking areas, shuttle services, paratransit, bicycle and pedestrian ways, and some form of exclusive way transit should be considered in a comprehensive plan. Beyond transportation actions, the need for integrated land use planning for all the major parcels will aid in reducing the need for vehicle trips.

From a planning perspective, OMPO's current efforts to update its Long Range Plan will institute new population and traffic forecast values for the Ewa Region. The results reported herein pertain specifically to the East Kapolei Project in addition to current preliminary population estimates. This assessment approach is conservative in that the impact is greater than would be expected, as population exceeds what is set forth in preliminary figures. The OMPO's new region-wide forecasts will likely result in less impacts and roadway needs than indicated herein due to smaller values of population. A major roadway needs study is needed to update the previous study for the Ewa Region.

CONCLUSIONS AND RECOMMENDATIONS

An example of a potentially major change that should be included in the update study is the final version of the BPNAS Reuse Plan. This and other major land use proposals in the Ewa Region should be evaluated for traffic impact on a region-wide basis, and their mitigating actions included in the afore-mentioned comprehensive transportation plan. Thus, 2011 (Phase 2) impacts should be re-evaluated when those forecasts are available, and a plan be developed that not only addresses highway projects but land use planning (to obviate the need for vehicle trips) transit, and other modes and services as well.

APPENDIX A

DEFINITIONS  
FOR

PLANNING ANALYSIS  
MULTILANE HIGHWAY ANALYSIS  
ON-RAMP AND OFF-RAMP ANALYSIS

**DEFINITION OF PLANNING ANALYSIS  
FOR  
SIGNALIZED INTERSECTIONS**

Planning analysis of intersections is a broad evaluation of the capacity of an intersection without considering the details of signalization. It provides a basic assessment of whether or not capacity is likely to be exceeded for a given set of demand volumes and geometrics. At this level, only capacity is addressed because the detailed information needed to estimate delay is not available.

Planning Analysis measures a signalized intersection's capacity level using the sum of its critical movements. The total critical volume for the intersection is the sum of the critical volumes for the north-south and east-west streets. The critical volume for the intersection is compared to the criteria in the table below. The analysis determines whether an intersection is under, near, or over capacity.

Critical Volume (vehicles per hour)	Relationship to Probable Capacity
0 to 1,200	Under Capacity
1,200 to 1,400	Near Capacity
≥ 1,400	Over Capacity

REFERENCE: Highway Capacity Manual (Special Report 209, 1985)

**DEFINITION OF LEVEL-OF-SERVICE  
FOR  
MULTI-LANE HIGHWAYS**

Level of service for multi-lane highways is defined in terms of *density*.

Level-of-service A describes completely free-flow conditions. Maximum density is 12 passenger cars per mile per lane (pcpmpl) and the ability to maneuver within the traffic stream is high.

Level-of-service B is also indicative of free flow. The maximum density is 20 pcpmpl. Minor disruptions to flow are still easily absorbed at this level.

Level-of-service C represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream, and to select an operating speed, is now clearly affected by the presence of other vehicles. The maximum density is 30 pcpmpl.

Level-of-service D borders on unstable flow. Speeds and ability to maneuver are severely restricted because of traffic congestion. The maximum density is 42 pcpmpl.

Level-of-service E represents operations at or near capacity and is quite unstable. The maximum density is 67 pcpmpl. This is the minimum spacing at which uniform flow can be maintained, and effectively defined a traffic stream with no usable gaps.

Level-of-service F represents forced or breakdown flow. It occurs at a point where vehicles arrive either at a rate greater than that at which they are discharged or at a point on a planned facility where forecasted demand exceeds the computed capacity. Densities are higher than 67 pcpmpl. Queues form behind the breakdowns and are highly unstable.

REFERENCE: Highway Capacity Manual (Special Report 209, 1985)



**DEFINITION OF LEVEL-OF-SERVICE  
FOR  
ON-RAMPS and OFF-RAMPS**

Level of service for signalized intersections is defined in terms of *flow rates*.

Level-of-service A: Represents unrestricted operation. Merging and diverging vehicles have little effect on other freeway flows.

Level-of-service B: Merging vehicles have to adjust their speed slightly to fill lane 1 gaps; diverging vehicles still do not experience any significant turbulence. Flow may be described generally as smooth and stable.

Level-of-service C: Both lane 1 and on-ramp vehicles must adjust their speed to accomplish smooth merging, and under heavy on-ramp flows, minor ramp queuing may occur. Some slowing may also occur in diverge areas. Overall speed and density of freeway vehicles are not expected to be seriously deteriorated.

Level-of-service D: Smooth merging becomes difficult to achieve. Both lane 1 and on-ramp vehicles must frequently adjust their speed to avoid conflicts in the merge area. Slowing in the vicinity of diverge areas is also significant. At heavily used on-ramps, ramp queues may become a disruptive factor.

Level-of-service E: Represents capacity operation. On-ramp queues may be significant. Diverge movements are significantly slowed, and some queuing may occur in the diverge area. All vehicles are affected by turbulence on freeway.

Level-of-service F: All merging is on a stop-and-go basis, and ramp queues and lane 1 breakdowns are extensive. Much turbulence is created as vehicles attempt to change lanes to avoid merge and diverge areas. Considerable delay is encountered in the vicinity of the ramp terminal, and conditions may vary widely, from minute to minute, as unstable conditions create "waves" of alternatively good and forced flow.

REFERENCE: Highway Capacity Manual (Special Report 209, 1985)

**UPDATED TRAFFIC IMPACT ASSESSMENT REPORT**  
**FOR**  
**EAST KAPOLEI PROJECT**

**December 11, 1995**

**Honolulu, Oahu, Hawaii**

**Prepared for:**

**Schuler Homes, Inc.**

**Prepared By:**

**Pacific Planning & Engineering, Inc.**  
**1221 Kapiolani Boulevard, Suite 6D**  
**Honolulu, Hawaii 96814**

## FOREWORD

The traffic forecasts shown within this report's figures and tables are the direct result of Pacific Planning & Engineering, Inc.'s proprietary analytical tools. For report editing and review purposes, some of the forecast values have been rounded to the nearest five vehicles from our mathematical results, although we do not imply this level of accuracy can exist in any forecast method. The rounded values, however, reasonably quantify the forecasted traffic volumes for the purposes of this study.

This report is an update to our previous report titled "Traffic Impact Assessment Report For East Kapolei Project" dated 17 October 1994. It includes the current master plan for the project which has been downsized in terms of residential units. Major land use proposals are still in the earliest planning stages such as the University, and agency assumptions of their locations are updated wherever possible.

In those report sections where no new information is provided or reading would not be interrupted, the reader is referred to the previous Report titled "Traffic Impact Assessment Report For East Kapolei Project" dated 17 October 1994.

## TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY. . . . .	1
	Project Description. . . . .	1
	Study Methodology. . . . .	2
	Conclusions and Recommendations . . . . .	3
II.	PROJECT DESCRIPTION. . . . .	5
III.	EXISTING TRAFFIC CONDITIONS. . . . .	7
	Land Uses. . . . .	7
	Roadway Facilities. . . . .	7
	Traffic Conditions. . . . .	7
IV.	FUTURE TRAFFIC CONDITIONS. . . . .	8
	Land Uses. . . . .	8
	Roadway Facilities. . . . .	8
V.	PROJECTED TRAFFIC CONDITIONS. . . . .	10
	Future Traffic Without Project. . . . .	10
	Future Traffic With Project. . . . .	11
VI.	TRAFFIC IMPACT ANALYSIS. . . . .	17
	Project Impact Analysis . . . . .	17
	Analysis Methods. . . . .	17
	Analysis Results. . . . .	17
VII.	CONCLUSIONS AND RECOMMENDATIONS. . . . .	22

**LIST OF FIGURES**

---

Figure 1.	Project Location and Site Map. . . . .	6
Figure 2.	2010 Weekday Morning Peak Hour Forecast Traffic Without Project . . . . .	12
Figure 3.	2010 Weekday Afternoon Peak Hour Forecast Traffic Without Project . . . . .	13
Figure 4.	2010 Weekday Morning Peak Hour Traffic Volumes With Project . . . . .	15
Figure 5.	2010 Weekday Afternoon Peak Hour Traffic Volumes With Project . . . . .	16

**LIST OF TABLES**

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Table 1	Land Use Summary (Acres). . . . .	1
Table 2.	Land Use Summary (Acres). . . . .	5
Table 3.	2010 Trip Generation For East Kapolei Project. . . . .	14
Table 5.	Project Trip Distribution. . . . .	14
Table 6.	Planning Analysis. . . . .	20
Table 7.	Ramp-Freeway Terminal Analysis. . . . .	20
Table 8.	Multilane Highway Analysis. . . . .	21

**APPENDICES**

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Appendix A. Definitions of Level of Service

## EXECUTIVE SUMMARY

Pacific Planning & Engineering, Inc. (PPE) was engaged to undertake a study to update its previous report titled "Traffic Impact Assessment Report For East Kapolei Project" dated 17 October 1994. This report updates the previous findings of future traffic impacts caused by the current plan for the East Kapolei Project. The current Plan contains less residential units with a corresponding decrease of project traffic compared to the previous master plan.

This report describes the methodology and guidelines used to evaluate the traffic impacts and presents the findings and recommendations from the study.

### Project Description

Schuler Homes, Inc. is proposing to construct the East Kapolei Project in Honolulu, Oahu, Hawaii.

The project plan contains uses for residential, park, commercial, school, and roadways. The project is located west of Fort Weaver Road in Ewa, south of existing Farrington Highway, and east of the proposed North-South Road. Part of the project is also located just north of Farrington Highway. The project site was recently agricultural, with no existing traffic. The table below summarizes the proposed land uses.

Vehicular access to the Project will be provided by three intersections. The first intersection will be located on Farrington Highway when a major spine road is constructed. Two other intersections will be connected to the proposed North-South Road at points serving the proposed University site forming four-legged intersections. If the University is not located there, the intersections

Land Use	Acres
Residential	649
Commercial	16
Schools	25
Parks	32
Major Roads	20
<b>Total</b>	<b>742</b>

would be T-intersections with higher levels of service since there would be no conflicting movements into and out of the University roadway.

### **Study Methodology**

---

This Report identifies and describes the probable impact of the traffic generated by the proposed development in the year 2010 when the project is expected to be completed. The analysis primarily focuses on the following intersections:

- Farrington Highway and Project Spine Road
- Proposed North-South Road at Secondary Project Road
- Proposed North-South Road at Project Spine Road
- Ramps at H-1 Interchange with Proposed North-South Road

Traffic was forecasted for the year 2010 at the study intersections and ramps by:

- adjusting trips for current development absorption rates as calculated based on the City Planning Department population estimates for areas within the Ewa region,
- updating land uses and roadway plans for the year 2010 prepared for the Ewa Region Highway Master Plan,
- preparing aggregated zonal trip tables for the year 2010 for the morning and afternoon peak hours,
- estimating traffic assignments to study roadways and balancing volumes for capacity restraints,
- forecast traffic generated by a proposed commercial project, and University,
- estimating traffic generated by the project and assigning traffic to the study roadways, and
- adding the traffic forecasts for the project and other developments.

The Report describes the impacts on each study roadway segment by the level-of-service (LOS) and capacity levels for year 2010 traffic conditions "without" and "with" Project.

### Conclusions & Recommendations

The previous plan for the East Kapolei Project reported in "Traffic Impact Assessment Report For East Kapolei Project" had assumed significantly more residential units and consequently more traffic than proposed currently. However, the previous conclusions and recommendations are still valid for this report update.

The results of the traffic analysis indicate that the proposed East Kapolei Project will significantly change the traffic flow quality at the study intersections when the project is completed. Major road improvements have been identified in the Ewa Region Highway Master Plan and adopted by the Oahu Metropolitan Planning Organization (OMPO). These improvements are assumed as part of the roadway network by 2010 in the assessment of the traffic impacts.

In order to minimize the impact of the project and provide for smoother traffic operating conditions, we recommend the following by the year 2010:

- Two left-turn lanes westbound at the intersection of Farrington Highway and the North-South Road.
- Addition of an extra through lane from about 1000' west of the intersection of Farrington Highway and the North-South Road to Project Road "C", east of the intersection.
- Two left-turn lanes entering and exiting Project Roads "A" and "B"

Sufficient right-of-way should be set aside to provide for future widening as development and traffic warrants. Traffic signals should be planned. Exact implementation dates depend on when traffic volumes meet established signal warrants.



Alternate methods of transportation actions should be investigated. A comprehensive plan that includes both Transportation System Management and Transportation Demand Management concepts should be developed for the area which would include the Project. Future traffic levels have regional sources that are undergoing current development. Integrated transit services, roadway plans and construction schedules, computer controlled traffic lights, remote parking areas, shuttle services, paratransit, bicycle and pedestrian ways, and some form of exclusive way transit should be considered in a comprehensive plan. Beyond transportation actions, the need for integrated land use planning for all the major parcels will aid in reducing the need for vehicle trips. The inclusion of convenience retail, minor commercial, schools, and parks within the East Kapolei Project will eliminate the need of travel on external roads for those trip purposes.

From a planning perspective, the City and State are making efforts to update the Long Range Plan with new population and traffic forecast values for the Ewa Region. The results reported herein pertain specifically to the East Kapolei Project in addition to current preliminary population estimates. This assessment approach is conservative in that the impact is greater than would be expected, as population exceeds what is set forth in preliminary figures. The new region-wide forecasts will likely result in less impacts and roadway needs than indicated herein due to smaller values of population.

An example of a potentially major change that should be included in the update study is the final version of the BPNAS Reuse Plan. This and other major land use proposals in the Ewa Region should be evaluated for traffic impact on a region-wide basis, and their mitigating actions included in the afore-mentioned comprehensive transportation plan. Thus, 2010 impacts should be re-evaluated when those forecasts are available, and a plan be developed that not only addresses highway projects but land use planning, transit, and other modes and services as well.

## PROJECT DESCRIPTION

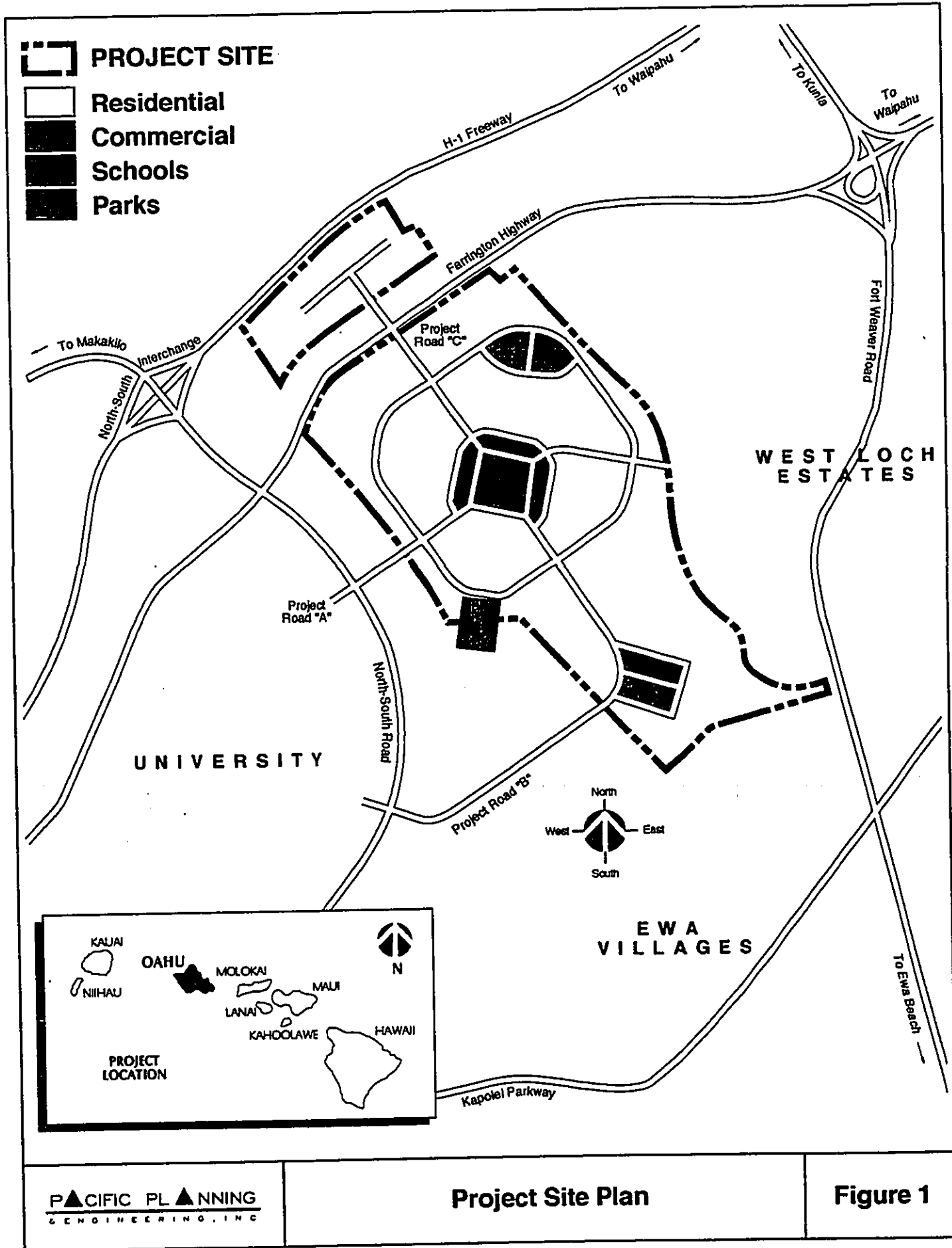
Schuler Homes, Inc. is proposing to construct the East Kapolei Project in Ewa, Oahu. Figure 1 shows the project location and roadway network in the vicinity.

### Project Land Uses

The project includes development of 742 acres by year 2010. The project is located west of Fort Weaver Road in Ewa, south of existing Farrington Highway, and just east of the proposed North-South Road. Part of the project is also located just north of Farrington Highway. The area is currently agricultural, with no existing traffic. Table 2 below summarizes the proposed land uses. Figure 1 shows the Project Site Plan.

Vehicular access to the Project will be provided by three intersections. The first intersection will be located on Farrington Highway when a major spine road is constructed. The other two intersections will be connected to the proposed North-South Road at points serving the proposed University site forming four-legged intersections. If the University is not located there, the intersections would be T-intersections with higher levels of service since there would be no conflicting movements into and out of the University roadway.

Land Use	Acres
Residential	649
Commercial	16
Schools	25
Parks	32
Major Roads	20
Total	742



## **EXISTING CONDITIONS**

### **Land Uses**

---

The existing land is in agriculture. There are no vehicle trips generated in the project site.

### **Roadway Facilities**

---

The site is currently served by Farrington Highway, a two-lane highway connecting Waipahu and Kapolei. Just north of Farrington Highway, H-1 freeway serves major east-west traffic volumes.

### **Traffic Conditions**

---

Existing conditions are not relevant for estimating the potential traffic impact of the proposed project since the Ewa region itself is planned for major growth in population and infrastructure. These changes by year 2010 will form the bases of the analysis for the "without project" scenario.

## FUTURE CONDITIONS

Future 2010 conditions were based on the current schedule of proposed developments in the Ewa Region. Research of planned developments and improvements to transportation facilities was conducted to estimate future traffic conditions at the study road segments. Adjustments were made to previously calculated trip tables for the Ewa Region highway study to update the vehicle trips during the morning and afternoon peak hours in the year 2010.

A comparison of the current Department of Planning population estimates to the values used in the previous Report indicates that residential uses would increase in Kapolei City but decrease in outlying areas, with the total population in the Ewa Region unchanged. Adjustments to the vehicle trips were made to reflect this new distribution of population within the Region. Adjustments were made to increase the external trips to Kapolei City as a conservative step to address the observation that the traffic forecasts for the Ewa Master Plan should reflect a lower retention of trips within the Region. These adjusted trips affect H-1 traffic volumes.

### **Land Uses**

---

The reader is referred to the previous Report titled "Traffic Impact Assessment Report For East Kapolei Project" dated 17 October 1994.

### **Roadway Facilities**

---

The road network for the year 2010 in the immediate area are shown in Figure 1. The major road changes planned in the Project area will include the following.

### North-South Road

The four-lane North-South Road provides an alternative route to/from the H-1 Freeway for the projects along the Fort Weaver Road corridor. With its link to Farrington Highway and Kapolei Parkway, the North-South Road would also serve to connect Ewa Beach and new residential projects in this vicinity with the employment in the Kapolei area.

### North-South Interchange

Along with the North-South Road, the new North-South Interchange with H-1 freeway will improve access to several areas within the Ewa region. The North-South Road will provide an alternative route to the Fort Weaver Road corridor and the H-1 Freeway. The North-South Interchange will also serve as a secondary access to the Makakilo development, the Villages of Kapolei, and the City of Kapolei.

### Farrington Highway

Farrington Highway, between Barbers Point Access Road and the access to Kapolei Knolls and the Villages of Kapolei, would be widened to provide two travel lanes in each direction with a median turning lane. The widening would increase the capacity of this roadway to accommodate the new developments in this area.

## PROJECTED TRAFFIC CONDITIONS

Future traffic was forecasted for the "without project" and "with project" conditions. Traffic forecasts were developed for the year 2010 when the project is expected to be completed.

### Future Traffic Without Project

This component of the forecast are future ambient traffic volumes. Future traffic is estimated by identifying all other land uses and forecasting traffic from those land uses.

In total, traffic was forecasted for the year 2010 at the study intersections and ramps by:

- updating land uses and roadway plans for 2010 prepared for the Ewa Region Highway Master Plan,
- adjusting trips forecasted by the Ewa Region Highway study for current development absorption rates as calculated based on the City Planning Department preliminary population estimates for areas within the Ewa region,
- preparing aggregated zonal trip tables for the year 2010 for the morning and afternoon peak hours,
- estimating traffic assignments to study roadways and balancing volumes for capacity restraints,
- forecast traffic generated by the commercial development, proposed University,
- estimating traffic generated by the project and assigning traffic to the study roadways, and
- adding the traffic forecasts for the project and other developments.

These forecast values are used to calculate the impacts on each study roadway segment by determining the level-of-service (LOS) and capacity levels for year 2010 traffic conditions without project and year 2010 traffic conditions with the Project.

Traffic forecasts are needed in the analysis to determine the LOS for each road segment of interest by specific time periods. The forecasts for the study roadways are shown in the following figures.

#### Traffic From Other Developments

The reader is referred to the previous Report titled "Traffic Impact Assessment Report For East Kapolei Project" dated 17 October 1994.

Figures 2 and 3 show the year 2010 "without project" traffic forecasts for the weekday morning and afternoon peak hours, respectively.

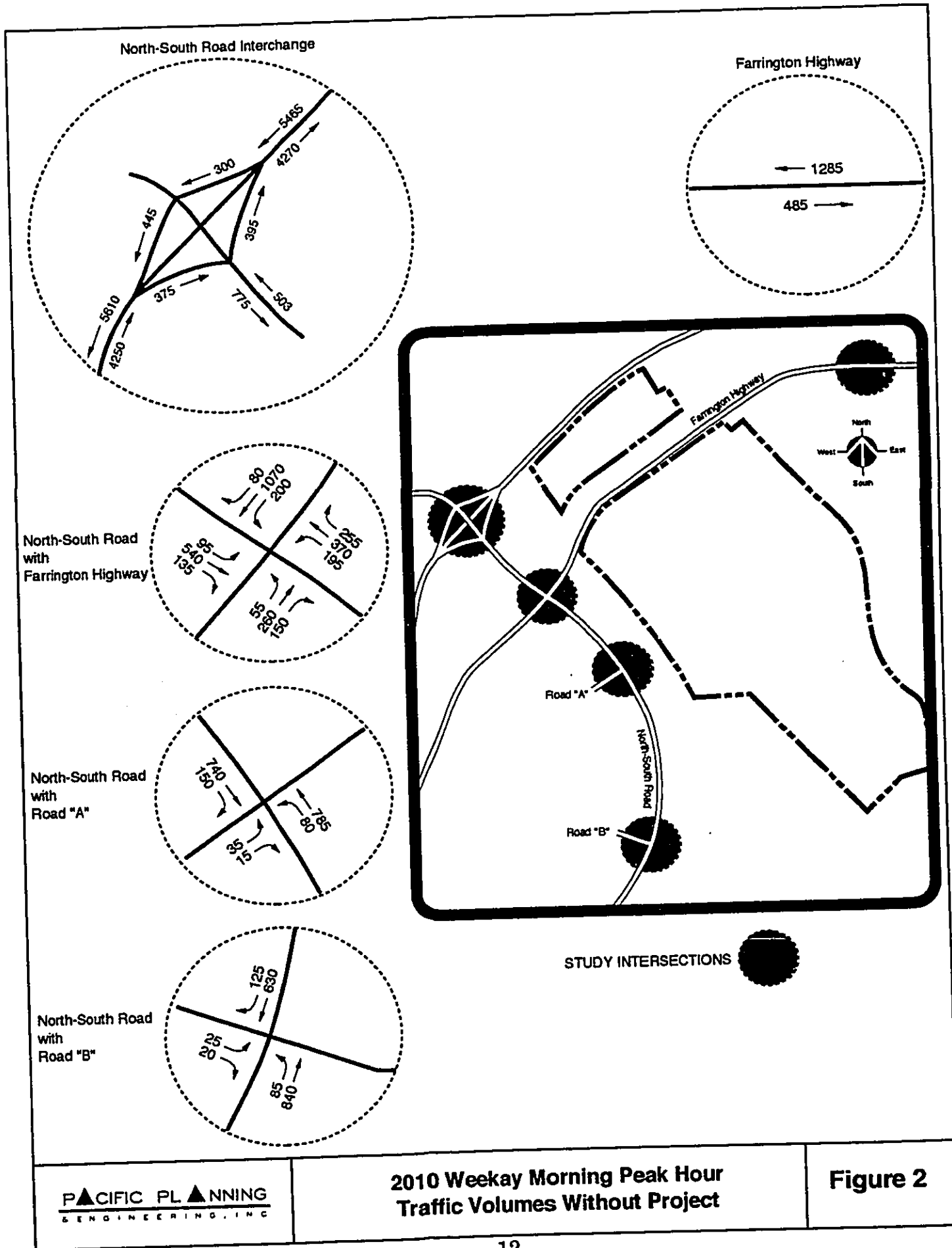
#### Future Traffic With Project

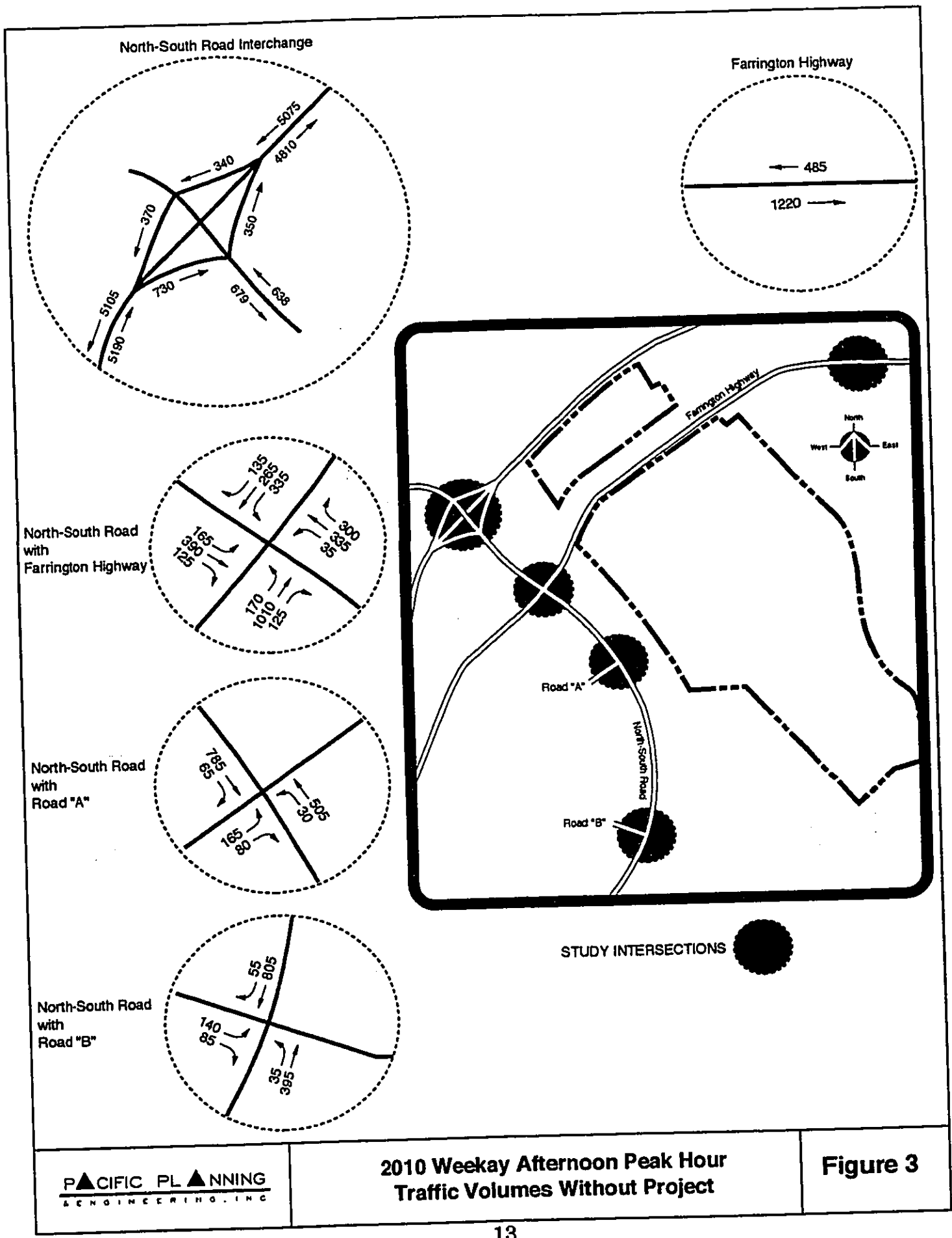
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Future traffic with the East Kapolei Project included in the land uses is calculated by adding the without project traffic to the traffic generated by the proposed Project. The method of determining the number of vehicle trips assigned to the roadways is described in the following sections.

As in the calculation of vehicle trips from other developments, the Project trip generation step estimates the number of trips generated by the proposed project. This estimate is based on rates obtained from the manual on Trip Generation, by the Institute of Transportation Engineers. Table 4 shows the estimated number of trips generated by the Project for year 2010.







PACIFIC PLANNING  
& ENGINEERING, INC

2010 Weekday Afternoon Peak Hour  
Traffic Volumes Without Project

Figure 3

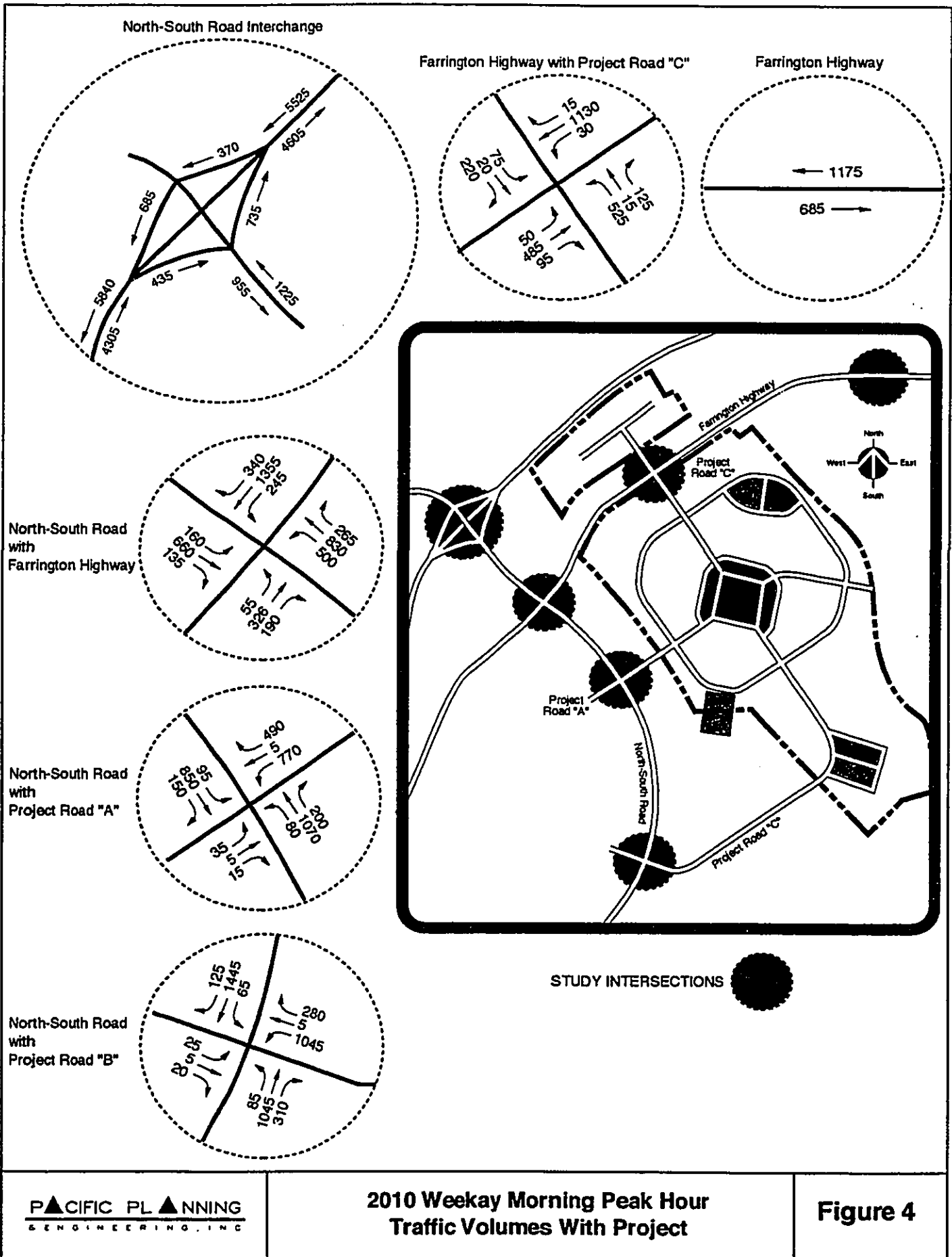
Land Use	Parameter	Morning Peak Hour		Afternoon Peak Hour	
		Enter	Exit	Enter	Exit
Single Family Homes	2,400 du	480	1320	1512	888
Multi Family Homes	5,600 du	392	2072	2128	1064
Schools	3 schools	336	216	24	24
Commercial Centers	16 acres	136	80	430	430

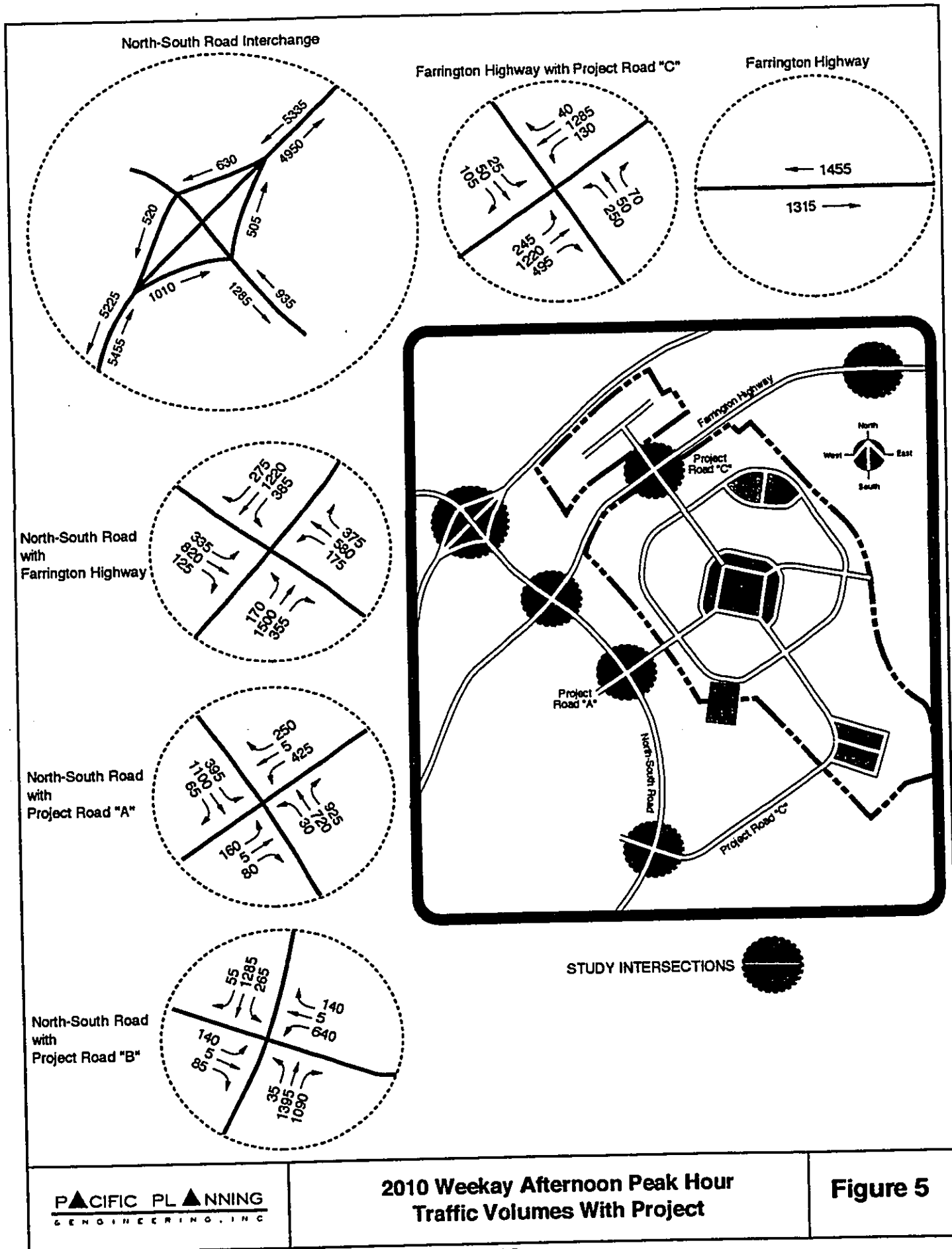
Figures 4 and 5 displays the "with Project" forecasts for the weekday morning and afternoon peak hours, respectively.

The trip distribution step assigns trips to their expected origins and destinations. Trip distribution for the project was estimated based on development of the Ewa Region as the Second City of Oahu. The trips were generally distributed as shown in Table 5.

Land Use	Morning Peak Hour		Afternoon Peak Hour	
	Enter	Exit	Enter	Exit
West of Project	57	72	72	63
South of Project	30	15	18	25
East of Project	11	13	9	10
North of Project	2	0	1	2
Total	100%	100%	100%	100%

The traffic assignment step assigns trips to a specific route on the roadway network that will take the driver from origin to destination. Traffic was assigned based on the estimated shortest path or travel time from origins to destinations.





## TRAFFIC IMPACT ANALYSIS

Analyses were conducted for the study roadway facilities to determine the relative impact of the proposed project on the local roadway system and to determine improvements to mitigate the impact of the project, if necessary.

### **Project Impact Analysis**

---

Analyses were conducted on the study roadway facilities to determine the relative impact of the proposed project on the roadway system. The analyses were conducted for the study year 2010 "with project" traffic conditions for the morning and afternoon peak hours.

The roadway facilities were analyzed based on the existing roadway geometrics and planned improvements. All known approved planned transportation improvements to the study facilities by the year 2010 have been included. The major roadway additions are widening Farrington Highway to four lanes, completion of the future North-South Road, a new H-1 interchange with the future North-South Road, and addition of a lane to H-1 freeway. These major projects were identified in previous analyses conducted for the Ewa Region highway study. As noted, the current Planning Department forecasts call for lower densities than used in the aforementioned study. Thus, it is possible that not all of the above projects are needed by 2010. A major regional study is needed to update the roadway needs for the Ewa Region.

### **Analysis Methods**

---

The study roadway facilities were analyzed using methods outlined in the Highway Capacity Manual (HCM), Special Report 209, 1994. Appendix A describes in more detail the various methods of analysis used in the study. (The

reader should note that certain significant changes released in early 1995 have been made to the HCM. These changes are incorporated in our analysis).

For the study intersections, HCM's Planning Analysis was used to estimate the impact of the Project. This planning method compares traffic volumes of the intersection to the capacity. The analysis determines whether an intersection is under, near, at, or over capacity.

The proposed H-1 interchange with the future North-South Road was analyzed using ramp analyses methods. This method provides a Level-of-Service (LOS) which measures traffic operational conditions ranging from LOS A, good operating conditions, to LOS F, poor operating conditions.

Multilane Rural and Suburban Highway Analysis was performed on Farrington Highway east of the project site. A Level-of-Service (LOS) is determined.

The analyses results assume the following roadways:

- Farrington Highway - four lanes by year 2010.
- H-1 Freeway - six lanes by year 2010.
- North-South Road - four lanes by year 2010.

In addition, the following improvement measures shown below were assumed for the "with" project analyses.

- Two left-turn lanes westbound at the intersection of Farrington Highway and the North-South Road.
- Addition of an extra through lane from about 1000' west of the intersection of Farrington Highway and the North-South Road to Project Road "C", east of the intersection.
- Two left-turn lanes entering and exiting project roads "A" and "B".

## Analysis Results

The following is a summary based on the analysis results:

- Without the project, the intersections of Farrington Highway with the North-South Road and North-South Road with Roads "A" and "B" would be under capacity for the morning and afternoon peak hours.
- With the project, the intersection of Farrington Highway with the North-South Road would operate at capacity for both peak hours.

The intersection of the North-South with Project Road "A" would operate under capacity during the morning peak hour and near capacity during the afternoon peak hour.

The intersection of the North-South Road with Project Road "B" would operate near capacity during both peak hours.

The intersection of the North-South Road with Project Road "C" would operate under capacity during both peak hours.

- The planned H-1/North-South Road Interchange operates at LOS D or better during the peak hours without or with the project.
- Farrington Highway east of the project operates at LOS A during the peak hours without or with the project.

Tables 6, 7, and 8 summarize the results of the analysis for the "with" project scenarios for the year 2010.



Table 6 - Planning Analysis			
Morning Peak Hour		Critical v/c Ratio $X_{cm}$ (Capacity Level)	
		Without Project	With Project
Farrington Highway / North-South Road		0.69 (under)	0.98 (at)
North-South Road / Project Road A		0.31 (under)	0.71 (under)
North-South Road / Project Road B		0.28 (under)	0.86 (near)
North-South Road / Project Road C		n/a	0.70 (under)
Afternoon Peak Hour		Critical v/c Ratio $X_{cm}$ (Capacity Level)	
		Without Project	With Project
Farrington Highway / North-South Road		0.61 (under)	0.90 (near)
North-South Road / Project Road A		0.36 (under)	0.87 (near)
North-South Road / Project Road B		0.32 (under)	0.88 (near)
North-South Road / Project Road C		n/a	0.76 (under)

Table 7 - Ramp-Freeway Terminal Analysis			
Morning Peak Hour		LOS (Max Density-pc/mi/ln)	
		Without Project	With Project
Eastbound	Off Ramp - Diverge Area	C (22)	C (23)
	On Ramp - Merge Area	C (22)	C (25)
Westbound	On Ramp - Diverge Area	D (28)	D (29)
	Off Ramp - Merge Area	D (31)	D (33)
Afternoon Peak Hour		LOS (Max Density-pc/mi/ln)	
		Without Project	With Project
Eastbound	Off Ramp - Diverge Area	C (28)	D (29)
	On Ramp - Merge Area	C (25)	C (25)
Westbound	On Ramp - Diverge Area	C (25)	C (28)
	Off Ramp - Merge Area	C (25)	C (27)

Table 8 - Multilane Highway Analysis			
Morning Peak Hour		LOS	
		Without Project	With Project
Farrington Highway East of Project Road C	Eastbound	A	A
	Westbound	A	A
Afternoon Peak Hour		LOS	
		Without Project	With Project
Farrington Highway East of Project Road C	Eastbound	A	A
	Westbound	A	A

## CONCLUSIONS AND RECOMMENDATIONS

The previous plan for the East Kapolei Project reported in "Traffic Impact Assessment Report For East Kapolei Project" had assumed significantly more residential units and consequently more traffic than proposed currently. However, the previous conclusions and recommendations are still valid for this report update.

The results of the traffic analysis indicate that the proposed East Kapolei Project will significantly change the traffic flow quality at the study intersections when the project is completed. Major road improvements have been identified in the Ewa Region Highway Master Plan and adopted by the Oahu Metropolitan Planning Organization (OMPO). These improvements are assumed as part of the roadway network by 2010 in the assessment of the traffic impacts.

In order to minimize the impact of the project and provide for smoother traffic operating conditions, we recommend the following by the year 2010:

- Two left-turn lanes westbound at the intersection of Farrington Highway and the North-South Road.
- Addition of an extra through lane from about 1000' west of the intersection of Farrington Highway and the North-South Road to Project Road "C", east of the intersection.
- Two left-turn lanes entering and exiting Project Roads "A" and "B"

Sufficient right-of-way should be set aside to provide for future widening as development and traffic warrants. Traffic signals should be planned. Exact implementation dates depend on when traffic volumes meet established signal warrants.

Alternate methods of transportation actions should be investigated. A comprehensive plan that includes both Transportation System Management and

Transportation Demand Management concepts should be developed for the area which would include the Project. Future traffic levels have regional sources that are undergoing current development. Integrated transit services, roadway plans and construction schedules, computer controlled traffic lights, remote parking areas, shuttle services, paratransit, bicycle and pedestrian ways, and some form of exclusive way transit should be considered in a comprehensive plan. Beyond transportation actions, the need for integrated land use planning for all the major parcels will aid in reducing the need for vehicle trips. The inclusion of convenience retail, minor commercial, schools, and parks within the East Kapolei Project will eliminate the need of travel on external roads for those trip purposes.

From a planning perspective, the City and State are making efforts to update the Long Range Plan with new population and traffic forecast values for the Ewa Region. The results reported herein pertain specifically to the East Kapolei Project in addition to current preliminary population estimates. This assessment approach is conservative in that the impact is greater than would be expected, as population exceeds what is set forth in preliminary figures. The new region-wide forecasts will likely result in less impacts and roadway needs than indicated herein due to smaller values of population.

An example of a potentially major change that should be included in the update study is the final version of the BPNAS Reuse Plan. This and other major land use proposals in the Ewa Region should be evaluated for traffic impact on a region-wide basis, and their mitigating actions included in the afore-mentioned comprehensive transportation plan. Thus, 2010 impacts should be re-evaluated when those forecasts are available, and a plan be developed that not only addresses highway projects but land use planning, transit, and other modes and services as well.

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THE EAST KAPOLEI AND VICINITY WASTEWATER COLLECTION SYSTEM  
MASTER PLAN, REVISED FEBRUARY 15, 1996.

GRAY, HONG, BILLS & ASSOCIATES

**THE EAST KAPOLEI & VICINITY  
WASTEWATER COLLECTION SYSTEM MASTER PLAN  
EAST KAPOLEI PROJECT  
HONOULIULI, EWA, OAHU, HAWAII**

Prepared By

**GRAY, HONG, BILLS & ASSOCIATES, INC.**  
119 Merchant Street, Suite 607  
Honolulu, Hawaii 96813

Revised February 15, 1996

2479-1

**TABLE OF CONTENTS**

	PAGE
SECTION 1. BACKGROUND INFORMATION .....	1
SECTION 2. DESIGN FLOWS .....	1 - 2
SECTION 3. HONOLULI TREATMENT PLANT CAPACITY .....	2
SECTION 4. TEMPORARY COLLECTOR & SERVICE .....	2 - 3

**EXHIBITS**

- EXHIBIT 1 -- East Kapolei Sewer Tributary Areas
- EXHIBIT 2 -- Total Average Daily Flow Calculations
- EXHIBIT 3 -- Tributary Area Flow Projections
- EXHIBIT 4 -- Proposed Regional Interceptor Sewer System
- EXHIBIT 5 -- Projected Wastewater Flows from Various Developments Revised to Add East Kapolei Development
- EXHIBIT 6 -- Interceptor Capacities
- EXHIBIT 7 -- Campbell Estate Disclaimer

**LIST OF APPENDICES**

- APPENDIX 1 -- Preliminary Oversizing of East Kapolei Project Sewer Lines for Campbell Estate Property
- APPENDIX 2 -- Proposed 42" Sewer Alignment within HECO 138 KV Easement
- APPENDIX 3 -- Preliminary Sizing of Sewer Lines for East Kapolei Project Alone

## **SECTION 1. BACKGROUND INFORMATION**

Schuler Homes, Inc. will be developing approximately 742 acres of land in Ewa known as the East Kapolei project. The East Kapolei project is bound by the H-1 freeway to the north, North-South Road to the west, Ewa Villages to the south and Fort Weaver Road to the east. The project will consist of 8,000 single-family and multi-family units.

We are in the process of preparing preliminary planning documents for the East Kapolei project to support a Land Use Commission petition, Development Plan redesignation and ultimately a Change of Zone request. To that end, Schuler Homes, Inc. is requesting preliminary comments regarding various infrastructure requirements. To assist the Department of Wastewater Management, Schuler Homes, Inc. has assumed the lead in providing master planning for utility services to the project area which makes assumptions for its unsewered neighbors. This preliminary wastewater master plan covers all the agricultural lands remaining in Ewa and bounded by the H-1 Freeway to the north, Ewa Villages to the south, the Villages of Kapolei to the west and West Loch Estates to the east. The total acreage involved in this master plan is approximately 2,809 acres. Of all the projects proposed in this area, it is only known that the development of Schuler's acreage will be proceeding uniformly beginning in 1998 with completion in 2010, approximately 13 years later (approximately 600 units per year).

## **SECTION 2. DESIGN FLOWS**

Exhibit 1 shows the master plan area. Exhibit 2 shows sewer projections for all of the individual parcels within the master planning boundaries. Exhibit 3 tabulates the average daily flow for each subarea within the tributary area including maximum flow, design average flow and peak design flow. This master plan assumes that the main interceptor trunk sewer which would deliver wastewater to the Honouliuli Treatment Plant would conceptually exist as shown on Exhibit 4.

Based on the data generated in Exhibit 3, the design peak flow for the master plan area would be approximately 19.9 mgd. This wastewater would need to be transported from the mauka limits of Ewa Villages along North-South Road in a southerly direction to a corridor approximately parallel with the existing Makakilo interceptor (30" sewer). At this intersection, the East Kapolei interceptor sewer would have the following possibilities:

1. Install its own parallel interceptor and travel east to the Honouliuli Treatment Plant. The required sewer interceptor size would be 42-inch based on the flow calculations contained in Exhibit 6.
2. Combine with the Kapolei interceptor (future). The total flow which would exist in this segment of trunk sewer is based on a combination of the master plan service area and the Villages of Kapolei trunk sewer calculations as shown on Exhibit 5. The required interceptor size would be 60-inches based on the design peak flow of 52.2 mgd as shown on the calculations contained in Exhibit 6.



Appendix 1 includes preliminary line oversizing for the East Kapolei project accounting for Estate of James Campbell property. Appendix 2 includes information on the alignment of the proposed 42" sewer line within the easement for the 138 KV Heco line. Appendix 3 includes preliminary line sizing of the sewer lines for the East Kapolei Project alone.

### **SECTION 3. HONOULIULI TREATMENT PLANT CAPACITY**

The proposed East Kapolei project will ultimately generate an average daily flow of 1.98 million gallons of wastewater flow over a 13-year period. The total average daily flow from the planning area will be 8.0 mgd. The time frame to generate the average daily flow of 8.0 mgd is unknown at the current time. Assuming orderly development it will be necessary to determine whether Honouliuli expansion can accommodate the East Kapolei sewage generation projections.

### **SECTION 4. TEMPORARY COLLECTOR & SERVICE**

We anticipate that 2 or 3 of the 50-acre blocks could be constructed before the North-South Road corridor is in place with the 42-inch East Kapolei trunk sewer connecting to Honouliuli Wastewater Treatment Plant. To meet project scheduling, it is anticipated that the 42-inch interceptor will be available for connection in 1999. However, since Schuler Homes, Inc. anticipates sales beginning in late 1998, a temporary connection to the City & County system is proposed as shown on Exhibit 1. The proposed connection to the City & County system is at the terminus of the 30-inch system adjacent to the elderly housing project on Fort Weaver Road.

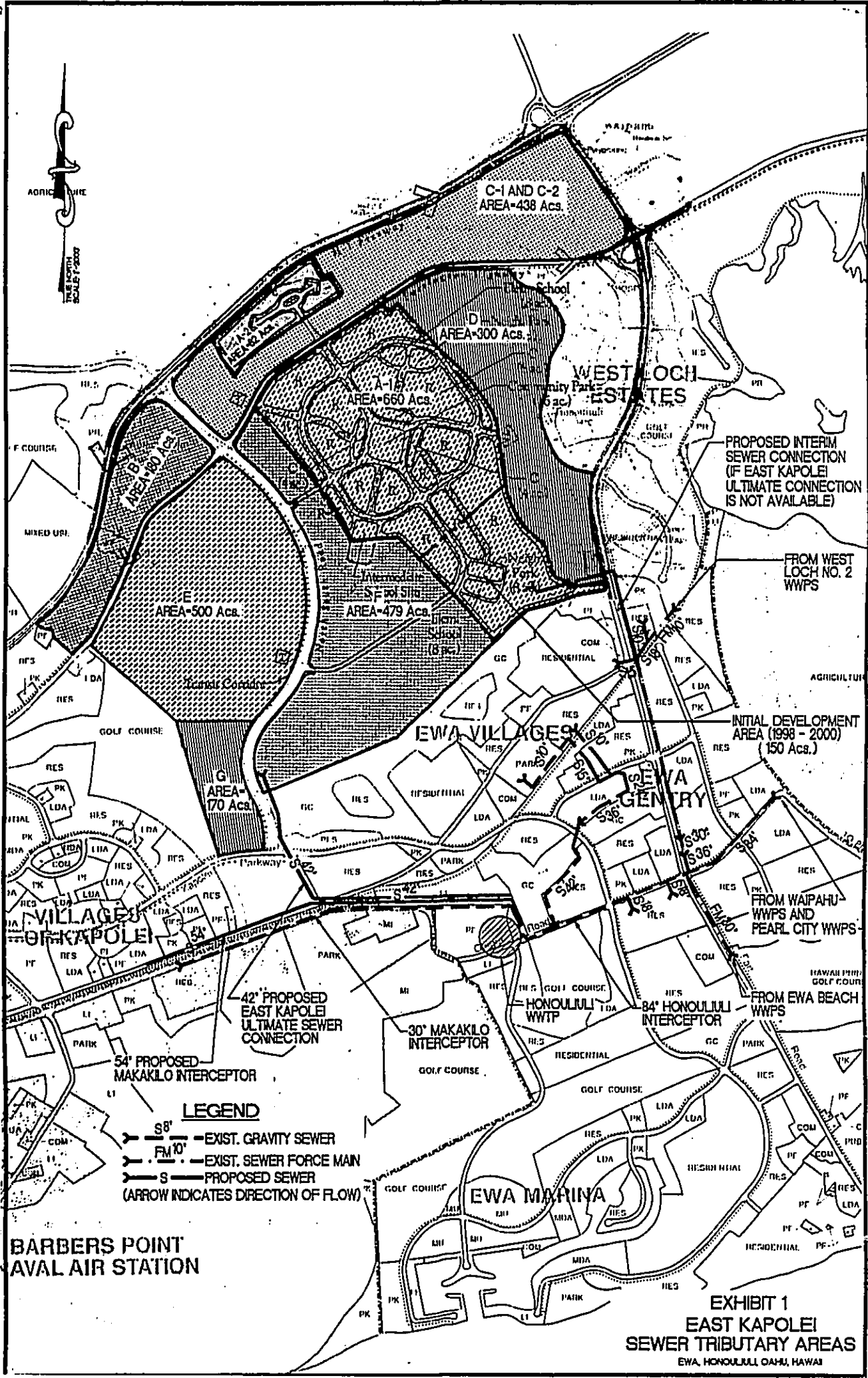
The proposed interim flow has been calculated based on the following:

1. Development = 1000 units
  - a. 750 multi-family
  - b. 250 single-family
2. Development area = 100 acres
3. Equivalent population = 3,100 people
4. Average daily flow (80 gal.) = 0.25 mgd
5. Maximum flow factor (Factor =  $5/P^{0.2}$ ) = 3.99
6. Maximum flow = 1.0 mgd

7. Dry weather infiltration (5 gcd) = 0.016 mgd
8. Design average flow =  $0.25 + 0.016 = 0.266$  mgd
9. Design maximum flow =  $1.0 + 0.016 = 1.016$  mgd
10. Wet weather infiltration (1250 gad) = 0.188 mgd
11. Design peak flow =  $1.016 + 0.188 = 1.204$  mgd say 1.2 mgd

The Department of Wastewater Management will need to confirm that capacity is available with the existing sewer lines within Fort Weaver Road. A determination as to whether this temporary improvement could be permanent is also an unresolved issue.

100 FEET  
 1" = 200'  
 1/4" = 50'  
 1/8" = 25'  
 SCALE:  
 1" = 200'



PREPARED BY  
 DATE 12-1-95

Owner	Zone	Tributary Area (Acres)	Units Capita	Equivalent Population	Average Flow Calculations	Total Flow (mgd)
East Kapolei	A-1	660	1,780 Single-family 5,340 Multi-family	22,072	1,780 x 4 x 80 gpcd = 0.570 mgd 5,340 x 2.8 x 80 gpcd = 1.196 mgd	1.766
	A-2	82	220 Single-family 660 Multi-family	2,728	220 x 4 x 80 gpcd = 0.070 mgd 660 x 2.8 x 80 gpcd = 0.148 mgd	0.218
	Subtotal	742	2,000 Single-family 6,000 Multi-family	24,800	Subtotal	1.984
Campbell Estate	B	180	47 capita per acre <sup>1</sup>	8,460	180 x 47 x 80 gpcd = 0.676 mgd	0.676
Campbell Estate	C-1	172	41 capita per acre <sup>1</sup>	7,052	172 x 41 x 80 gpcd = 0.564 mgd	0.564
	C-2	266	45 capita per acre <sup>1</sup>	11,970	266 x 45 x 80 gpcd = 0.958 mgd	0.958
	Subtotal	438		19,022	Subtotal	1.522
Campbell Estate	D	300	48 capita per acre <sup>1</sup>	14,400	300 x 48 x 80 gpcd = 1.152 mgd	1.152
University of Hawaii, West Oahu Campus	E	500	20,000 capita	6,250 <sup>2</sup>	6,250 x 25 gpcd = 0.5 mgd	0.500
Campbell Estate State of Hawaii <sup>3</sup>	F	46 (Campbell) <sup>3</sup> 433 (State) <sup>3</sup> 479 (Total)	48 capita per acre <sup>1</sup>	22,992	479 x 48 x 80 gpcd = 1.839 mgd	1.839
DHHL	G	170	6 units/acre	4,080	170 x 6 x 4 x 80 gpcd = 0.327 mgd	0.327
		2,809		113,754	Total Average Daily Flow	8.000

<sup>1</sup> Based on information provided by Engineering Concepts, Inc.

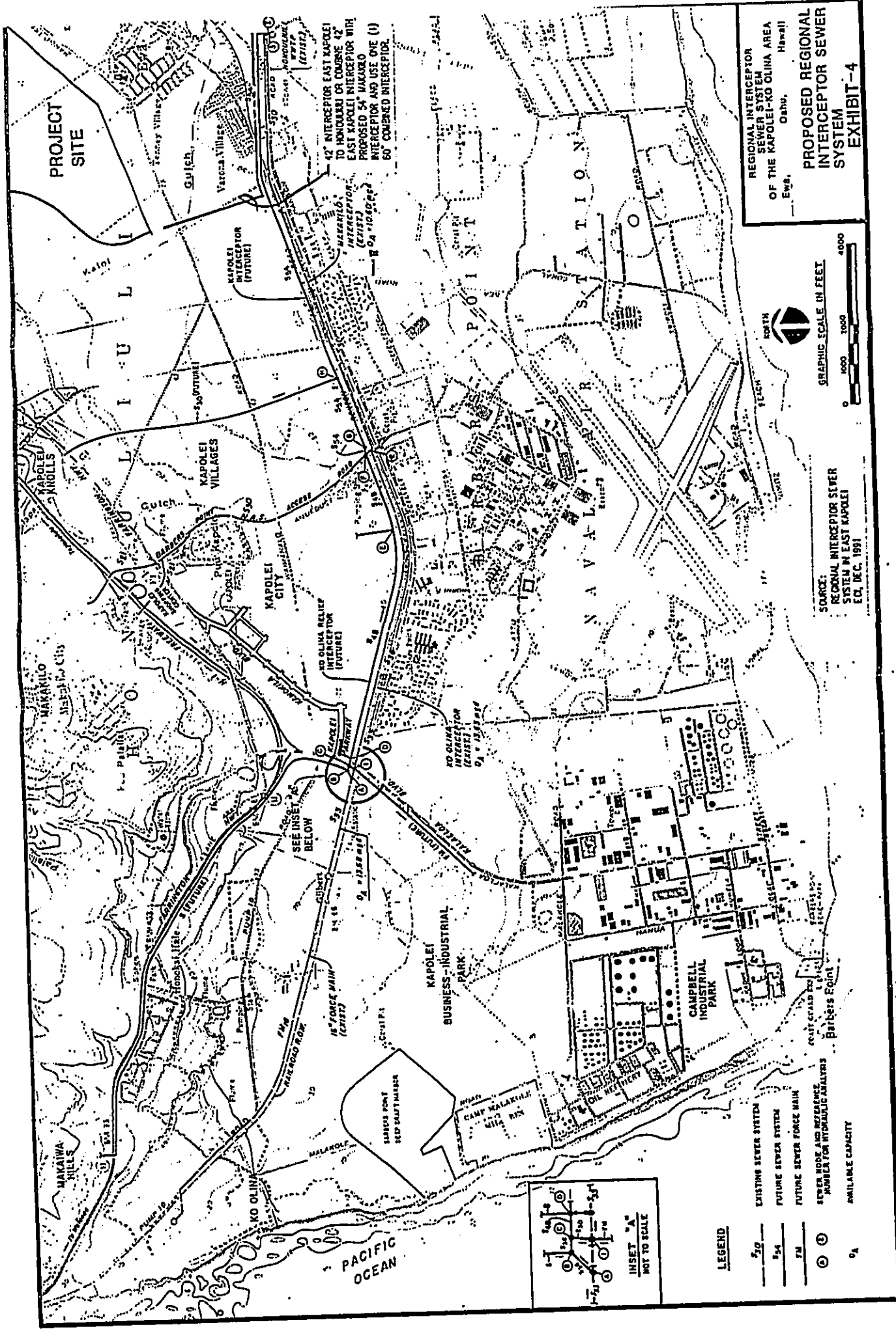
<sup>2</sup> Based on 20,000 @ 25 gpcd = 6,250 @ 80 gpcd

<sup>3</sup> Revised January 16, 1996

Exhibit 2 -- Total Average Daily Flow Calculations

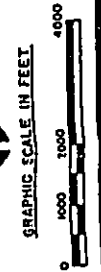
District Zone or Street	Sewer Location	Tributary Area (Acres)		Tributary Equivalent Population						Wastewater Flow Computation							
		Incr.	Total	Residential		Other		Total	Ave. WWF @ 80 GPCD (MGD)	Maximum Flow Factor	Maximum Flow (mgd)	Dry Weather Infiltration (mgd)	Design Average Flow (mgd)	Design Maximum Flow (mgd)	Wet Weather Infiltration (mgd)	Design Peak Flow (mgd)	
				Incr.	Total	Incr.	Total										Incr.
Area "C-1"	Refer	172.00	172.00	7,052	7,052	-	-	7,052	7,052	-	-	-	-	-	-	-	
Area "C-2"		266.00	266.00	11,970	11,970	-	-	11,970	11,970	-	-	-	-	-	-	-	
Area "D"		300.00	300.00	14,400	14,400	-	-	14,400	14,400	-	-	-	-	-	-	-	
Area "A-1"		660.00	660.00	22,072	22,072	-	-	22,072	22,072	-	-	-	-	-	-	-	
Area "A-2"		82.00	82.00	2,728	2,728	-	-	2,728	2,728	-	-	-	-	-	-	-	
Area "F"		479.00	479.00	22,992	22,992	-	-	22,992	22,992	-	-	-	-	-	-	-	
Area "B"		180.00	180.00	8,460	8,460	-	-	8,460	8,460	-	-	-	-	-	-	-	
Area "E"		500.00	500.00	-	-	6,250	6,250	6,250	6,250	-	-	-	-	-	-	-	
Area "G"		170.00	170.00	4,080	4,080	-	-	4,080	4,080	-	-	-	-	-	-	-	
Total			2809.00	93,754	93,754	-	6,250	6,250	100,004	8,000	1.991	15.92	0.500	8,500	16,425	3,511	19,936

EXHIBIT 3 -- TRIBUTARY AREA FLOW PROJECTIONS

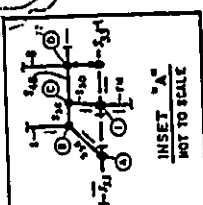


REGIONAL INTERCEPTOR  
SEWER SYSTEM  
OF THE KAPOLEI-KO OLINA AREA  
Ewa, Oahu, Hawaii

**PROPOSED REGIONAL  
INTERCEPTOR SEWER  
SYSTEM**  
EXHIBIT-4



SOURCE:  
REGIONAL INTERCEPTOR SEWER  
SYSTEM IN EAST KAPOLEI  
ED, DEC. 1981



- LEGEND**
- S20 ——— EXISTING SEWER SYSTEM
  - S24 ——— FUTURE SEWER SYSTEM
  - FM ——— FUTURE SEWER FORCE MAIN
  - ① ——— INTERCEPTOR AND INTERFERENCE NUMBER FOR HYDRAULIC ANALYSIS
  - ——— AVAILABLE CAPACITY

Sewer Location District Zone or Street	Refer	Tributary Area (Acres)		Tributary Equivalent Population				Wastewater Flow Computation								
		Incr.	Total	Residential		Other		Total	Ave. WWF @ 80 GPCD (MGD)	Maximum Flow Factor	Maximum Flow (mgd)	Dry Weather Infiltration (mgd)	Design Average Flow (mgd)	Design Maximum Flow (mgd)	Wet Weather Infiltration (mgd)	Design Peak Flow (mgd)
				Incr.	Total	Incr.	Total									
Ko Olina Resort	1	600.00	600.00	39,549	39,549	-	-	39,549	3.164	2.396	7.58	0.198	3.362	7.779	0.750	8,529
KBIP (JCIP)	2	850.00	850.00	-	-	72,515	72,515	72,515	5.801	2.123	12.31	0.698	6.499	13.012	1.256	14,268
BP Deep Harbor	2	269.00	269.00	-	-	10,752	10,752	10,752	0.860	3.109	2.67	0.376	1.236	3.051	0.739	3,790
Camp Malakole	2	65.00	65.00	2,588	2,588	10,752	10,752	2,588	0.207	4.134	0.86	0.091	0.298	0.947	0.178	1,125
KBIP (Total)		1184.00	1184.00	2,588	2,588	85,855	85,855	85,855	6.868	2.052	14.10	1.165	8.033	15.260	2.173	17,433
Makaiwa Hills	3	735.00	735.00	12,000	12,000	-	-	12,000	0.960	3.042	2.92	0.060	1.020	2.980	0.919	3,899
Kapolei City	4	766.00	766.00	27,278	27,278	-	-	27,278	2.182	2.581	5.63	0.136	2.319	5.769	0.958	6,727
Kapolei Knolls	5	75.00	75.00	2,000	2,000	-	-	2,000	0.160	4.353	0.70	0.010	0.170	0.706	0.094	0,800
Kapolei Village	6	823.00	823.00	24,255	24,255	-	-	24,255	1.940	2.642	5.13	0.121	2.062	5.249	1.029	6,277
Makakilo City	7	971.00	971.00	31,700	31,700	-	-	31,700	2.536	2.620	6.64	0.159	2.695	6.803	1.214	8,017
ALL AREAS			5154.00	139,370	139,370	83,267	83,267	222,637	17.811	1.696	30.21	1.849	19.660	32.058	7.136	39,194
East Kapolei & Adjacent Property Owners		2809.00	2809.00	93,754	93,754	6,250	6,250	100,004	8.000	1.991	15.92	0.500	8.500	16.425	3.511	19,936
ALL AREAS			7963.00	233,124	233,124	89,517	89,517	322,641	25.811	1.575	40.65	1.613	27.424	42.261	9.954	52,215

Original Table III-1 prepared by Engineering Concepts, Inc.  
Included in "Engineering Report for the Regional Interceptor Sewer System for the Developments of the Estate of James Campbell in the Kapolei Area"  
dated December 1991.

EXHIBIT 5 --PROJECTED WASTEWATER FLOWS FROM VARIOUS DEVELOPMENTS  
REVISED TO ADD EAST KAPOLEI DEVELOPMENT AND ADJACENT PROPERTY OWNERS

\*\*\*\*\* PIPECAP \*\*\*\*\*  
 \*\*\*\*\* Version 2.50 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: East Kapolei  
 User: GRAY HONG BILLS & ASSOCIATES  
 Date: 2/15/1996 Thursday  
 Time: 15:00:15  
 Output: EXH6

MANNING n	SPAN in	RISE in	SLOPE ft/ft	JUST FULL		JUST FULL DISCHARGE AT	
				VELOCITY fps	DISCHARGE cfs	So-.001 cfs	So+.001 cfs
Circular							
.01300	63.00	63.00	.001000	4.33	93.80 (60.63 MGD)	.0	132.7
.01300	60.00	60.00	.001000	4.19	82.36 (53.24 MGD)	.0	116.5
.01300	42.00	42.00	.001000	3.31	31.82 (20.57 MGD)	.0	45.0
.01300	30.00	30.00	.004000	5.28	25.94 (16.77 MGD)	22.5	29.0
.01300	30.00	30.00	.003000	4.58	22.47 (14.52 MGD)	18.3	25.9
.01300	24.00	24.00	.004000	4.55	14.31 (9.25 MGD)	12.4	16.0
.01300	21.00	21.00	.004000	4.17	10.02 (6.48 MGD)	8.7	11.2
.01500	18.00	18.00	.007000	4.31	7.62 (4.93 MGD)	7.0	8.1
.01500	15.00	15.00	.005000	3.23	3.96 (2.56 MGD)	3.5	4.3

Exhibit 6 -- Interceptor Capacities



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*THE ESTATE OF JAMES CAMPBELL*

Re: Campbell Estate Disclaimer

To Whom It May Concern:

The information contained in the attached materials represents the views of Schuler Homes, Inc. ("Schuler"), and has been prepared by or for Schuler from its own sources. This information does not necessarily reflect the views of the Estate of James Campbell (the "Estate"), and the Estate expressly disclaims any responsibility for the accuracy or completeness of such information. Nothing in the attached materials shall be deemed or construed in any way to represent the views of the Estate, or to bind or otherwise obligate the Estate in any way, all rights of the Estate being hereby expressly reserved. All inquiries regarding the Estate's position on any matters set forth in the attached materials should be directed to Ms. Jan Burns, Manager, Special Projects, Campbell Estate.

Exhibit 7

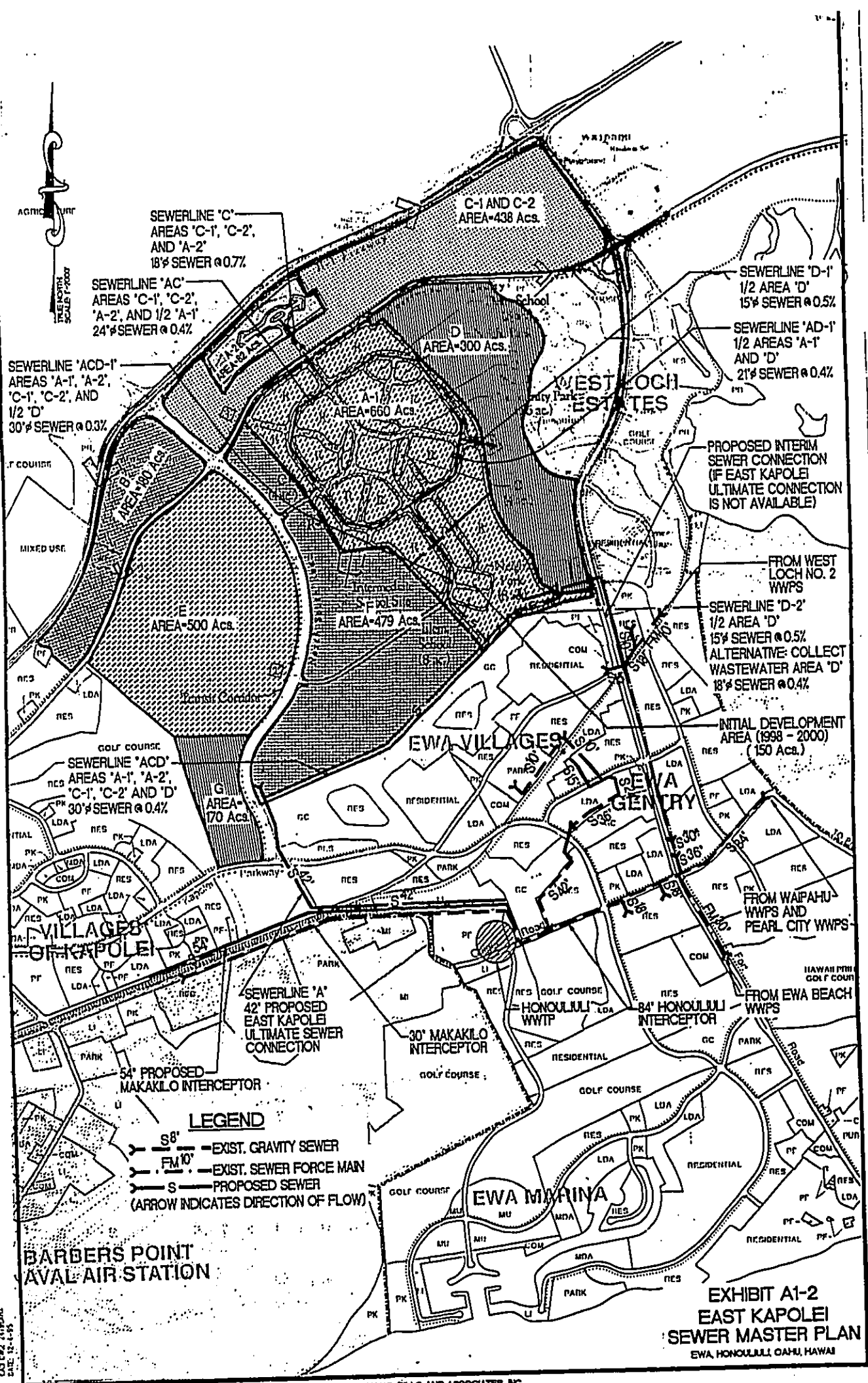
**APPENDIX 1**

**Preliminary Oversizing of East Kapolei Project Sewer Lines for  
Campbell Estate Property**

Sewer Location		Tributary Area (Acres)		Tributary Equivalent Population						Wastewater Flow Computation							
				Residential		Other		Total		Ave. WWF @ 80 GPCD (MGD)	Maximum Flow Factor	Maximum Flow (mgd)	Dry Weather Infiltration (mgd)	Design Average Flow (mgd)	Design Maximum Flow (mgd)	Wet Weather Infiltration (mgd)	Design Peak Flow (mgd)
				Incr.	Total	Incr.	Total	Incr.	Total								
Sewer "C"	Area "C" & "A-2"	520.00	520.00	21,750	21,750	-	21,750	1.740	2.701	4.70	0.109	1.849	4.808	0.650	5.458		
Sewer "D-1"	1/2 Area "D"	150.00	150.00	7,200	7,200	-	7,200	0.576	3.369	1.94	0.036	0.612	1.977	0.188	2.164		
Sewer "D" (Alternative)	Area "D"	300.00	300.00	14,400	14,400	-	14,400	1.152	2.933	3.38	0.072	1.224	3.451	0.375	3.826		
Sewer "AD-1"	1/2 Areas "A-1" and "D"	630.00	630.00	18,236	18,236	-	18,236	1.459	2.798	4.08	0.091	1.550	4.173	0.788	4.960		
Sewer "AC"	Areas "C", "A-2" & 1/2 Area "A"	850.00	850.00	32,786	32,786	-	32,786	2.623	2.488	6.53	0.164	2.787	6.689	1.063	7.752		
Sewer "ACD-1"	Areas "A-1", "A-2", "C", & 1/2 Area "D"	1330.00	1330.00	51,022	51,022	-	51,022	4.082	2.277	9.30	0.255	4.337	9.550	1.663	11.213		
Sewer "ACD"	Areas "A", "C" & "D"	1480.00	1480.00	58,222	58,222	-	58,222	4.658	2.218	10.33	0.291	4.949	10.622	1.850	12.472		
Sewer "A"	Areas "A" thru "G"	2809.00	2809.00	93,754	93,754	6,250	100,004	8.000	1.991	15.92	0.500	8.500	16.425	3.511	19.936		

EXHIBIT A1-1 -- PEAK FLOW CALCULATIONS

DATE: 12/28/88



SEWERLINE 'C'  
AREAS 'C-1', 'C-2',  
AND 'A-2'  
18" SEWER @ 0.7%

SEWERLINE 'AC'  
AREAS 'C-1', 'C-2',  
'A-2', AND 1/2 'A-1'  
24" SEWER @ 0.4%

SEWERLINE 'ACD-1'  
AREAS 'A-1', 'A-2',  
'C-1', 'C-2', AND  
1/2 'D'  
30" SEWER @ 0.3%

SEWERLINE 'D-1'  
1/2 AREA 'D'  
15" SEWER @ 0.5%

SEWERLINE 'AD-1'  
1/2 AREAS 'A-1'  
AND 'D'  
21" SEWER @ 0.4%

PROPOSED INTERIM  
SEWER CONNECTION  
(IF EAST KAPOLEI  
ULTIMATE CONNECTION  
IS NOT AVAILABLE)

FROM WEST  
LOCH NO. 2  
WWPS

SEWERLINE 'D-2'  
1/2 AREA 'D'  
15" SEWER @ 0.5%  
ALTERNATIVE: COLLECT  
WASTEWATER AREA 'D'  
18" SEWER @ 0.4%

INITIAL DEVELOPMENT  
AREA (1998 - 2000)  
(150 Acs.)

FROM WAIPAHU  
WWPS AND  
PEARL CITY WWPS

FROM EWA BEACH  
WWPS

**LEGEND**

8" — EXIST. GRAVITY SEWER

FM 10" — EXIST. SEWER FORCE MAIN

S — PROPOSED SEWER  
(ARROW INDICATES DIRECTION OF FLOW)

BARBERS POINT  
AVAL AIR STATION

**EXHIBIT A1-2**  
**EAST KAPOLEI**  
**SEWER MASTER PLAN**  
EWA, HONOLULU, OAHU, HAWAII

PREPARED BY  
CJ ENGINEERS  
DATE: 12/28/88

GRAY HAWAII, INC. AND ASSOCIATES, INC.

\*\*\*\*\* PIPECAP \*\*\*\*\*  
 \*\*\*\*\* Version 2.50 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: East Kapolei  
 User: GRAY HONG BILLS & ASSOCIATES  
 Date: 2/15/1996 Thursday  
 Time: 15:00:15  
 Output: EXHA13

MANNING n	SPAN in	RISE in	SLOPE ft/ft	JUST FULL		JUST FULL DISCHARGE AT	
				VELOCITY fps	DISCHARGE cfs	So-.001 cfs	So+.001 cfs
Circular							
.01300	63.00	63.00	.001000	4.33	93.80 (60.63 MGD)	.0	132.7
.01300	60.00	60.00	.001000	4.19	82.36 (53.24 MGD)	.0	116.5
.01300	54.00	54.00	.001000	3.91	62.19 (40.20 MGD)	.0	87.94
.01300	48.00	48.00	.001000	3.61	45.42 (29.36 MGD)	.0	64.24
.01300	42.00	42.00	.001000	3.31	31.82 (20.57 MGD)	.0	45.0
.01300	30.00	30.00	.004000	5.28	25.94 (16.77 MGD)	22.5	29.0
.01300	30.00	30.00	.003000	4.58	22.47 (14.52 MGD)	18.3	25.9
.01300	24.00	24.00	.004000	4.55	14.31 (9.25 MGD)	12.4	16.0
.01300	21.00	21.00	.004000	4.17	10.02 (6.48 MGD)	8.7	11.2
.01500	18.00	18.00	.007000	4.31	7.62 (4.93 MGD)	7.0	8.1
.01500	15.00	15.00	.005000	3.23	3.96 (2.56 MGD)	3.5	4.3

Exhibit A1-3 -- Interceptor Capacities

**APPENDIX 2**

**Proposed 42" Sewer Alignment within HECO 138 KV Easement**



Gray • Hong • Bills & Associates, Inc.  
CONSULTING ENGINEERS

Brian L. Gray, P.E.  
Daniel S. C. Hong, P.E.  
David B. Bills, P.E.  
Roy T. Aoki, P.E.  
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## MEMORANDUM

TO: Mr. Mike Angotti  
Mr. Harvey Goth  
Schuler Homes, Inc.

FROM: David B. Bills <sup>DB</sup>  
Gray, Hong, Bills & Associates, Inc.

SUBJECT: East Kapolei  
42-inch Sewer Interceptor

DATE: November 8, 1994

The preliminary trunk sewer report shows an interceptor extending from the makai side of the East Kapolei project to the corridor for the existing 30-inch interceptor which enters the Honouliuli Treatment Plant.

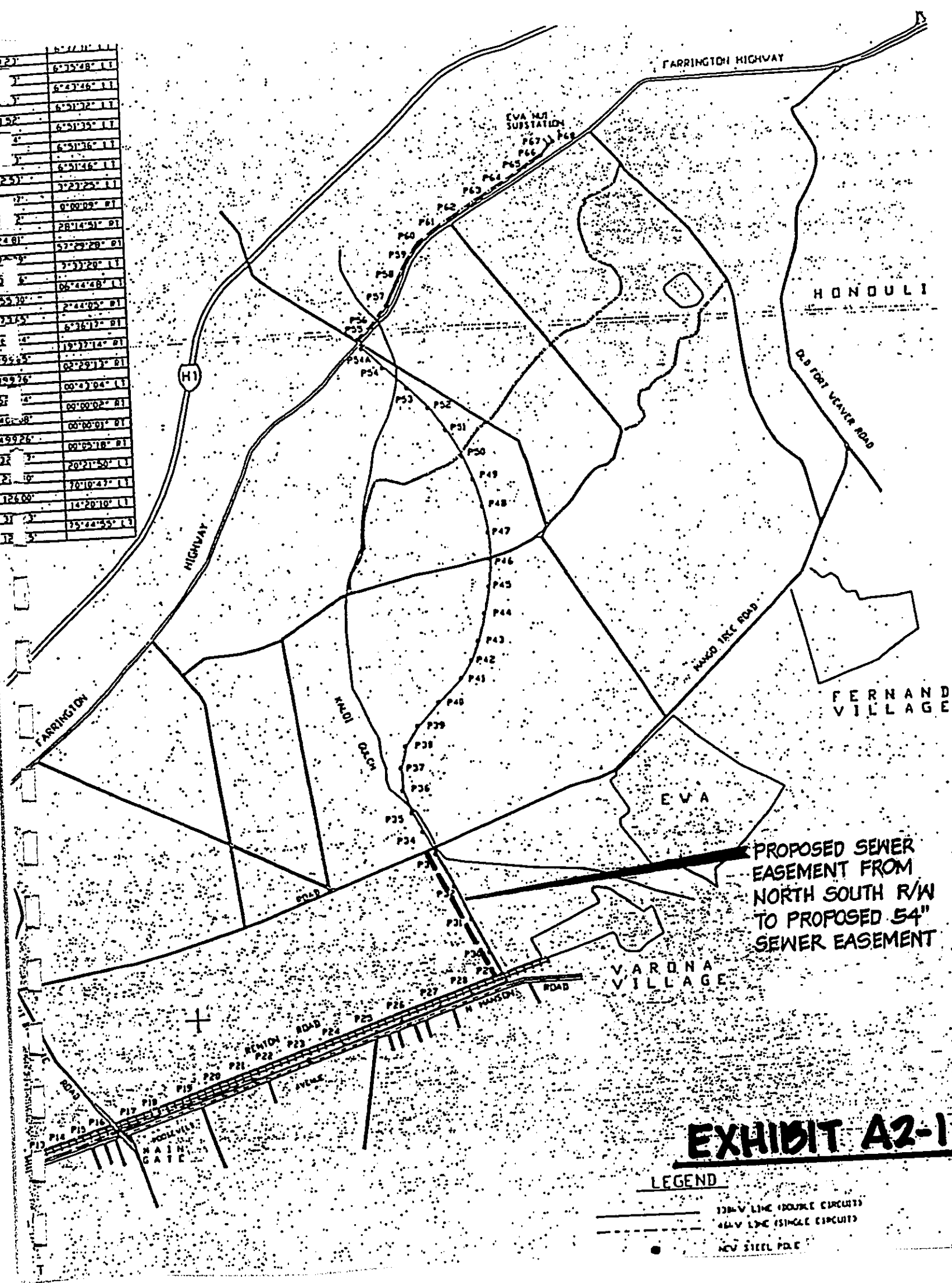
We are enclosing a more detailed alignment showing the proposed 42-inch interceptor being installed on the westerly boundary and within the 75-foot Hawaiian Electric easement. We have been informed that the Hawaiian Electric easement is not exclusive and this could be a reasonable location. The enclosed preliminary plan shows 42-inch interceptor from Pole 29 to Pole 33 of the new 138 kv line alignment. This proposed alignment would allow connection of sewer from the north/south road alignment to the Honouliuli sewer interceptor corridor. Pole 33 is approximately where the north/south corridor alignment starts to swing east and the sewer would be located outside the north/south roadway corridor.

Should you have any questions regarding this matter, please contact our office.

DB:am  
2479  
Encl. as above

cc: Ron Katahara - MK Engineers, Ltd.  
Bill Liu - Department of Wastewater Management

433.23	6°37'10" L I
43	6°35'48" L I
45	6°43'46" L I
49.52	6°51'32" L I
43	6°51'36" L I
45	6°51'46" L I
492.51	3°27'25" L I
54	0°00'09" R I
41	28°14'51" R I
124.81	52°29'28" R I
37	3°33'29" L I
23	06°44'48" L I
455.10	2°44'05" R I
32.45	6°36'13" R I
31	19°37'14" R I
784.65	02°29'13" R I
392.26	00°43'04" L I
57	00°00'02" R I
46	00°00'01" R I
499.26	00°05'18" R I
31	20°21'50" L I
21	70°10'43" L I
126.00	14°20'10" L I
31	35°44'55" L I
11	



PROPOSED SEWER  
EASEMENT FROM  
NORTH SOUTH R/W  
TO PROPOSED 54"  
SEWER EASEMENT

# EXHIBIT A2-1

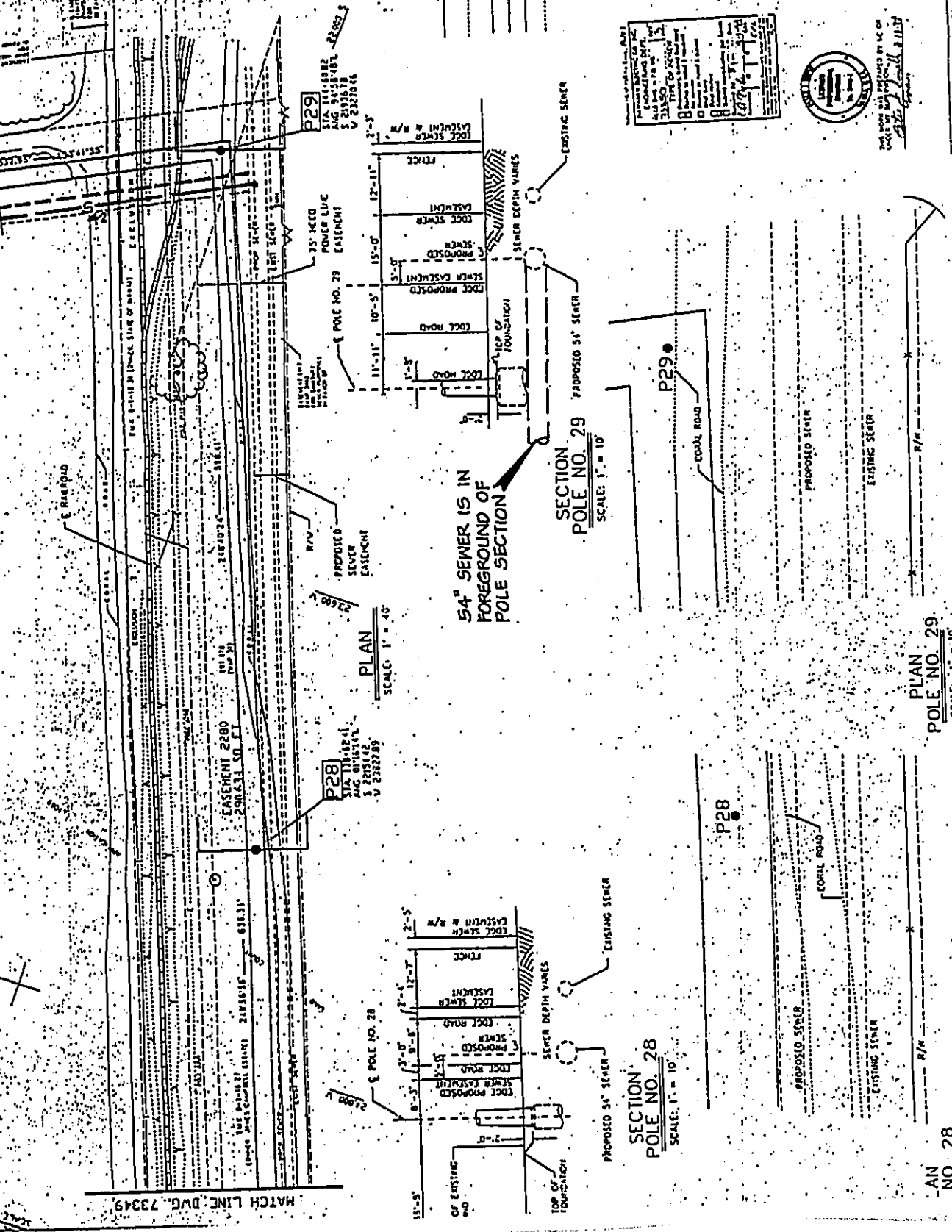
## LEGEND

- 330V LINE (DOUBLE CIRCUITS)
- 480V LINE (SINGLE CIRCUITS)
- NEW STEEL PIPE



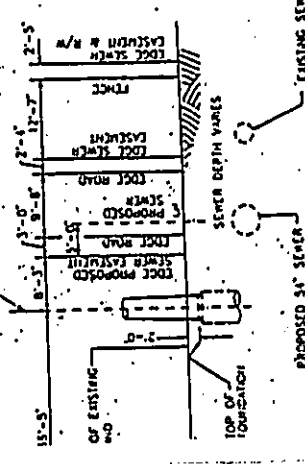
MATCH LINE DVG. 73351

MATCH LINE DVG. 73349



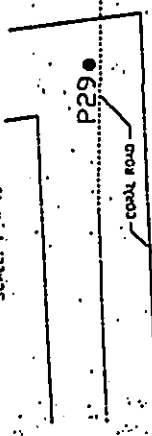
PLAN SCALE: 1" = 40'

PLAN SCALE: 1" = 40'



SECTION NO. 28 SCALE: 1" = 10'

SECTION NO. 29 SCALE: 1" = 10'



- LEGEND**
- EXISTING TELEPHONE LINE & POLE
  - EXISTING TRANSMISSION LINE & POLE
  - 138KV LINE
  - 48KV LINE
  - 138KV LINE
  - REMOVE LINE
  - NEW STEEL POLE
  - EXISTING STEEL POLE
  - REMOVE WOOD POLE
  - REMOVE EXISTING ANCHOR
  - NEW ANCHOR

**EXHIBIT A2-2**

NO.	REVISED ELEMENTS	DATE	BY	CHKD.
1	ISSUED FOR CONSTRUCTION			
2				
3				

MAIN - CIP 138KV LINE, 11 & 12 - PART I  
 PLANS & SECTIONS - P28 & P29  
 138KV OVERHEAD LINES

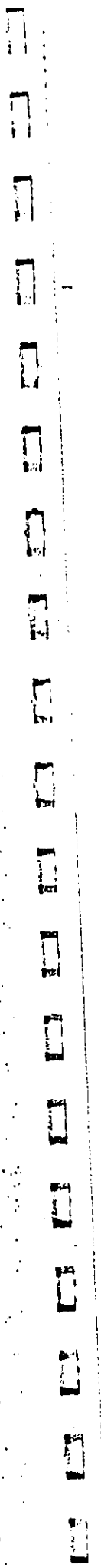
DATE: 11/11/11  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 PROJECT NO.: 73350



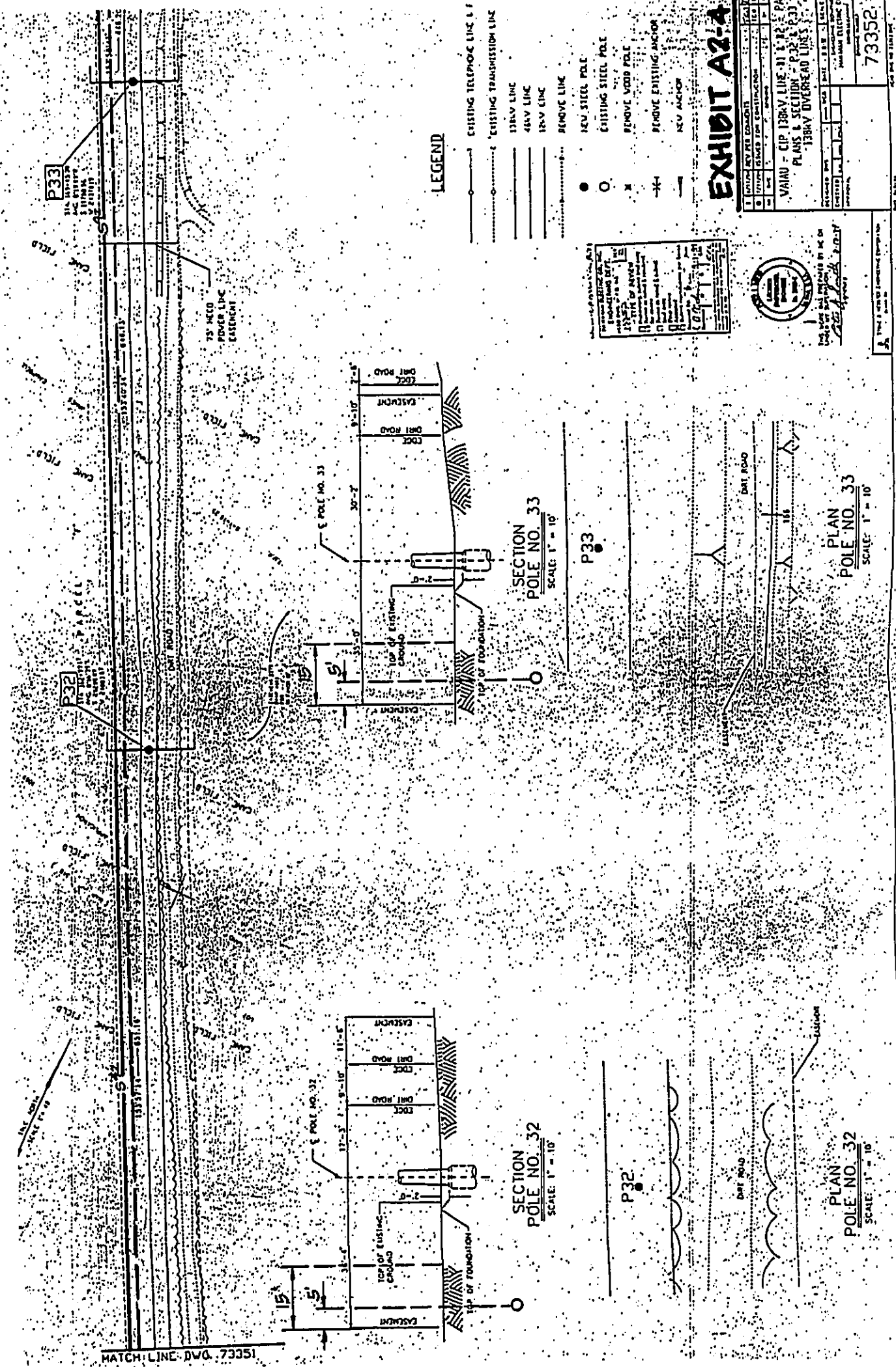
THIS DOCUMENT IS THE PROPERTY OF THE ENGINEERING FIRM. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE ENGINEERING FIRM.

PLAN NO. 29 SCALE: 1" = 10'

PLAN NO. 28 SCALE: 1" = 10'







**LEGEND**

- EXISTING TELEPHONE LINE 1-1
- EXISTING TRANSMISSION LINE
- 138KV LINE
- 44KV LINE
- 18KV LINE
- REMOVE LINE

- NEW STEEL POLE
- EXISTING STEEL POLE
- × REMOVE WOOD POLE
- ✱ REMOVE EXISTING ANCHOR
- NEW ANCHOR

**EXHIBIT A2-A**

NO.	DATE	BY	CHKD.	REVISION
1	1988			
2	1988			
3	1988			
4	1988			
5	1988			

VAIAD - CIP 138KV LINE - 31 & 32  
 PLANS & SECTION - P32 & P33  
 138KV OVERHEAD LINES

DATE: 1988  
 PROJECT NO.: 73352

SECTION  
POLE NO. 33  
SCALE: 1" = 10'

SECTION  
POLE NO. 32  
SCALE: 1" = 10'

PLAN  
POLE NO. 33  
SCALE: 1" = 10'

PLAN  
POLE NO. 32  
SCALE: 1" = 10'

MATCH LINE DWG. 73351

**Preliminary Sizing for Sewer Lines for**

**East Kapolei Project Alone**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Sewer Location		Tributary Area (Acres)		Tributary Equivalent Population						Was		
				Residential		Other		Total		Ave. WWF @ 80 GPCD (MGD)	Maximum Flow Factor	Maximum Flow (mgd)
				Incr.	Total	Incr.	Total	Incr.	Total			
District Zone or Street	Refer											
Sewer "C"	Area "A-2"	82.00	82.00	2,728	2,728	-	-	2,728	2,728	0.218	4.091	0.8
Sewer "AD-1"	1/2 Area "A-1"	330.00	330.00	11,036	11,036	-	-	11,036	11,036	0.883	3.093	2.73
Sewer "AC"	Areas "A-2" & 1/2 Area "A-1"	412.00	412.00	13,764	13,764	-	-	13,764	13,764	1.101	2.960	3.2
Sewer "ACD-1"	Areas "A-1", "A-2"	742.00	742.00	24,800	24,800	-	-	24,800	24,800	1.984	2.631	5.22
Sewer "ACD"	Areas "A-1", "A-2"	742.00	742.00	24,800	24,800	-	-	24,800	24,800	1.984	2.631	5.2
Sewer "A"	Areas "A-1", "A-2"	742.00	742.00	24,800	24,800	-	-	24,800	24,800	1.984	2.631	5.22

EXHIBIT A3-1 -- PEAK FLOW CALCULATION

Sewer Location		Tributary Area (Acres)		Tributary Equivalent Population						Wastewater Flow			
District Zone or Street	Refer	Incr.	Total	Residential		Other		Total		Ave. WWF @ 80 GPCD (MGD)	Maximum Flow Factor	Maximum Flow (mgd)	V In
				Incr.	Total	Incr.	Total	Incr.	Total				
Ko Olina Resort	1	600.00	600.00	39,549	39,549	-	-	39,549	39,549	3.164	2.395	7.58	
KBIP (JCIP)	2	850.00	850.00	-	-	72,515	72,515	72,515	72,515	5.801	2.123	12.31	
BP Deep Harbo	2	269.00	269.00	-	-	10,752	10,752	10,752	10,752	0.860	3.109	2.67	
Camp Malakole	2	65.00	65.00	2,588	2,588	-	-	2,588	2,588	0.207	4.134	0.86	
KBIP (Total)		1184.00	1184.00					2,588	2,588	0.207	4.134	0.86	
Makaiwa Hills	3	735.00	735.00	12,000	12,000	-	-	12,000	12,000	6.868	2.052	14.10	
Kapolei City	4	766.00	766.00	27,278	27,278	-	-	27,278	27,278	0.960	3.042	2.92	
Kapolei Knolls	5	75.00	75.00	2,000	2,000	-	-	2,000	2,000	2.182	2.581	5.63	
Kapolei Village	6	823.00	823.00	24,255	24,255	-	-	24,255	24,255	0.160	4.353	0.70	
Makakilo City	7	971.00	971.00	31,700	31,700	-	-	31,700	31,700	1.940	2.642	5.13	
ALL AREAS			5154.00		139,370			83,267	222,637	2.536	2.620	6.64	
East Kapolei Project alone		742.00	742.00	24,800	24,800	-	-	24,800	24,800	17.811	1.696	30.21	
ALL AREAS			5896.00		164,170			83,267	247,437	1.984	2.631	5.22	
										19.795	1.661	32.87	

Original Table III-1 prepared by Engineering Concepts, Inc.

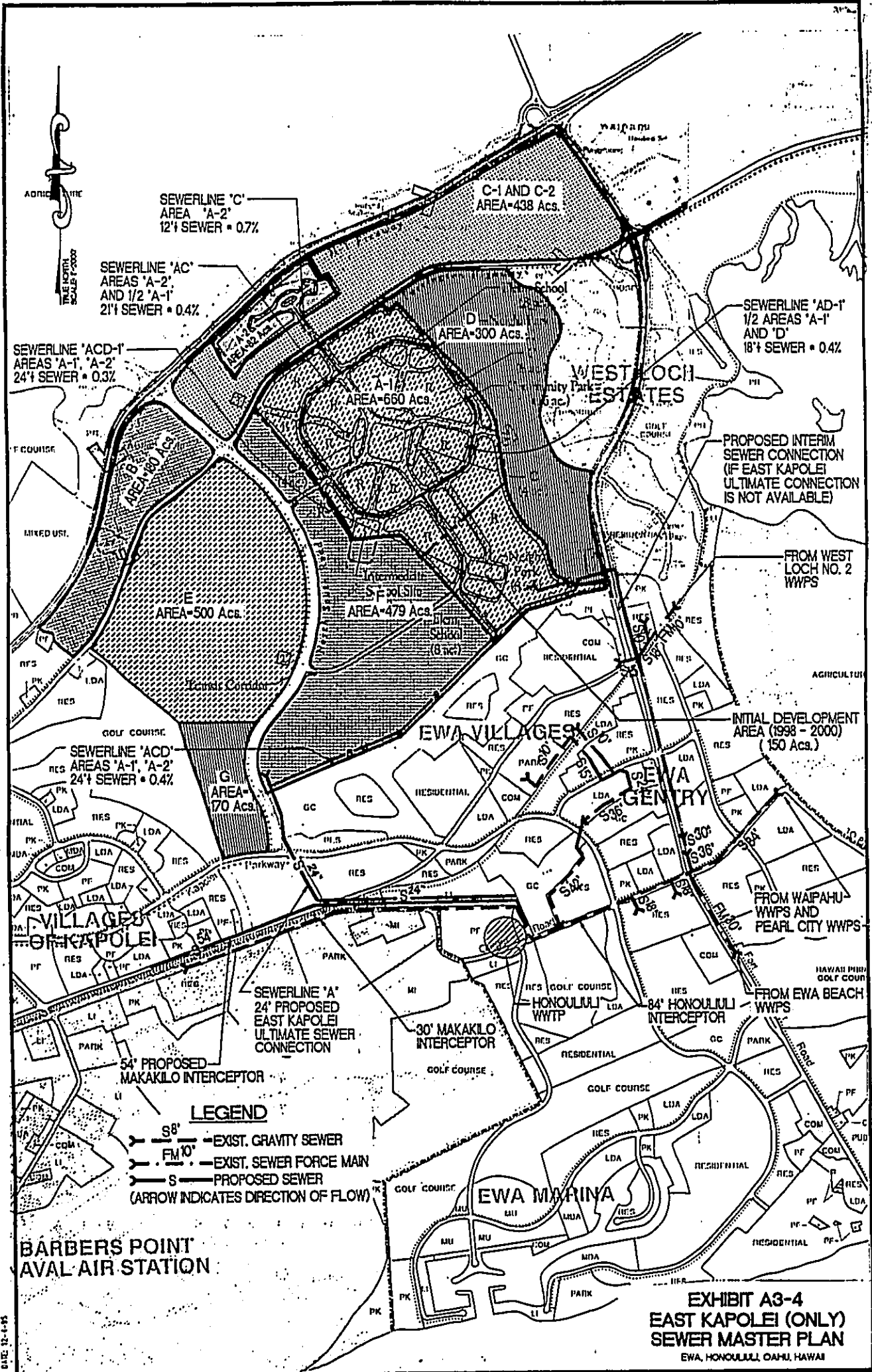
Included in "Engineering Report for the Regional Interceptor Sewer System for the Developments of the Estate of James Campbell in the Kapolei Area" dated December 1991.

EXHIBIT A3-2 -PROJECTED WASTEWATER  
REVISED TO ADD EAST KAPOLEI DEVELOPME

MANNING n	SPAN ft.	RISE ft.	SLOPE ft./ft.	VELOCITY fps	DISCHARGE cfs	So-.001 ft.	So+.001 ft.
Circular							
.01300	60.00	60.00	.001000	4.19	82.36 (53.24 MGD)	.0	116.5
.01300	54.00	54.00	.001000	3.91	62.19 (40.20 MGD)	.0	87.94
.01300	24.00	24.00	.003000	3.94	12.39 (8.01MGD)	10.1	14.3
.01300	21.00	21.00	.004000	4.17	10.02 (6.48 MGD)	8.7	11.2
.01500	18.00	18.00	.004000	3.26	5.76 (3.72 MGD)	5.0	6.4
.01500	12.00	12.00	.007000	3.29	2.58 (1.67 MGD)	2.4	2.8

Exhibit A3-3 -- Interceptor Capacities

SCALE  
1" = 1000'



BARBERS POINT  
AVAL AIR STATION

**EXHIBIT A3-4**  
**EAST KAPOLEI (ONLY)**  
**SEWER MASTER PLAN**  
EWA, HONOLULU, OAHU, HAWAII

DATE: 12-1-83



M

PRELIMINARY DRAINAGE STUDY, WEST LOCH DRAINAGE BASIN,  
EAST KAPOLEI PROJECT, DECEMBER 1, 1995

GRAY, HONG, BILLS & ASSOCIATES

**PRELIMINARY DRAINAGE STUDY**

**WEST LOCH DRAINAGE BASIN  
EAST KAPOLEI PROJECT**

**HONOULIULI, EWA, OAHU, HAWAII**

Prepared for

**SCHULER HOMES, INC.  
828 Fort Street, 4th Floor  
Honolulu, Hawaii 96813**

Prepared by

**GRAY, HONG, BILLS & ASSOCIATES, INC.  
119 Merchant Street, Suite 607  
Honolulu, Hawaii 96813**

Revised December 1, 1995

(Addendum Added April 18, 1996)

**TABLE OF CONTENTS**

1.	PROJECT DESCRIPTION .....	1
2.	EXISTING TOPOGRAPHY .....	1
3.	EXISTING DRAINAGE .....	1
	3.1 DRAINAGE PATTERN .....	1
	3.2 HYDROLOGY .....	2
4.	EXISTING CONSTRAINTS .....	3
5.	PROPOSED ONSITE DRAINAGE IMPROVEMENTS .....	3
	5.1 CANE HAUL ROAD .....	4
	5.2 MODIFICATION OF EXISTING DETENTION BASIN .....	4
	5.3 DEDICATION OF IMPROVEMENTS .....	5
6.	EWA BY GENTRY-EAST PHASE I PROJECT .....	5
7.	CONCLUSION AND RECOMMENDATIONS .....	7
8.	ADDENDUM .....	8

**LIST OF EXHIBITS**

Exhibit 1.	East Kapolei Project - Preliminary Concept Plan
Exhibit 2.	East Kapolei Drainage Map
Exhibit 3.	Ewa by Gentry-East Offsite Drainage Plan with Proposed East Kapolei Detention/Channel
Exhibit 4.	East Kapolei Channel Section "A-A" (Asing Park)
Exhibit 5.	East Kapolei Channel Section "B-B" (Asing Park)
Exhibit 6.	East Kapolei Preliminary Channel Profile (Asing Park)
Exhibit 7.	East Kapolei Pedestrian Overpass (Asing Park)
Exhibit 8.	East Kapolei Basin & Channel Plan (31 Ac. Site)
Exhibit 9.	East Kapolei Typical Channel Section (31 Ac. Site)
Exhibit 10.	East Kapolei Typical Channel Profile (31 Ac. Site)
Exhibit 11.	Campbell Estate Disclaimer

## **1. PROJECT DESCRIPTION**

The proposed East Kapolei Project by Schuler Homes, Inc. is located in Honouliuli, Ewa, Oahu (see Exhibit 1). The project site is between Ewa Villages and H-1 Freeway, west of Fort Weaver Road and east of the proposed North-South Road. The entire project covers a total of 794 acres of land, of which 52 acres is to be used for offsite infrastructures.

The proposed East Kapolei Project is a master-planned residential community of approximately 8,000 residential units. Neighborhood parks, elementary and intermediate schools, and small localized commercial areas are being proposed as part of the preliminary concept plan.

The purpose of this study is to summarize the various drainage patterns, constraints, concept drainage improvements and alternatives for the East Kapolei Project and adjacent tributary land. More detailed drainage studies and reports will be done as appropriate for the various stages of planning, land use process, zoning and design.

## **2. EXISTING TOPOGRAPHY**

The project site is located within the Ewa Plain of Leeward Oahu. The land was recently taken out of sugar cane production and is now fallow. The property is relatively flat with elevations ranging from 220 feet above mean sea level (M.S.L.) at the mauka boundary at H-1 to elevation 55 feet above M.S.L. at Fort Weaver Road. The surface of the site slopes mauka to makai at approximately 1.6%.

## **3. EXISTING DRAINAGE**

The East Kapolei Project is within the West Loch drainage basin. The entire West Loch drainage basin extends from below the H-1 Freeway to the shoreline, encompassing approximately 2.6 square miles and several different developments. The areas west of Fort Weaver Road and north of Ewa Villages (includes project site and EJC property) presently contribute relatively low flows because they remain undeveloped. However, upon development of these areas, storm runoff will be substantially increased.

### **3.1 DRAINAGE PATTERN**

Runoff from the upper limits of the drainage area flows from H-1 Freeway, across Farrington Highway, through the project site and to the northeast Ewa Village boundary. Storm runoff then flows either along the cane haul road, which crosses under Fort Weaver Road, or over Fort Weaver Road in the vicinity just mauka of the Elderly Housing project.

The existing cane haul road is within easement "2680" on the future Asing Park site owned by the City and County of Honolulu, Department of Housing and Community Development (DHCD) (TMK: 9-1-17:66). Although Oahu Sugar Company has an easement for the cane haul road, the easement will probably be terminated since the Oahu Sugar Company is being dissolved. The cane haul road runs from the project site to the existing detention basin. Any runoff collected by the road ponds at the low-point at the underpass until it is forced out toward the basin.

Storm runoff from the Elderly Housing site, a portion of the Ewa Villages site (via two 54" pipe culverts under Fort Weaver Road), the East Kapolei project site, and Campbell Estate land flows into an existing siltation/detention basin. This basin was built within TMK: 9-1-10: por. 2 just southeast of the West Loch subdivision in conjunction with the West Loch Estates project. Overflow from the basin sheet-flows toward the West Loch basin of Pearl Harbor.

### 3.2 HYDROLOGY

The drainage basin and storm runoff flows for the project area were analyzed in this study using aerial contour maps, the Ewa District Runoff Map (revised July 9, 1993) prepared by Engineering Concepts, Inc. and the "Drainage Report for Ewa by Gentry-East Phase 1" May 1995, prepared by Park Engineering. The drainage map for the West Loch drainage basin is shown as Exhibit 2.

The Park Engineering report shows a total drainage basin area of 1,607 acres. As discussed in the Park Engineering report, for purposes of hydrologic analysis, land belonging to the City and County, Estate of James Campbell, and the State of Hawaii was considered as one watershed, the other two watersheds being the Gentry and Navy lands. In the report an average discharge per acre was computed by dividing the peak discharge by the total drainage area. This was used to determine peak discharges for each landowner. The peak discharge per acre for the City & County/State/Campbell watershed, based on the SCS method, was 2.98 cfs/acre. Using Plate 6, the peak discharge per acre was 2.67 cfs/acre.

Our analysis indicates that the West Loch drainage basin is roughly 1,684 acres -- 5% larger than estimated by the Park Engineering report. The 77 acre increase is accounted for in a revision of the western boundary of the State/Campbell tributary area (referred to in this report as "East Kapolei/Campbell Estate").

Table 1 compares storm runoff values applying the SCS Method and the Storm Drainage Standards of the City and County of Honolulu, Plate 6, "Design Curves for Peak Discharge Versus Drainage Area for More Than 100 Acres." The SCS peak discharge values for the City and County, East Kapolei and Campbell tributary areas were based on the 2.98 cfs/acre average discharge per acre developed by Park Engineering discussed above and will need to be verified during design based on the larger tributary area. The Plate 6 peak discharge values are based on a total flow of 3,000 cfs for a 1,116 acre watershed (City and East Kapolei/Campbell Estate), averaging 2.69 cfs/acre.

	DRAINAGE AREA (Acres)		SCS PEAK DISCHARGE (cfs)		PLATE 6 PEAK DISCHARGE (cfs)	
	Incr.	Cumulative	Incr.	Cumulative	Incr.	Cumulative
Between H-1 & Farrington	160	160	477	477	430	430
East Kapolei & Campbell Estate west of Fort Weaver	760	920	2,268	2,745	2,044	2,474
Ewa Villages (City & County)	75	995	224	2,969	202	2,676
Elderly Housing (City & County)	90	1,085	269	3,238	241	2,917
East Kapolei (east of Fort Weaver)	31	1,116	92	3,330	83	3,000
Gentry	245	1,361	965	4,295	965	3,965
U.S. Navy	323	1,684	835	5,130	1,180	5,145
Total	1,684	--	5,130	--	5,145	--

Table 1. Summary of Drainage Area and Peak Discharge

#### **4. EXISTING CONSTRAINTS**

Existing constraints that affect the regional drainage for the West Loch basin are:

1. Inadequate drainage improvements under existing Fort Weaver Road.
2. An inadequate drainage culvert through the Elderly Housing project.
3. An unimproved seaward terminus of the West Loch basin.

#### **5. PROPOSED ONSITE DRAINAGE IMPROVEMENTS**

Within the proposed development, drainage improvements are to include catch basins, underground drain lines, culverts and channels. All improvements would be designed in accordance with applicable drainage standards of the City and County of Honolulu.

## 5.1 CANE HAUL ROAD

In order for runoff from the project site to reach the detention basin, water from the area must either be channelized along the existing cane haul road through the future park; or must pass through the Ewa Village Golf Course, under Fort Weaver Road and through the Elderly Housing Development. The option of passing through the Elderly Housing Development would involve upgrading the culvert crossing at Fort Weaver Road and constructing an additional drain line between existing buildings in the Elderly Housing. Should the earlier projects have included this work within their scope, it is estimated that construction of this latter option would have cost roughly \$2-\$3 million. However, due to the difficulties, expense, and undesirable disruption associated with this option, it is proposed that improvements be made along the cane haul road at a cost between \$5-\$6 million.

It is proposed that a reinforced concrete rectangular channel sized to carry the 100-year peak flow will continue from the project's southeast boundary, under Fort Weaver Road and then along the existing cane haul road (known as Balfour Boulevard). Balfour Boulevard runs within an easement in the future Asing park. A six-foot high chain link fence will be installed on both walls and the ground alongside the channel will be graded to drain toward the channel (see Exhibits 4 & 5). A preliminary channel profile is shown on Exhibit 6.

A pedestrian overpass linking the West Loch Subdivision Phase 2 to the park is proposed as shown on Exhibit 7. Without the overpass, access from West Loch subdivision to the park is not possible due to elevation differences averaging 7' to 20' between the cane haul road and the ground on either side.

## 5.2 MODIFICATION OF EXISTING DETENTION BASIN

A box culvert will be constructed under the O.R. & L. Co. right-of-way to connect the channel to the existing detention basin. The existing basin will be modified, creating an unlined channel from the existing basin to the proposed Ewa by Gentry-East basin (see Exhibits 3 & 8). The channel will be trapezoidal with 2:1 (H:V) side slopes, approximately 950 feet long and with an 80-foot wide base (see Exhibit 9). The channel will serve to convey the runoff from the existing basin to the new basin as well as to provide additional storage. The basin and channel will provide approximately 35 acre-feet of storage, which, when combined with the Gentry basin will meet 2-year 24-hour detention requirements. The actual storage requirement is being coordinated with Park Engineering in conjunction with the Gentry improvements.

The hydraulic grade line (HGL) was approximated using the slope-area method. Weir flow was assumed at the Gentry overflow structure. Sections were taken through the Gentry channel and the East Kapolei channel. Assuming uniform flow, the rise in the HGL would be insignificant, roughly 0.4 feet from the overflow structure (19.4 ft. M.S.L.) to the existing basin on the 31-acre parcel (19.8 ft. M.S.L.) With a channel slope of 0.2%, velocity within the channel will be less than 3 feet per second (see Exhibit 10).

The Ewa by Gentry-East Phase I detention basin includes a berm with top elevation at 20.0 ft. M.S.L. along a portion of the O. R. & L. boundary. It is proposed that the berm be extended through the 31-acre parcel to provide at least 1 foot freeboard above the HGL.

The berm serves mainly to prevent flood waters from inundating the existing O. R. & L. Co. right-of-way, by confining water to the Campbell property. It also serves to protect two low-lying areas within the West Loch Subdivision. The sewage pump station, with a finished floor elevation of 16.3, is below the ultimate HGL (19.4 ft. M.S.L.). Several lots along the cul-de-sac at Road "H" have finished pad elevations ranging from elevation 18.5 to 20.0. The buildings, however, have adequate freeboard above the ultimate HGL, with finished floor elevations at approximately 20.6. The berm will serve to provide an extra degree of protection for this area (see Exhibit 8).

### **5.3 DEDICATION OF IMPROVEMENTS**

It is proposed that the entire storm drainage system from H-1 to the Ewa by Gentry-East detention basin be constructed to meet City and County of Honolulu, Department of Public Works standards and be dedicated to the City. Dedication of the entire system is important since it is unlikely that the FHA will agree to insure mortgages for projects in which a private drainage system handles offsite storm drainage.

The channel within the existing easement within the future Asing Park would be dedicated to the City and County of Honolulu and would come under the jurisdiction of the Department of Public Works for maintenance. The pedestrian overpass would also be under the jurisdiction of the City and County of Honolulu.

It is proposed that the 31-acre parcel, with the channel, berm and basin improvements, be dedicated to the City and County of Honolulu. Approximately 40% of the 31-acre site is above the ultimate HGL and is, therefore, usable for development.

## **6. EWA BY GENTRY-EAST PHASE I PROJECT**

The Ewa by Gentry-East Phase I project is proposing to construct a drainage channel and a detention basin with an outlet near the wildlife refuge (See Exhibit 3). The "Drainage Report for the Ewa by Gentry-East Phase I Offsite Drainage Plan" (approved May 25, 1995 by the Department of Public Works) prepared by Park Engineering indicates that the detention basin was designed to include storm runoff, under developed conditions, from tributary areas including the Gentry-East Phase I development, the City and County of Honolulu, the U.S. Navy, and land presently owned by the Estate of James Campbell and the State of Hawaii. The East Kapolei project comprises the State of Hawaii land and a portion of the Estate of James Campbell land. This area will be referred to as East Kapolei/Campbell Estate in the following discussion.

The proposed improvements consist of an unlined channel leading from the Gentry project to an unlined detention basin. The detention basin has outlet works consisting of 3-24" orifices and an emergency spillway. The drainage plan assumed that the existing siltation/detention basin on the 31-acre site was to remain. Runoff from the basin would sheet-flow into the new siltation/detention basin.



The original design of the detention basin was developed for "interim" and "ultimate" conditions. It was assumed that the existing restriction, i.e., either the Fort Weaver Road/Elderly Housing culverts or the Fort Weaver Road underpass, would need to be upgraded to convey the "ultimate" drainage west of Fort Weaver to West Loch, as originally masterplanned. The "interim" condition refers to the area before drainage restrictions are removed.

Schuler Homes is now negotiating a cost-sharing agreement with Gentry for the construction of the detention basin to meet requirements for ultimate development of the watershed. The channel and detention basin will provide a 2-year 24-hour storage volume of approximately 195 acre-feet at a maximum stage of 15.0 feet M.S.L. Any additional storage required for the East Kapolei project will be provided by Schuler Homes on the adjacent 31-acre parcel. This is discussed in Section 5.2. The outlet works will be constructed with a width of 200 feet and height of 15.0 feet M.S.L.

We are in the process of coordinating with Park Engineering to identify final design parameters. A preliminary comparison of drainage area, peak discharge and storage requirements are summarized below in Tables 2, 3, and 4.

Drainage Basin	Area (Acres)	
	Interim Conditions	Ultimate Conditions
East Kapolei/Campbell Estate	31	951
City & County of Honolulu	165	165
Gentry	245	245
U.S. Navy	323	323
Totals	764	1,684

Table 2. Comparison of Drainage Areas Under Interim & Ultimate Conditions

Drainage Basin	Area (Acres)		Composite SCS Peak Discharge(cfs)	
	Incr.	Cumulative	2-year	100-year
East Kapolei/Campbell Estate	951	951	776	2,837
City & County of Honolulu	165	1,116	132	493
Gentry	245	1,361	280	965
U.S. Navy	323	1,684	100	835
Totals	1,684	--	1,288	5,130

Table 3. Composite Peak Discharge

Storm Frequency	Ultimate Conditions			
	Peak Inflow (cfs)	Peak Outflow (cfs)	Max Stage (ft. M.S.L.)	Storage (ac.-ft.)
2-Year	1,288	150	15	195
100-Year	5,127		19.4	287

Table 4. Detention Basin Characteristics

## 7. CONCLUSION AND RECOMMENDATIONS

Existing drainage master plans indicate that storm runoff from the project site and adjacent Campbell lands within the West Loch drainage basin eventually discharges into West Loch near the existing detention basin. There are presently no defined drainage ways to convey storm runoff from the project site to the West Loch shoreline. This project proposes to construct a channel/culvert from the project boundary to the Fort Weaver Road underpass. A concrete-lined rectangular channel is to be built within the existing cane haul road to the existing detention basin. A pedestrian overpass will be constructed from the Asing Park to the West Loch subdivision.

The existing detention basin will be modified to accommodate the transmission of the runoff from the East Kapolei project, Estate of James Campbell and City and County of Honolulu land, to the Gentry detention basin and outlet. A grassed trapezoidal channel will be excavated from the existing basin to the Gentry basin. The channel and basin will provide approximately 35 acre-feet of storage, which, when combined with the Gentry basin, will meet 2-year 24-hour detention requirements. A berm will be constructed 10 feet from the existing O. R. & L. Co. right-of-way to protect adjacent low-lying areas within the West Loch subdivision.

It is proposed that all drainage improvements and the pedestrian overpass be built to City and County of Honolulu standards and be dedicated to the City.

## **8. ADDENDUM**

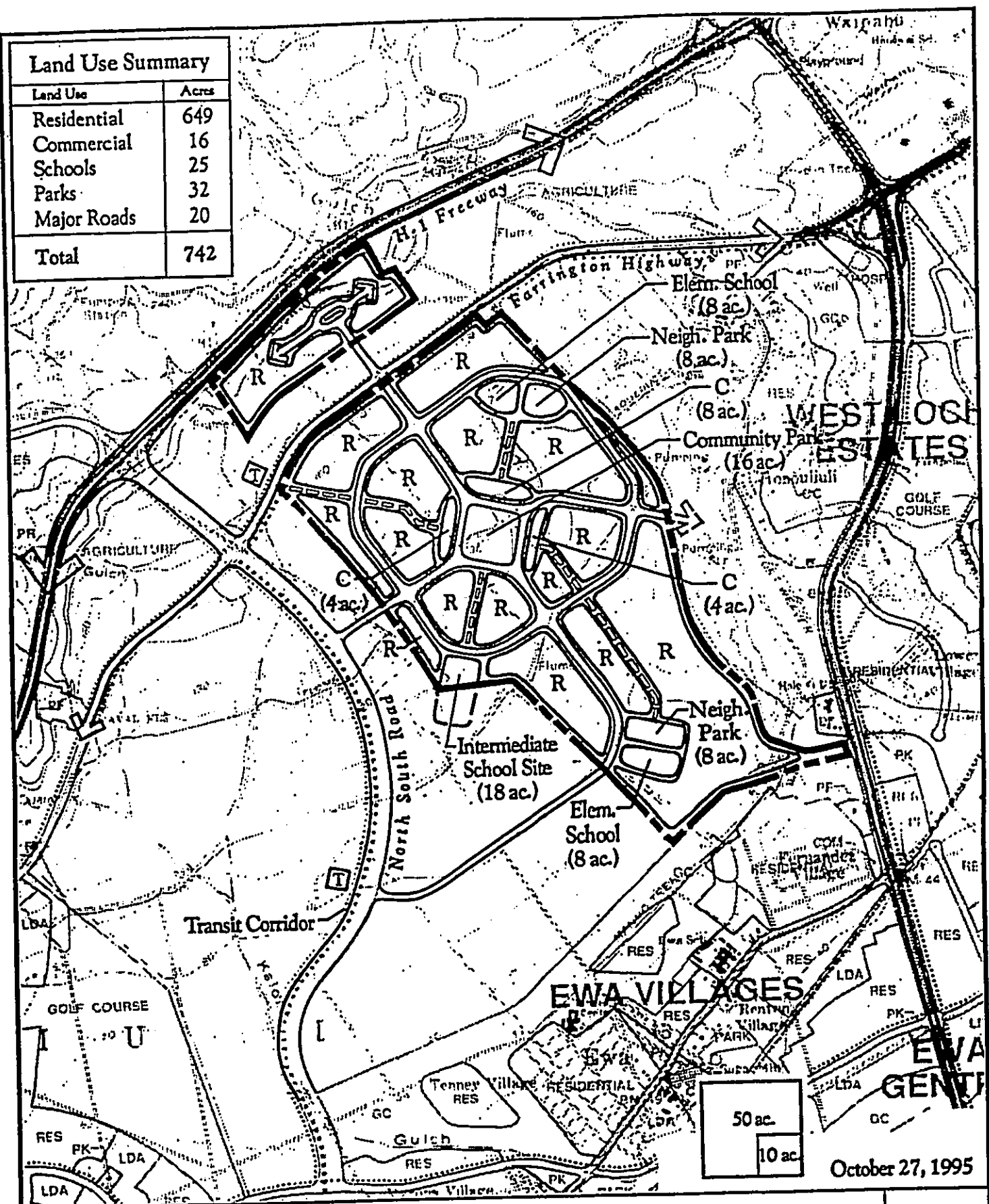
The drainage study herein contained dated December 1, 1995 estimated that the West Loch watershed was 1,684 acres, approximately 77 acres larger than included in the *Drainage Report for Ewa by Gentry-East, Phase 1* (Park Engineering, 1995). Based on the increased drainage area and corresponding increase in runoff, it was estimated that the hydraulic grade line (HGL) at the overflow would increase by 1 foot, to elevation 19.4 MSL. The project proposal included modification of the existing detention basin within the 31-acre site and excavation of a grassed trapezoidal channel from the existing basin to the Gentry basin, providing roughly 35-acre feet of storage. The proposed improvements, in combination with the Gentry detention basin, were to provide the required 2-year 24-hour detention.

Section 3.1 of the drainage study describes the existing drainage pattern, stating that any runoff collected by the cane haul road ponds at the low-point until it is forced out toward the basin. Based on current research, runoff which falls onto the road will flow through an existing inlet structure at the low-point and then into the West Loch Fairways drainage system.

We are currently working with Park Engineering to confirm the limits of the watershed and the HGL. Based on current negotiations between Schuler Homes, Inc. and Gentry, a joint detention basin will be constructed to accommodate the runoff from the total West Loch watershed. Additional storage will be provided within the 31-acre site, which when combined with the proposed Gentry detention basin will accommodate the total runoff. The berm proposed by Gentry for protection of the Wildlife Refuge and the berm proposed in the 31-acre parcel will have 1-foot minimum freeboard above the HGL. The portion of the 31-acre site used for the drainage improvements will be dedicated to the City and County of Honolulu.

The drainage study will be revised at a later date to reflect the final improvements.

Land Use Summary	
Land Use	Acres
Residential	649
Commercial	16
Schools	25
Parks	32
Major Roads	20
<b>Total</b>	<b>742</b>



**Preliminary Concept Plan**  
**EAST KAPOLEI PROJECT**  
 Schuler Homes, Inc.

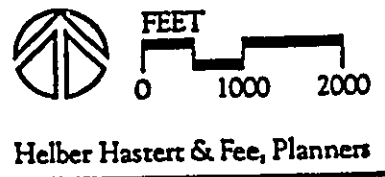
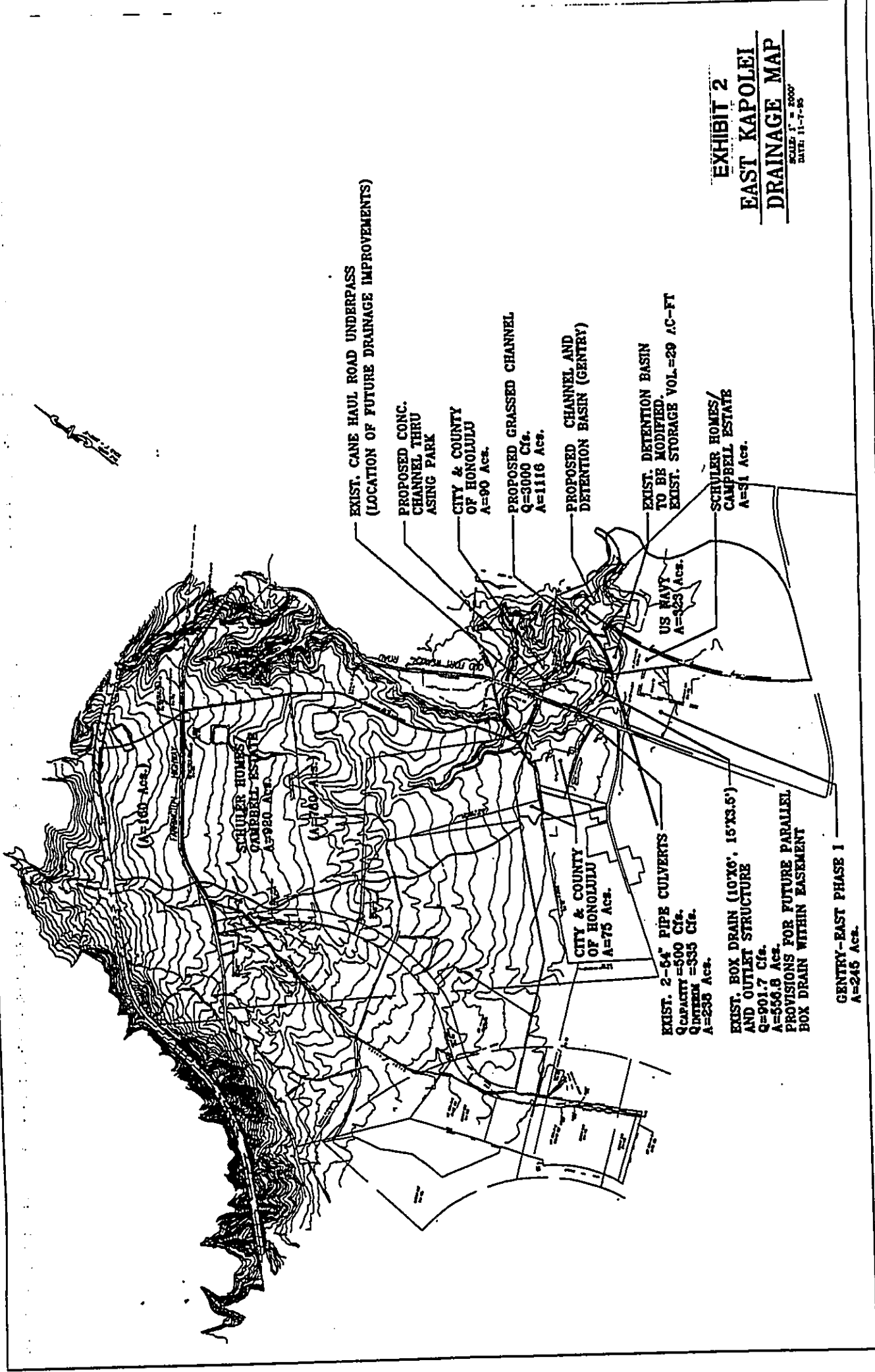


EXHIBIT  
**1**

Helber Hastert & Fee, Planners



**EXHIBIT 2**  
**EAST KAPOLEI**  
**DRAINAGE MAP**  
SCALE: 1" = 200'  
DATE: 11-7-85

EXIST. CANE HAUL ROAD UNDERPASS  
 (LOCATION OF FUTURE DRAINAGE IMPROVEMENTS)

PROPOSED CONC.  
 CHANNEL THRU  
 ASING PARK

CITY & COUNTY  
 OF HONOLULU  
 A=90 Acs.

PROPOSED GRASSED CHANNEL  
 Q=3000 Cfs.  
 A=1116 Acs.

PROPOSED CHANNEL AND  
 DETENTION BASIN (GENTRY)

EXIST. DETENTION BASIN  
 TO BE MODIFIED.  
 EXIST. STORAGE VOL.=29 AC-FT

SCRIVER HOMES/  
 CAMPBELL ESTATE  
 A=91 Acs.

US NAVY  
 A=423 Acs.

SCRIVER HOMES/  
 CAMPBELL ESTATE  
 A=920 Acs.

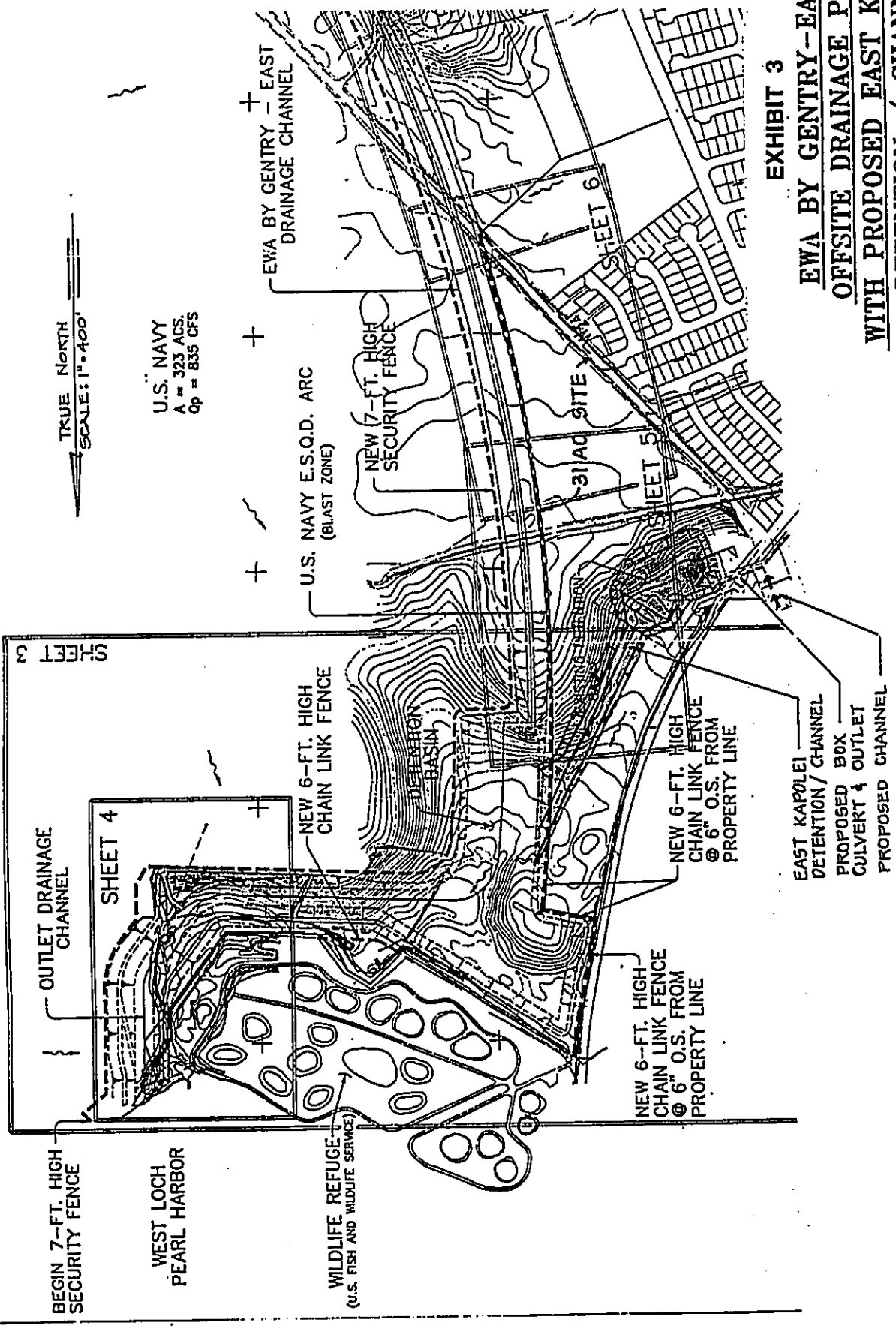
CITY & COUNTY  
 OF HONOLULU  
 A=75 Acs.

EXIST. 2-64" PIPE CULVERTS  
 CAPACITY=500 Cfs.  
 Q DESIGN=335 Cfs.  
 A=238 Acs.

EXIST. BOX DRAIN (10'X6', 15'X3.5')  
 AND OUTLET STRUCTURE  
 Q=901.7 Cfs.  
 A=556.6 Acs.  
 PROVISIONS FOR FUTURE PARALLEL  
 BOX DRAIN WITHIN EASEMENT

GENTRY-EAST PHASE 1  
 A=245 Acs.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



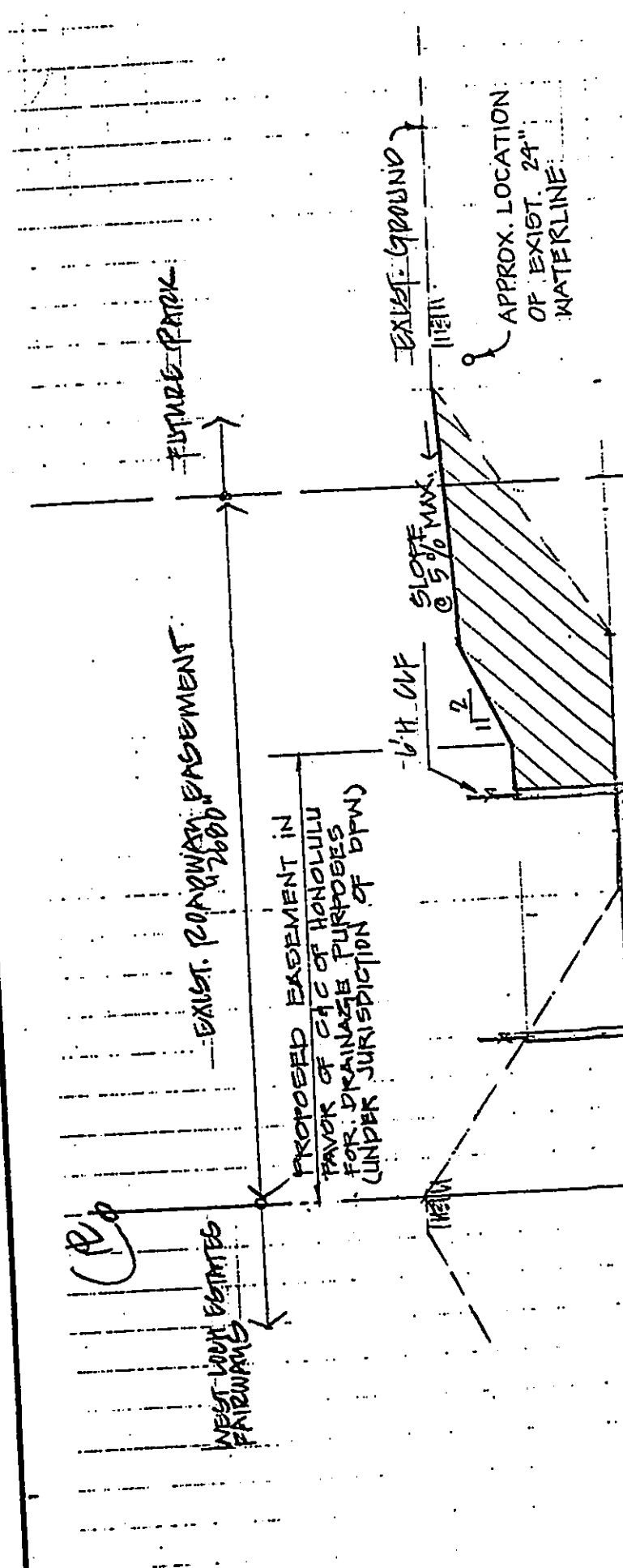
TRUE NORTH  
SCALE: 1" = 400'

U.S. NAVY  
A = 323 ACS  
Op = 835 CFS

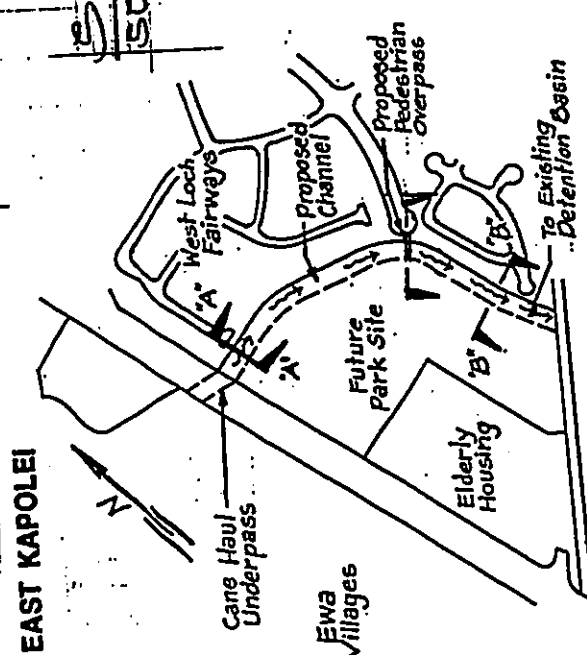
EXHIBIT 3

EWA BY GENTRY-EAST  
OFFSITE DRAINAGE PLAN  
WITH PROPOSED EAST KAPOLEI  
DETENTION / CHANNEL

4/1/14



SECTION "A-A"  
SCALE: 1" = 20'



LOCATION MAP  
Scale: 1" = 1000'

**EXHIBIT 4**  
**EAST KAPOLEI**  
**CHANNEL SECTION "A-A"**  
**(ASING PARK)**

PROPOSED EASEMENT IN FAVOR  
OF C.A.C. OF HONOLULU FOR  
DRAINAGE PURPOSES  
(UNDER JURISDICTION OF DPM)

EXIST  
EASEMENT  
LINE

FINISH  
GRADE  
11'  
@ 5.7% MAX.

APPROX.  
EXIST. GRD.

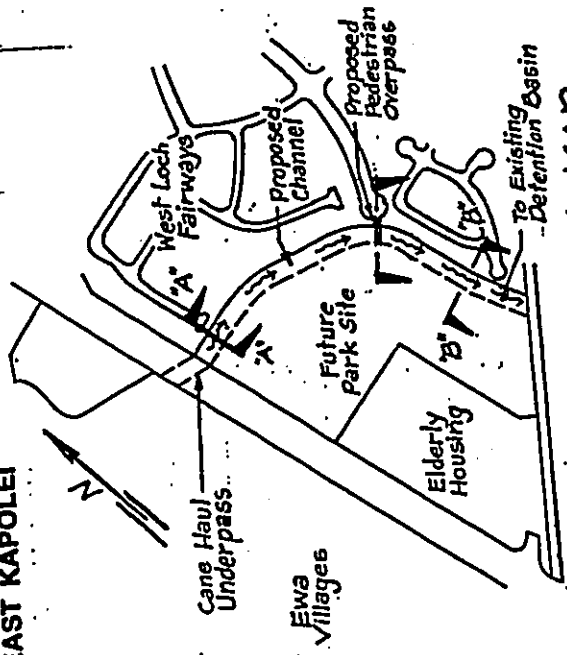
APPROX. LOCATION OF  
EXIST. 24" IRRIG.  
WATERLINE

PROPOSED  
CHANNEL

SECTION "B-B"

Scale: 1" = 20'

EAST KAPOLEI



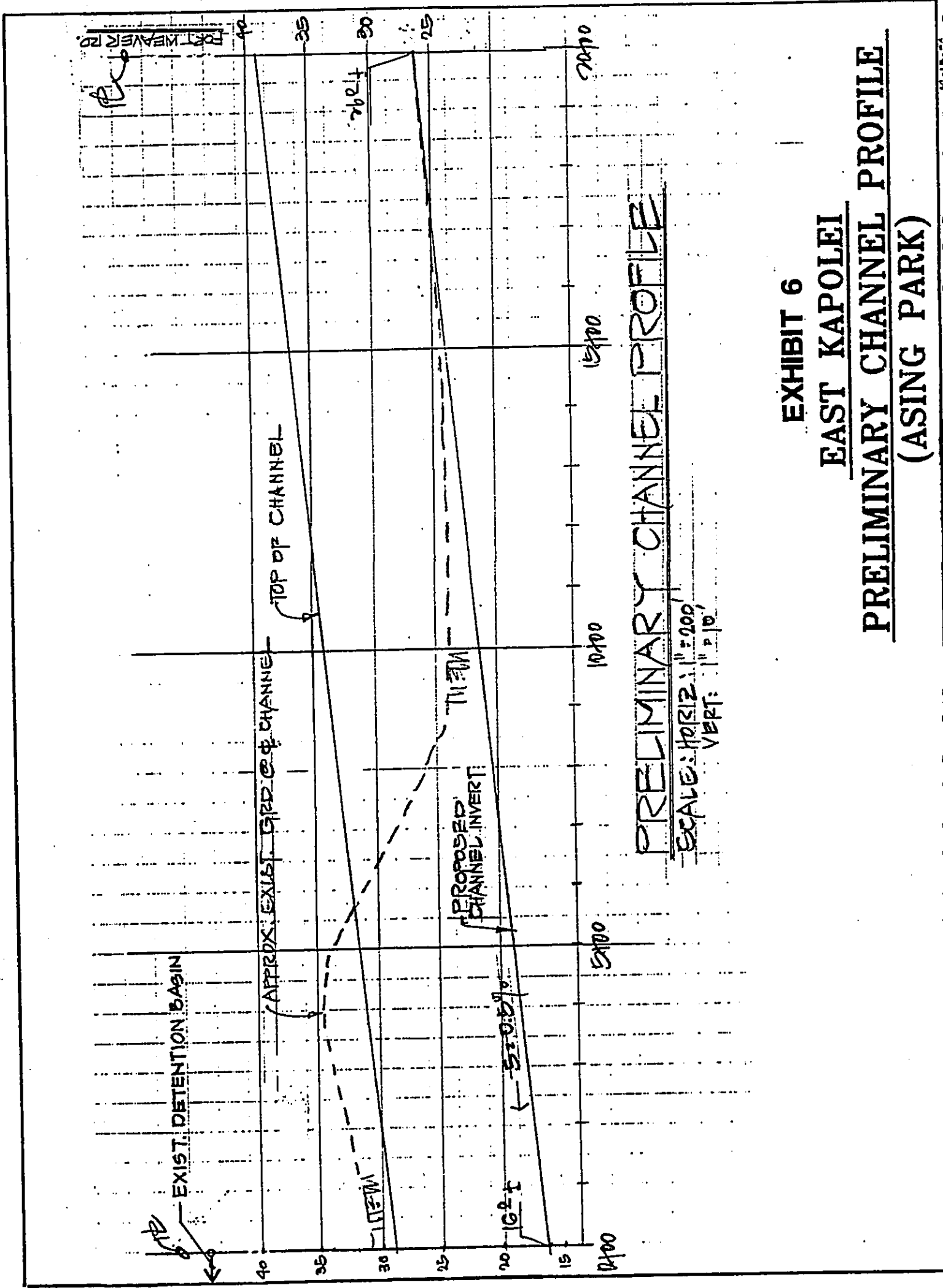
LOCATION MAP

Scale: 1" = 1000'

**EXHIBIT 5**  
**EAST KAPOLEI**  
**CHANNEL SECTION "B-B"**  
**(ASING PARK)**

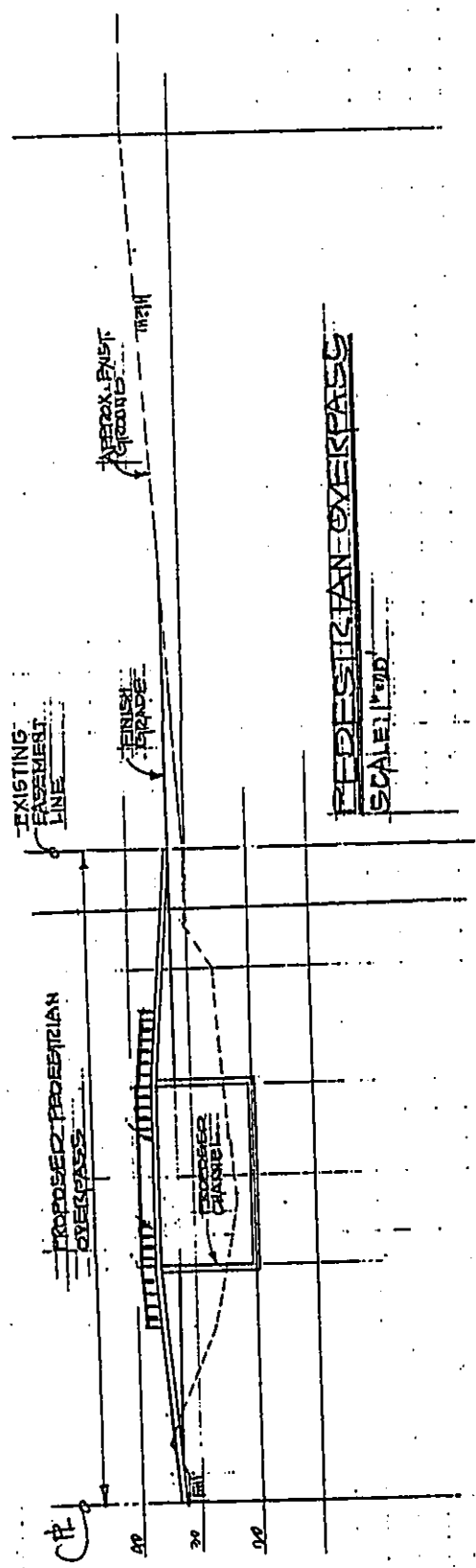
11/1/05



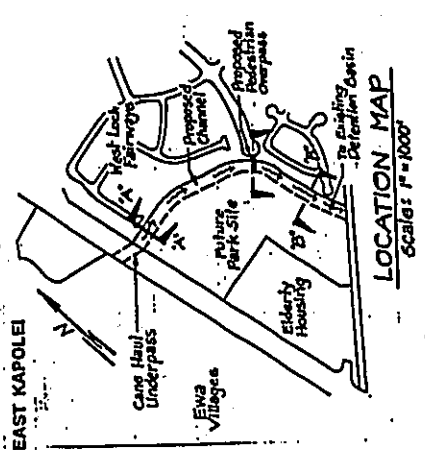


**EXHIBIT 6**  
**EAST KAPOLEI**  
**PRELIMINARY CHANNEL PROFILE**  
**(ASING PARK)**

**EXHIBIT 7**  
**EAST KAPOLEI**  
**PEDESTRIAN OVERPASS**  
**(ASING PARK)**



**PEDESTRIAN OVERPASS**  
**SCALE: 1" = 20'**



**LOCATION MAP**  
**SCALE: 1" = 1000'**

11-15-74



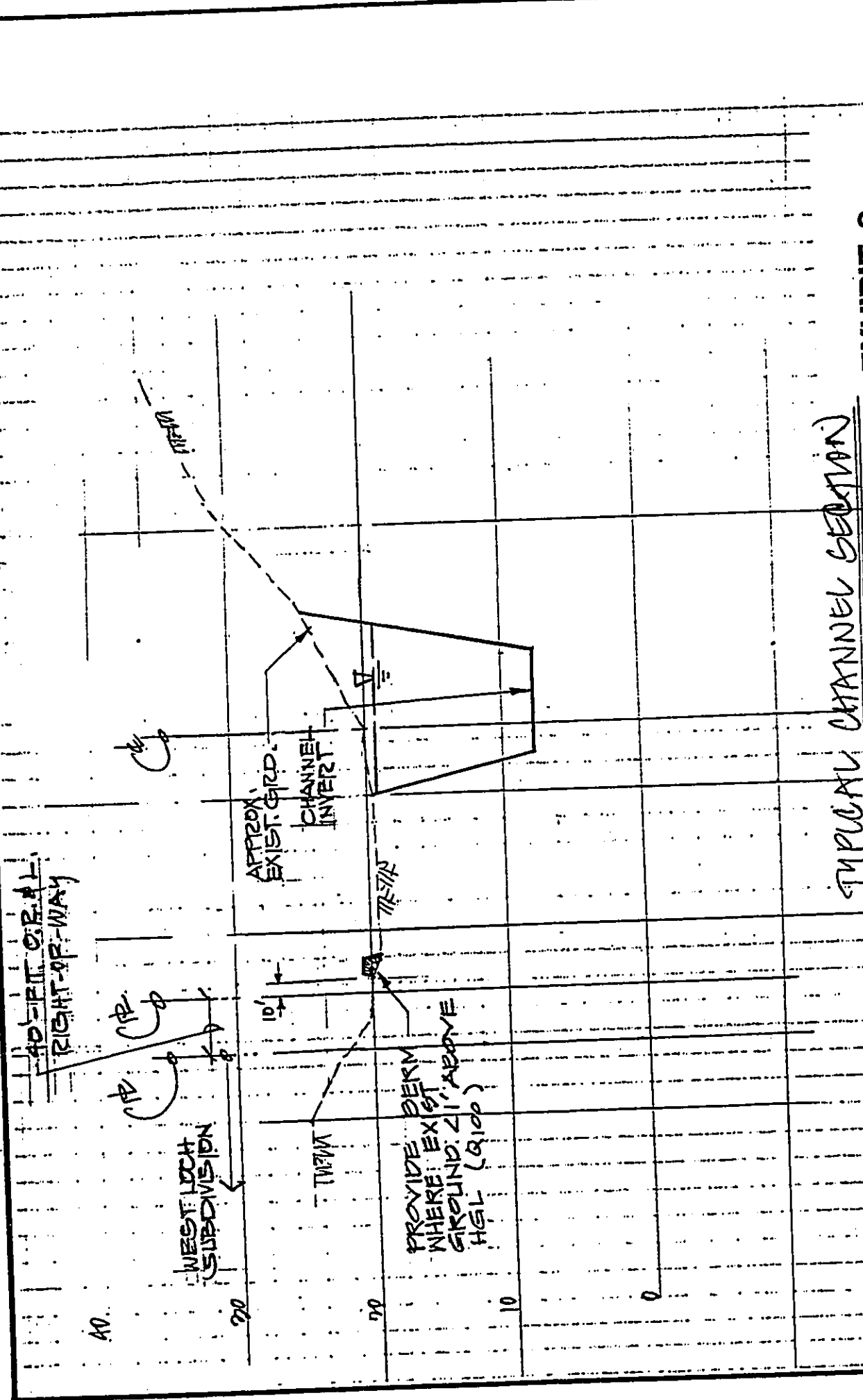
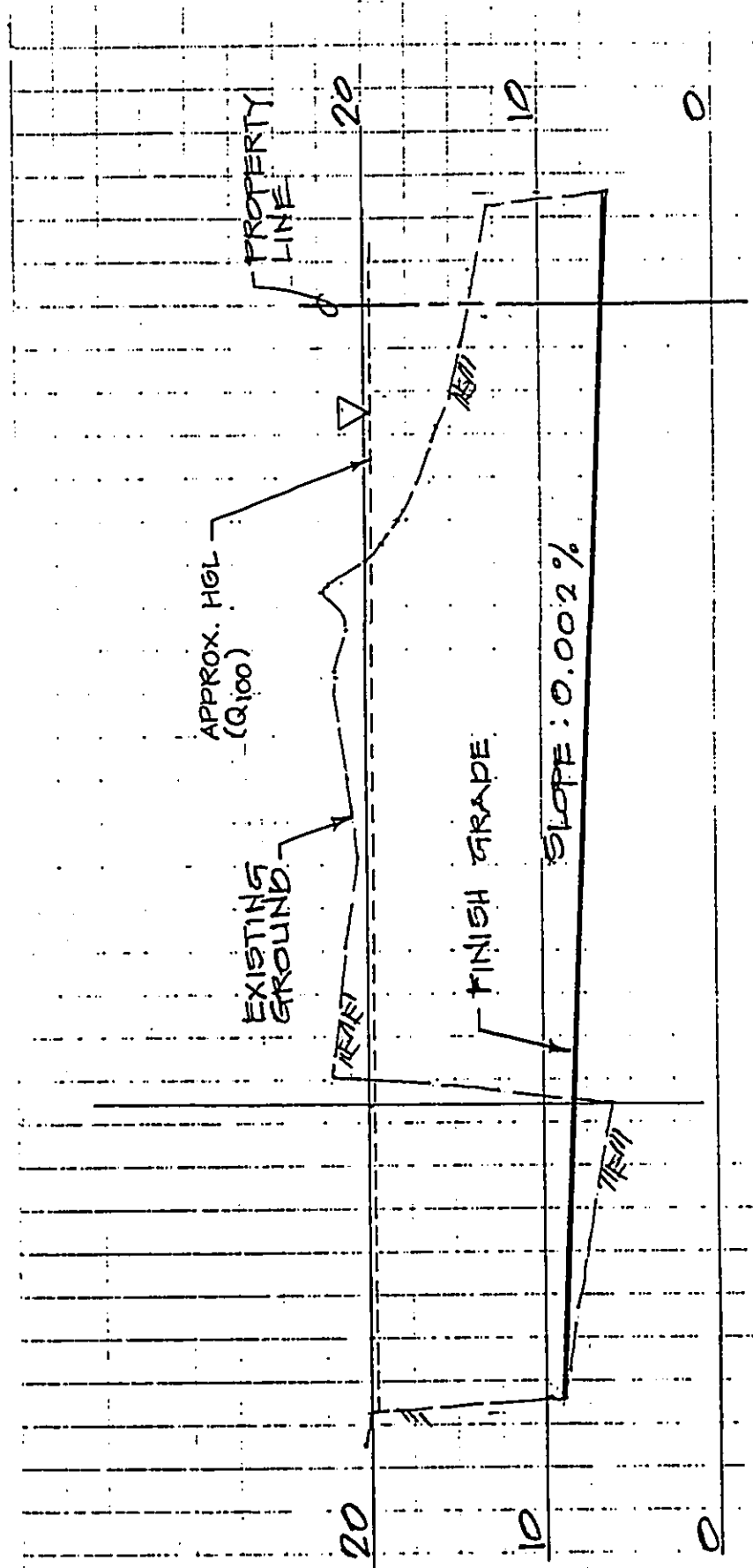


EXHIBIT 9

EAST KAPOLEI  
TYPICAL CHANNEL SECTION  
(31-AC. SITE)

TYPICAL CHANNEL SECTION

SCALE: HORIZ: 1" = 100'  
 VERT: 1" = 10'



**EXHIBIT 10**  
**EAST KAPOLEI**  
**PRELIMINARY CHANNEL PROFILE**  
**(31-AC. SITE)**

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THE ESTATE OF JAMES CAMPBELL

Re: Campbell Estate Disclaimer

To Whom It May Concern:

The information contained in the attached materials represents the views of Schuler Homes, Inc. ("Schuler"), and has been prepared by or for Schuler from its own sources. This information does not necessarily reflect the views of the Estate of James Campbell (the "Estate"), and the Estate expressly disclaims any responsibility for the accuracy or completeness of such information. Nothing in the attached materials shall be deemed or construed in any way to represent the views of the Estate, or to bind or otherwise obligate the Estate in any way, all rights of the Estate being hereby expressly reserved. All inquiries regarding the Estate's position on any matters set forth in the attached materials should be directed to Ms. Jan Burns, Manager, Special Projects, Campbell Estate.

EXHIBIT 11

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PROPOSED DRAFT REVISIONS TO EWA DP SPECIAL PROVISIONS

ARTICLE 3. EWA

PART I

DEVELOPMENT PLAN  
SPECIAL PROVISIONS FOR EWA

SECTION 24-3.2 URBAN DESIGN PRINCIPLES AND CONTROLS FOR EWA

\* \* \*

(b) Principles and Controls for Special Areas

\* \* \*

(5) East Kapolei Planned Community

The East Kapolei Planned Community Special Area shall be developed with the urban uses generally identified in this subsection as an integral part of the larger growing Kapolei region. The area planned for development shall contain approximately 750 acres of land in two non-contiguous sites in East Kapolei. The area shall develop as a master planned residential community containing a mixture of residential uses; neighborhood commercial uses, public and quasi-public facilities; and park areas and facilities, all as generally shown on the Land Use Map of this Development Plan.

Development within the East Kapolei Planned Community shall be permitted in accordance with the Land Use and Public Facilities Maps of the Development Plan, and in accordance with the following development principles and standards:

(A) Residential development within the area shall be permitted to be developed as generally shown on the Land Use Map in densities ranging from single-family detached units in the 7 unit per acre net range to multi-family units in the 20 units per net acre range.

A total of about 8,000 residential units be permitted to be developed within the area.

(B) Public parks and recreation facilities within the area, shown on the Land Use Map and Public Facilities Map, as applicable, shall be developed.



(C) Supporting public facilities, infrastructure, roadways, utilities, and improvements thereto, shall be permitted to be developed in accordance with the Land Use Map and Public Facilities Map, as applicable.

(D) Permitted land uses with the area, shown on the Land Use Map, shall contain the following approximate acreages:

	<u>Acres</u>
<u>Low Density Apartment</u>	<u>674</u>
<u>Commercial</u>	<u>16</u>
<u>Public and Quasi-Public</u>	<u>25</u>
<u>Parks and Recreation</u>	<u>35</u>
<u>Total (Application Area)</u>	<u>750</u>

(E) Panoramic and other significant views from within and across the area shall be maintained and enhanced where possible.