February 6, 1986

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Waieele Development
Amfac Property Development Corporation
Tax Map Keys: 9-4-02: 3, 10, 11, 12 (portion), 31 and 42;
9-4-07: 1-, 12, 13 and 32

We are notifying you that the above is an acceptable Environmental Impact Statement (EIS) document, pursuant to Chapter 343, HRS, and the EIS Regulations.

The Acceptance Report identifies the following unresolved issues:

1. Highway Improvements
2. Water Commitment

Several land use approvals will be required in order to implement the proposed project. These are listed in Part IX of the EIS.

A copy of our Acceptance Report is attached. If there are any questions, please contact Bennett Mark of our staff at 527-5038.

Very truly yours,

JOHN P. WHALEN
Director of Land Utilization

cc: Fred Rodrigues, Environmental Communications
Amfac Property Development Corp.
FINAL

WAIKELE

ENVIRONMENTAL IMPACT STATEMENT

JANUARY 1986
FINAL ENVIRONMENTAL IMPACT STATEMENT FOR WAIKELE

AUALII, WAIKELE, EWA DISTRICT, OAHU, HAWAII

JANUARY 1986

SUBMITTED PURSUANT TO CHAPTER 343, HAWAII REVISED STATUTES, ENVIRONMENTAL IMPACT STATEMENT REGULATIONS

F.J. RODRIGUEZ, PRESIDENT
ENVIRONMENTAL COMMUNICATIONS, INC.
ENVIRONMENTAL CONSULTANTS FOR AMFAC PROPERTY DEVELOPMENT CORP.
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I. SUMMARY

CHAPTER 343, HRS
ENVIRONMENTAL IMPACT STATEMENT (EIS)

Action: Applicant

Project Name: Waieke Development

Project Description: A rezoning proposal for a 577.2 acre site has been prepared and submitted for the Waieke Development planned community. The project, as proposed, would comprise of: approximately 2700 residential units; a 150,000 square foot commercial center; an office/business park; a recreation center; an 18 hole golf course; neighborhood parks; Fire Station site; and an elementary school site. Requested rezoning is from existing AG-1 to R-1. Residential, A-1 Low Density Apartment, P-1 Golf course, Parks, and B-2 Commercial Center/and Office/Business Park.

Project Location: The site is located mauka of Interstate Route H-1 between Kanehameha Highway and Waieke Stream/Kipapa Gulch. Lands to be rezoned are vacant except for the Amfac nursery operation and some Oahu Sugar Company management personnel residences.

Tax Map Key: 9-4-2: 3, 10, 11, portion of 12, 31, and 41
9-4-7: 10, 12, 13 and 32

Zoning: AG-1

Proposing Applicant: Amfac Property Development Corp

Environmental Consultant: Environmental Communications, Inc.

Accepting Authority: Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Summary: The project site is currently planted with 200± acres of ratoon sugar cane which serves to control dust and erosion. A major portion of the land has been withdrawn from active sugar cultivation with the implementation of the Oahu Sugar Company's survival plan designed to increase efficiency through reduction of the size of its operation, and the elimination of high cost fields. The site also presently harbors a nursery and housing for a few Oahu Sugar Company supervisory employees.
The proposed project is based upon the Waiekele Master Plan which is a development concept for a total, planned community. This plan would include approximately 2,700 residential units. A commercial center including a supermarket, drug store and small retail spaces, financial institutions, professional offices, restaurants and convenience stores, will be one of the major activity centers within the development. An office/business park will provide a major employment center for clean, technical service industries. Recreational facilities will include a regulation-sized golf course, a central recreation center and neighborhood parks. The total project area will be master planned and fully landscaped.

The affected environment consist of well drained lands in a temperate climate. The area currently drains naturally into the Waiekele Gulch and stream which lie to the west of the project. The site is not known to be a permanent habitation site of any rare or endangered species. Flora and fauna primarily consists of common exotic species. Archaeological survey of the site indicates that there are no known archaeological sites within the immediate project area. Traffic within the site is presently limited to an access road used by military personnel and Oahu Sugar Company management housing. Air and noise conditions are typically good for former agricultural usage. Infrastructure, utilities and public facilities are currently limited on the site, however access and availability for such services are good. Urban use of the site will result in significant changes in the environment, however, these changes are supported by the Hawaii State Plan, the General Plan of the City and County of Honolulu and the Central Oahu Development Plan.

Impacts on the natural environment will be significant but not necessarily adverse. Physical alterations in changing the open fallowed field to a developed area will include some impact in and out of the project site such as: changes in traffic, air and noise conditions; utilities and service requirements; and impacts on the social environment. The Waipahu 2000 Master Plan is a key element for the transition of Waiekele into the Waipahu community.

Environmental effects which cannot be avoided consist primarily of short-term construction impacts. Project alternatives and other considerations of project compliance are outlined in later sections of this document.
II PROJECT DESCRIPTION
II. PROJECT DESCRIPTION AND STATEMENT OF OBJECTIVES

A. Location of Proposed Project

The 577.2 acre site consists of low, gently sloping lands cut by three gulches and is located mauka of Interstate Route H-1 between Kamahameha Highway and Waikele Stream/Kipapa Gulch (Figure 1 & 2). More specifically, the project area is defined as follows:

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<td>j) 9-4-07:10</td>
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</table>

TOTAL ACREAGE 577.210

* Does not include existing Board of Water Supply site

The lands to be rezoned are vacant except for the Amfac nursery operation and some residences for Oahu Sugar Company management personnel. Several existing residential communities are located adjacent to the project site, including Village Park, Crestview, Seaview, Waipio-Gentry, and Waipahu Town. Castle & Cooke's pineapple fields are located directly mauka of the project site while greater Waipahu lies to the south and Waiawa Interchange of H-1 and H-2 freeways directly to the southeast. To the west of the project site is the Waikele-Kipapa Gulch where the Naval Magazine (NAVMAG) Lualualei (Waikele Branch)
is located. A Navy owned access road traverses the project site at
the present time, and negotiations between Amfac and the Navy are
being conducted to relocate or realign this access road. Farther to
the west, is the Village Park residential community. The communities
of Crestview, Seaview, and Waipio Gentry are immediately to the east
(Figure 3).

B. Project Description

The Waiekele Master Plan is based upon a development concept which
is designed to create a master planned community which offers resi-
dential uses, neighborhood scale commercial retail uses, an Office/
Business Park, and an 18-hole golf course extending throughout the
site (Figure 4). Waiekele will provide a substantial mix of residential
dwelling unit types with a significant portion targeted for the middle
income or affordable housing market and the subsidized housing market.
It would also contain a high ratio of open space and recreation uses
to developed lands, with the open space taking the forms of a regu-
lation length golf course, recreation center and neighborhood parks.

The chief constraints to development are the natural gulches which
run mauka/makai through the project site. These gulches mark
not only the path of storm water flow over the site, but also the
location of the steeper slopes on the property. Under the develop-
ment concept these gulches will not be developed, but will become
part of a continuous green belt system which will form a major open
space on the site. The major gulch will be used as an integral
element of the golf course and also function as a drainage course to
accommodate major surface runoff.

The variety of land uses and activities called for under the develop-
ment concept would be linked together by a road system, which
would provide both regional access to surrounding major highways
and to the existing Waipahu Town and immediate access to the various
activity centers and residential neighborhoods in the site.
The project involves rezoning approximately 577.2 acres of vacant or underutilized agricultural lands to appropriate urban usages that would be consistent for urban designated lands. The uses in the Master Plan for the development of Waieke would consist of:

1. **Residential - Approximately 338 Acres.**

   A total of approximately 2,700 residential and apartment units are planned at R-6 and A-1 Residential densities (Table 1). The Central Oahu Development Plan provides for a maximum of 3,000 units.

   The R-6 Residential density category would consist of a variety of unit types, including single-family detached, zero lot-line, townhouses, duplexes and fourplexes. The A-1 Low Density Apartment density category will include garden type apartments with buildings not exceeding three stories.

2. **Commercial Center - Approximately 15 Acres.**

   The Waieke Village Commercial Center on 14.5 acres will accommodate approximately 150,000 square feet of retail space which will be designed and planned to primarily serve the Waieke residents. The anticipated anchor for the center would be a supermarket and a drug store. Small retail spaces would make up the remainder of the commercial floor space, and may include financial services, professional offices, restaurants and convenience stores. Commercial buildings are anticipated to be two to three stories high with office uses on the upper floors. Unlike most shopping centers, the commercial center would be organized along a street which would be extensively landscaped and wide enough to provide on-street parking. This "main street" will connect with a loop road system connecting all uses in the village center to the office/business park and to the surrounding residential neighborhood.

II-7
<table>
<thead>
<tr>
<th>ZONING DISTRICT</th>
<th>PROPOSED USE</th>
<th>APPROXIMATE ACRES* BY USE</th>
<th>BY DISTRICT</th>
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<tr>
<td>P-1</td>
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<td></td>
<td>Park/Recreation Center</td>
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<td>Public School</td>
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<td>B-2</td>
<td>Commercial Center</td>
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<tr>
<td></td>
<td>Office/Business Park</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>577.2</strong></td>
<td><strong>577.2</strong></td>
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</tbody>
</table>

*Gross acres, including roads.
3. **Office/Business Park - Approximately 51 Acres.**

The Office/Business Park will be designed as an office center in a campus-like setting. The center will provide space for uses such as offices, research activities, telecommunications/data processing, office support service businesses and corporate headquarters. There is an established market at the present time for the proposed uses. High technology businesses which are compatible with the Office Park setting can also be accommodated, but are not being relied upon to comprise a high percentage of the Office Park space due to their unproven market potential in Hawaii at this time. Buildings in the Office Park are planned for six stories. Structures would be clustered around a central plaza to provide visual prominence, identity and increased pedestrian connections to the commercial center. Parking for the Office Park would be at grade.

4. **Recreational - Approximately 164 Total.**

   a. **Golf Course - Approximately 142 Acres.** The golf course will be a par 72, regulation size, privately-owned course, open to the public for play. The course will be designed to accommodate tournament play on an islandwide basis. The golf course will occupy the gulch areas of Waikele, allowing bordering residential land uses view amenities and to overlook the fairways, greens and tees. The fairways situated on the higher elevations will be aligned to provide views of Diamond Head, Honolulu and Pearl Harbor. The golf clubhouse will be located on a high point of the site to provide views. The clubhouse will be designed to serve the needs of the golfers as well as to provide meeting rooms and food service facilities for community functions, service organizations, and private celebrations such as weddings, high school activities and other special events.
b. **Recreational Center Parks— Approximately 22 Acres.**
Approximately 22 acres are included to meet the recreation and parks open space needs of Waiekele residents. A central recreation center of 13 acres is located adjacent to the Village Commercial Center and Office/Business Park. It will provide major sports facilities including athletic fields. In addition, neighborhood parks totalling about 9 acres will provide open space for use by Waiekele residents.

5. **Public Services and Facilities**

a. **Schools— Approximately 6 Acres.** A six acre site will be set aside for an elementary school.

b. **Fire Station.** A fire station site will be located on the property at a location to be determined later. Discussions with the Honolulu Fire Department indicated a need for this facility.

c. **Infrastructure Roadways.** Roads will comprise the remaining portion of the site. The roadway system will include connection to the existing highway system. The developer with whatever governmental assistance is available will participate in the construction of the following: a new interchange for the H-1 Freeway at Paliwa Street; improvements to Kamehameha Highway; and improvement of the existing Manager's Drive Bridge. A central loop road will link the Waiekele Village Commercial Center and accommodate on-street parking. All roads will be extensively landscaped.
C. Statement of Objectives

To guide the development of Waikiki, goals were established to ensure that the proposed action will accommodate those land uses which are mutually supportive to the Waipahu community at large, the City of Honolulu and State of Hawaii, Oahu Sugar Company and Amfac Property Development Corp. The Waipahu 2000 Master Plan prepared by representatives of Waipahu's community, business and labor groups establishes Waikiki as an integral part of the redevelopment of Waipahu.

The project recognizes that the impact of removing this parcel permanently from agricultural use must be offset by providing other uses which will clearly benefit the community beyond the present use of the site. The Waikiki development has and will provide support to Oahu Sugar Company, by providing additional income to offset the cyclical losses common to the sugar industry. The objectives of the Waikiki Master Plan are as follows:

To Meet State and City Policies. For the City and State, the Waikiki Master Plan recognizes that the impact of amending the land use classification of the Petition Area from Agriculture to Urban must take into consideration the provisions of alternative uses which will clearly benefit the community above and beyond the present use of the site. These uses include housing, employment and recreation.

To Provide More Middle Income Residential Uses. Waikiki will be a middle income community in which approximately 40 percent of the housing is planned to be sold at prices affordable to the middle-income market. Ten percent of all housing to be provided will be subsidised and offered at price levels consistent with existing City and County unilateral agreement requirements.

To Provide Employment Opportunities. Waikiki's major employment areas, including the Waikiki Village Commercial Center and Waikiki Office Park, are proposed to support a range of business and office uses. The Village Center could provide space for 2000 jobs, an
amount equivalent to 40 percent of the anticipated labor force generated by Waieke's resident population.

To Provide Recreation Opportunities. At least 25 percent of the total site would be used for open space and recreation. This would include the following major elements: a par 72, 18-hole regulation golf course, a major community recreation center featuring athletic fields, a swimming pool, tennis courts and neighborhood parks with a combined area of nine acres.

To Support the Oahu Sugar Company Survival Plan. The development of the Waieke project site has and will provide support for Oahu Sugar Company operations. Urbanization of the site will justify the capital expenditures by the company in order for it to increase its viability.

To Provide Community Services. General areas and sites will be set aside for an elementary school, neighborhood parks and a community recreation center. The developer is investigating a security system with a two-way cable communication system which is designed to monitor traffic at intersections, streets and parking lots to ensure safety and improve traffic flow.

To Provide Neighborhood Shopping For Residents. Convenience/retail commercial uses would be provided in the Village Commercial Center to meet the basic day-to-day needs for the residents of Waieke. It is anticipated that major retail purchases by Waieke residents would be made at established businesses in Waipahu Town and other surrounding shopping establishments.

To Establish A Reasonable Completion Date For Full Development of Waieke. The Waieke Master Plan is designed to be fully developed and completed within an 8-year time frame.

To Promote Energy Conservation. In order to minimize the use of
the automobile, the Plan is designed to allow for pedestrian and bicycle circulation within the project site. Other energy conservation techniques would encourage the use of solar energy for hot water heating and utilize tradewinds for natural ventilation.

To Create A Rural Character For the Community. Development will be low scale with residential and commercial areas planned for three stories and the Office Park planned for six stories. The buildings would be designed to conserve energy and blend in with an environment of extensive landscaping and green spaces.

To Create A High Quality Community for the Future. Consistent with the Waiekele Master Plan objectives and the market demand analysis, the Waiekele Master Plan would provide a competitively priced, quality residential living environment. The basic goal is to create a new community which simultaneously meets the needs of its residents while upgrading the community at large.

D. Phasing

The Waiekele project is planned for implementation over an eight-year period. A schedule of development by phase is summarized in Table 2 and illustrated in Figure 5, followed by a general description of the development sequence.

The overall phasing begins at the east edge of the property along Kamehameha Highway, proceeds westerly across the site, and terminates with the later phases bordering Waiekele Gulch. This sequence is based on establishing access to the site from Kamehameha Highway. The golf course, which is spread across the site, would all be developed in the initial two years.
<table>
<thead>
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<th>YEARS</th>
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<td></td>
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</table>

* Acreage and unit counts are approximate and intended to illustrate the development phasing concept. The precise phasing may vary to reflect detailed design development and market absorption.

** Area includes adjoining roadways for zoning purposes.
Year 1. Initial emphasis is planned on improving Kamehameha Highway and establishing two entrances to the site with an internal loop road. A neighborhood park site fronts on this road as do the first residential increments. The golf course is also begun, and the first increment of the Office Park is established. Connections to existing off-site drainage facilities are also completed. The Paiwa Street interchange is started, and Manager's Drive Extension is developed from Kamehameha Highway to the golf course. Water system improvements in this phase include a 1.0 million gallon reservoir, transmission main, water treatment facility for existing wells and pump station. Sewer system improvements include connections to the existing off-site sewer main.

Year 2. Residential development extends north and south from the first increments, completing residential development along most of the Kamehameha Highway frontage. Golf course construction is completed and the second increment of the Office Park is established. A new Navy access road is also provided by developing one-half of the 60-foot right-of-way from Paiwa Street Extension to the western project boundary, and the Paiwa Interchange is completed. The north loop road is constructed up to the golf clubhouse entrance. Manager's Drive Extension is continued to its intersection with Paiwa Street Extension by constructing one-half of the right-of-way. Additionally, one-half of the Paiwa Street Extension right-of-way is constructed from Paiwa Interchange to the Navy Access Road.

Year 3. Residential development proceeds along Kamehameha Highway and a low density neighborhood is established along the golf course. Low density apartment use is also developed adjacent to the commercial center. The "first phase" of the Community Recreation Center is built and the third increment of the Office Park. The Manager's Drive extension is widened to its full 100-foot right-of-way to serve the apartment site and community recreation center.
Year 4. Residential development continues at several locations, fronting the golf course on the north and south, along the northern boundary, and the low density apartment neighborhood continues to be developed adjacent to the commercial center. The fourth increment of the Office Park is established, and drainage improvements are made at Pawiwa Street. Water system improvements include a second 1.0 million gallon reservoir and an additional well and water treatment facility.

Year 5. Residential increments proceed along the golf course to the north and west, a low density apartment neighborhood continues to be developed adjacent to the Commercial Center, which is also developed at this time. The last increment of the Office Park is available during this phase. The neighborhood park and school at the west side of the project is also developed, and residential development is begun along the Waikiki Gulch boundary. The Navy access road is improved to its full 60-foot right-of-way. Off-site drainage improvements at Pawiwa Street are also completed and the existing reservoir reconfigured to accommodate the Pawiwa Street extension right-of-way. Both halves of Pawiwa Street are completed between the H-1 Interchange and Manager's Drive Extension. Manager's Drive Extension is also extended west of Pawiwa Street Extension to the school/park site. The north loop road is completed and one-half of Pawiwa Street Extension is developed from the north loop road to the Navy access road. Sewer system improvements include connections to the existing 15-inch and 30-inch City and County sewer mains.

Year 6. Residential increments are established along the northern portion of the Waikiki Gulch boundary, and the Community Recreation Center is completed in this phase. Pawiwa Street is widened to its full 100-foot right-of-way between Manager's Drive Extension and the Navy access road.

Year 7. Residential development proceeds in the southwest portion of the site, on both sides of the Manager's Drive extension and
adjacent to the school site. Manager's Drive bridge over the H-1 is widened, and Manager's Drive Extension is completed from the school/park site to the H-1 Freeway.

Year 8. The final residential increments are developed along the Walkele Gulch perimeter at the southwest corner of the site. Paiwa Street is widened to its full 100-foot right-of-way between the Navy access road and the north property boundary.

E. Funding

Total projected land development cost for the Walkele development is in excess of $60 million. This figure reflects the cost for general planning and engineering, and on and off site infrastructure improvements. The cost projection does not include land values, anticipated financing costs, general corporate overhead costs or property and income taxes. The project will be primarily developed at the land owner's expense. Public funds and land may be utilized in development of traffic improvements and a Navy access road crossing the project site.

F. Historical Perspective

The project site is currently owned by Oahu Sugar Company which is a subsidiary of Amfac. Prior to its existing fallowed state, the property was actively used for sugarcane cultivation. This cultivation use originated in the late 1800's when Benjamin F. Dillingham began to consolidate leeward lands for sugarcane cultivation. Following this consolidation of lands, H. Hackfeld and Co. ventured into what would become the Oahu Sugar Company. The Walkele site remained in active sugarcane cultivation use until 1982 when the site was allowed to go fallow. The site is still classified agriculture under the State Land Use Boundaries and is zoned AG-1.
III AFFECTED ENVIRONMENT
III. THE AFFECTED ENVIRONMENT

A. Geographical Characteristics

1. Topography

The land surface adjacent to the Interstate Highway H-1 side of project site is relatively flat. A short distance north of that road, the land surface rises gently at a gradient of 4 to 6 percent. The gently sloping terrain is crossed by three gulches. One of these gulches is significant in size, bisecting the entire property and crossing under the Interstate Highway near Paikwa Street. Two other gulches, though smaller in size and not as significant, do contribute prominent surface characteristics to the gently rolling hillside. The gulch areas comprise all slopes above 6 percent, including some areas above 25 percent.

2. Geology

The proposed project area is located on the southern slope of the Schofield Plateau. This plateau was built up by many successive lava flows originating from the Koolau shield volcano. This rock unit is made up of firm to very hard volcanic rocks which form bedrock in the proposed project area and vicinity. Logs of deep borings and artesian wells indicate the volcanic rocks become harder with depth. The soils in this area are typically residual, derived from the weathering of basic igneous rock.

3. Soils

The project area is underlain by soils consisting of silts and...
clays of the Molokai Soil Series. The U.S. Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," August 1972, classifies the soils as Molokai silty clay loam (MuB to MuD). They consist of well-drained soils and are formed in material weathered from basic igneous rock. This type of soil is generally found in nearly level to moderately steep lands with elevations ranging mainly from near sea level to 1,000 feet. The mean annual soil temperature is 73° F. Molokai soils are geographically associated with Holomua, Keahua, Lahaina, and Uwala soils. They are reddish-brown to brown, stiff to hard, silty clays and clayey silts. Based on the Unified Soil Classification System, they can be classed as CL, MH and ML groups. The entire project area is underlain by these groups of soils.

The soil mantle at the site varies randomly from 5 to 23 feet in thickness and is underlain by reddish-brown, severely weathered basaltic rock which grades downward to the underlying hard rock. The soil thickness reduces along the gulch areas and along steeper slopes. At higher elevations and along the relatively steep banks of the gulches boulders of basaltic rock are either exposed or can be encountered at shallow depths. A number of these boulders can be observed along the cane haul roads.

The upper soil zones are expected to range in thickness from 5 to 14 feet, whereas the soft weathered rock may extend up to 14 to 40 feet in some locations.

In terms of agricultural suitability, the soils are rated II to IV, if irrigated, and II and III, if non-irrigated, according to the Conservation Service. The ratings of the service range from I, which means few limitations, to VIII, which indicates very severe limitations and precludes use of the land for agriculture.
Reference to the report entitled "Preliminary Geotechnical Engineering Investigation: Proposed Development Waipahu-Waipio Master Plan," prepared by PSC Associates, Inc., in October, 1983 will provide further detail of the soils found at the project area.

4. Climate

The mean rainfall at Waipahu is approximately 30.5 inches per year. The months of May through October are normally dry. The median monthly rainfall during these months is less than 1.4 inches.

The predominant wind direction and higher wind speeds are from a northeast to east direction. Other predominant winds come from the north-northeast and east-northeast.

The median annual temperature is 82.6° F.

B. Hydrological Characteristics

1. Groundwater

PSC Associates, Inc., when conducting their geotechnical engineering investigation, encountered no groundwater. Groundwater, in general, should not be a problem in the project area, since water in the basalt aquifer is 50 to 180 feet below the land surface.

The Walkele Stream flows by the western edge of the project site. The stream is a continuously flowing stream found at the base of the Walkele Gulch. This stream flows through Waipahu Town into West Loch of Pearl Harbor.
2. Flood Insurance Study Designation

According to the Flood Insurance Study for the City and County of Honolulu prepared by the Federal Insurance Administration (FIA) in September 1980, flood-prone areas have not been identified for these areas. Most of the development will occur in a designated Zone D, an area of undetermined, but possible flood hazard. There are no improvements planned for the Waikele Gulch portion of the site.

3. Drainage

The project site is well drained and should not be susceptible to flooding. The Waikele/Kipapa gulch is a major drainage way which collects surface run-off from a major portion of the Central Oahu Plain. These gulches cut anywhere from 100 to 150 feet below the surface of the surrounding areas, and do not pose any threat of overflowing onto the project site in the event of major rain storms. Waikele Stream is a perennial stream found at the base of the gulch. This stream flows through the Waipahu Town area into West Loch of Pearl Harbor. A large portion of the site drains into the large gulch which bisects the site and crosses under the H-1 Freeway to Waipahu Town.

Most of the project site lies within a drainage basin which is tributary to existing improved drainage facilities in Waipahu. Based on the natural topography, storm runoff from most of the site as well as other lands mauka of the site (Castle and Cooke) flow to three existing drainage facilities at the H-1 Defense Highway above Waipahu Town. These public facilities include the following:

1. Forty-eight-inch storm drainage pipe system in Paiwa

2. Concrete rectangular channel which terminates at the mauka side of the Haul Cane Road Underpass of the H-1 Defense Highway.

3. Two 84-inch corrugated metal culverts, which terminate at grade on the mauka side of the H-1 Defense Highway and on the makai side, connect to a concrete rectangular channel.

All three drainage systems are connected to the Kahu Drainage Channel which discharges the collected runoff into Middle Loch of Pearl Harbor. The Kahu Drainage Channel is adequate to accommodate additional storm runoff from the mauka unimproved drainage basin; therefore, a portion of the increased storm runoff from the project will be diverted to this channel.

G. Biological Characteristics

1. Flora

A field inspection was made of the project site on October 23, 1982, by Winona Char, Botanical Consultant. Char found that the development site occupies land which was under agricultural use for the cultivation of sugar cane (Saccharum officinarum). Since that time, the area has been fallowed. 184 acres of the site is currently in ratoon sugar cane in order to reduce erosion and provide dust control.

Cane lands can be classified as man-modified ecosystems, that is, the environment is modified and more or less controlled by man. Once economic plant species, sugar cane, forms the
monodominant cover. A number of weedy (or ruderal) plant species characteristic of agricultural lands can also be found associated with the cane fields. The great majority of the weedy species are found alongside the roads and accompanying network of irrigation ditches that transect and border the fields. Most of these weedy species are annuals and are adapted to the frequent disturbances which accompany cultivation practices. These weedy species generally form a low-growing herbaceous cover which may become 1 to 3 feet high in places where there is more available moisture such as along irrigation ditches. Along the peripheries of the H-1 Freeway boundary a number of ornamental tree species such as monkeypod (Samanea saman), royal poinciana (Delonix regia), and African tulip tree (Spathodea campanulata) can be found. Koa-haole (Leucaena leucocephala) scrub is the dominant vegetation type along the H-1 Freeway boundary and in the small gulches found in the project area. Koa-haole forms a more or less dense scrub, 6 to 10 feet high, with Guinea grass (Panicum maximum) forming the most abundant understory cover. A few scattered shrubs of klu (Acacia farnesiana) can be found in the koa-haole scrub.

An inventory of the plant species found within the proposed development site is presented in Table 3. The plants are arranged alphabetically by scientific name. Common names and/or Hawaiian names are given when known. No endangered or threatened flora species exist on the project site.

2. Fauna

Due to the existing agricultural use of the project site insects, avifauna, and mammals populating the site are largely exotic in nature, and not considered rare or endangered species. Various common bird species, such as the barred dove (Gopelia striata), lace-necked dove (Streptopelia chirensis chirensis), common
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acacia farnesiana</em> (L.) Willd.</td>
<td>Klu</td>
</tr>
<tr>
<td><em>Achyranthes indica</em> (L.) Mill.</td>
<td>Khaki weed</td>
</tr>
<tr>
<td><em>Alternanthera repens</em> (L.) Ktze.</td>
<td>Spiny amaranth, pakai-kuku</td>
</tr>
<tr>
<td><em>Amaranthus spinosus</em> L.</td>
<td>Slender amaranth, pakai</td>
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<tr>
<td><em>Amaranthus viridis</em> L.</td>
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</tr>
<tr>
<td><em>Bidens pilosa</em> L.</td>
<td>Spanish needle, ko'oko'olau</td>
</tr>
<tr>
<td><em>Boerhavia coccinea</em> Mill.</td>
<td>Bougainvillea</td>
</tr>
<tr>
<td><em>Bougainvillea</em> sp.</td>
<td></td>
</tr>
<tr>
<td><em>Brachiaria reptans</em> (L.) Gard. &amp; C. E. Hubb.</td>
<td>Asiatic butterfly bush</td>
</tr>
<tr>
<td><em>Buddleja asiatica</em> Lour.</td>
<td></td>
</tr>
<tr>
<td><em>Cassia surattensis</em> Burm. f.</td>
<td>Kolomona</td>
</tr>
<tr>
<td><em>Cenchrus echinatus</em> L.</td>
<td>Common sandbur, 'ume'alu</td>
</tr>
<tr>
<td><em>Chloris inflata</em> Link</td>
<td>Swollen fingergrass, nau'ulei</td>
</tr>
<tr>
<td><em>Crotolaria incana</em> L.</td>
<td>Fuzzy rattle-pod, kukae-hoki</td>
</tr>
<tr>
<td><em>Cynodon dactylon</em> (L.) Pers.</td>
<td>Bermuda grass, manienie</td>
</tr>
<tr>
<td><em>Delonix regia</em> (Boj.) Raf.</td>
<td>Royal poinciana</td>
</tr>
<tr>
<td><em>Desmanthus virgatus</em> (L.) Willd.</td>
<td>Virgate mimosa</td>
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<td>Scientific Name</td>
<td>Common Name</td>
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<tr>
<td>-----------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Echinochloa colona (L.) Link</td>
<td>Jungle rice</td>
</tr>
<tr>
<td>Eleusine indica (L.) Gaertn.</td>
<td>Wiregrass, manienie-ali'i</td>
</tr>
<tr>
<td>Emilia javanica (Burm. f.) C. B. Robins</td>
<td>Red pua-lele</td>
</tr>
<tr>
<td>Erigeron canadensis L.</td>
<td>Canada fleabane, ilioha</td>
</tr>
<tr>
<td>Eugenia cuminii (L.) Druce</td>
<td>Java plum, palama</td>
</tr>
<tr>
<td>Euphorbia gloomiferi (Millep.) L. C. Wheeler</td>
<td>Hairy spurge, koko-kahiki</td>
</tr>
<tr>
<td>Euphorbia hirta L.</td>
<td>Prostrate spurge</td>
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<tr>
<td>Ficus microcarpa L. f.</td>
<td>Chinese banyan</td>
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<tr>
<td>Gossypium barbadense L.</td>
<td>Cotton, pulupulu-haole</td>
</tr>
<tr>
<td>Ipomoea triloba L.</td>
<td>Little bell</td>
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<tr>
<td>Leucaena leucocephala (Lam.) de Wit</td>
<td>Koa-haole</td>
</tr>
<tr>
<td>Lycopersicon pinnellifolium Mill.</td>
<td>Currant tomato</td>
</tr>
<tr>
<td>Malvastrum itamellianum (L.) Garcke</td>
<td>False mallow</td>
</tr>
<tr>
<td>Monordica charantia var. pavel Grants</td>
<td>Wild bitter melon, ku kua</td>
</tr>
<tr>
<td>Panicum maximum Jacq.</td>
<td>Guinea grass</td>
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<tr>
<td>Pennisetum setosum (Sw.) L. C. Rich.</td>
<td>Feathery pennisetum</td>
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<td>Phaseolus lathyroides L.</td>
<td>Cow pea, papapa</td>
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<tr>
<td>Phyllanthus debilis Klein ex Willd.</td>
<td>Phyllanthus weed</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>Common Name</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Rhynchelytrum repens (Willd.) C. E. Hubb.</td>
<td>Natal redtop</td>
</tr>
<tr>
<td>Saccharum officinarum L.</td>
<td>Sugar cane, ko</td>
</tr>
<tr>
<td>Samanea saman (Jacq.) Merr.</td>
<td>Monkeypod</td>
</tr>
<tr>
<td>Schinus terebinthifolius Raddi</td>
<td>Christmas berry, wilelaiki</td>
</tr>
<tr>
<td>Sida spinosa L.</td>
<td>Prickly sida</td>
</tr>
<tr>
<td>Sonchus oleraceus L.</td>
<td>Sow thistle, pua-lele</td>
</tr>
<tr>
<td>Spathodea campanulata Beav.</td>
<td>African tulip tree</td>
</tr>
<tr>
<td>Synedrella sp.</td>
<td>Prostrate synedrella</td>
</tr>
<tr>
<td>Thunbergia grandiflora Roxb.</td>
<td>Large-flowered thunbergia</td>
</tr>
<tr>
<td>Tribulus terrestris L.</td>
<td>Puncture vine</td>
</tr>
<tr>
<td>Tridax procumbens L.</td>
<td>Coat buttons</td>
</tr>
<tr>
<td>Verbena litoralis HSK.</td>
<td>Weed verbena, ha'uowi</td>
</tr>
<tr>
<td>Waltheria americana L.</td>
<td>Hi'a-loa, uhaloa</td>
</tr>
</tbody>
</table>
mynah (*Actidiotheres t. tristis*), Japanese White-eye (*Zosterops Japonica Japonica*) and red-crested cardinals (*Paroaria coronata*) may frequent the site. Three Hawaiian Coots, Alae keokeo, have been observed at an irrigation reservoir on the north end of the project site. The Alae keokeo is considered an endangered species however, the site is not considered a habitation area but may serve as a transient resting area.

Butterflies, of common variety, may also be abundant. Finally, pests, such as the house mouse (*Mus musculus*), Polynesian rat (*Rattus exulans hawaiensis*), and Indian mongoose (*Herpestes auropunctatus auropunctatus*) are likely to be at the project site.

Waikiki Stream which lies west of the project site contains native species of o'opu nakea (*Awaous stamineus*) and a native prawn (*Macrobrachium grandimanus*). Other stream inhabitants are common exotic fish and crustaceans.

D. Historical and Archaeological Characteristics

The project site was used for agricultural purposes in the cultivation of sugar cane from the late 1890's to mid-1982. Since late 1982 a substantial portion of the site has been fallowed, though, approximately 200 acres of the site is currently planted in ratoon sugar cane as an erosion, flood, and dust control measure. The site also contains several supervisory plantation homes, the plantation manager's residence, and an Amfac nursery operation.

An archaeological reconnaissance was conducted by Chiniago, Inc. for the project site with a preceding literature search. No information could be found regarding the use of the land prior to the late 1890s when sugar production first commenced.

III-10
1. Literature Search

The literature search included inspection of Handy's *The Hawaiian Planter* (1940), McAllister's *Archaeology of Oahu* (1933), Sterling and Summers' *Sites of Oahu* (1978), Cox and Stasack's *Hawaiian Petroglyphs* (1970), maps on file at the State of Hawaii Survey Office, site maps on file at the State Historic Preservation Office, and reports and publications in the Hawaiian collection of the University of Hawaii.

Handy mentions terraces for growing taro along Waikele Stream, immediately outside of the survey area on the west:

"Waikele. In the flatland, where the Kamehameha Highway crosses the lower valley of Waikele Stream, there are the remains of terraces on both sides of the road, now planted to bananas, beans, cane, and small gardens. For at least 2 miles upstream there were small terrace areas" (Handy 1940:82).

The present status of these small terraces is not known, but extensive construction activities in the valley since the time of Handy's visit have probably resulted in their destruction. These sites lie outside of the project area.

McAllister discusses three sites to the south of the survey area, all of which have been destroyed:

"Site 127. Mokoula heiau, southwest of the main road in the village of Waipahu."

"The heiau has been completely destroyed for building purposes of the neighborhood. The site is at the edge of a 50-foot elevation which projects out into the present rice fields and was pointed..."
out by Kaluawai, a kamaaina undoubtedly more than 100 years old.

"Site 128. Waipahu spring, famous in tradition as the place at which the tapa mallet appeared after having been lost in Kahuku. A pump has been placed over the site.

"Site 129. Heiau, Waipahu, said to have been named Hapupu.

"The Waipahu plantation stables on the mountain side of the road across from the schoolhouse west of the town now occupy the site of the former heiau. According to Thrum, it was a 'Heiau pookanaka, where the chief Hao was surprised during temple worship and slain with his priest and attendant chiefs by direction of the mol of Oahu, about 1650.' The site was pointed out by Kapano" (McAllister 1933:106).

Also to the south of the survey area, on the ocean side of the H-1 Freeway, is a small petroglyph site:

"On the cliff boulders, north side of Waikele Stream, west edge of Waipahu town. Human figures, triangular (arms curved downward), dogs. ± 12 units" (Cox and Stasack 1970:97).

The only additional information provided in Summers and Sterling's Sites of Oahu is that the project area is located in an area known as Kanoenoe Plain, but they associate no legendary or historical happenings with the place.

As all of the remains revealed in the literature search are (or were, in the case of those which have been destroyed)
located outside of the project area, the proposed development represents no threat to them.

2. Field Inspection

Fieldwork consisted of a two-day pedestrian inspection of the property. Structural remains (platforms, terraces, shelters, etc.) would have been destroyed by sugarcane production long ago, so the only evidence of past human utilization which was expected were unearthed fragments of food remains (bones and shells) and artifacts. No evidence of past utilization of any kind was observed either in the open fields or in the exposed earthen faces of irrigation ditches.

E. Existing Population and Growth Characteristics

As described in Analysis of Market Potential for the Amfac Properties Waipahu-Waipio Area prepared by Williams-Kuebelbeck and Associates, Inc., July 1984, the population base for Waiekele property encompasses the area of Oahu delineated in Hawaii State law as the Ewa Judicial District. It includes the residential communities of Alea, Pearl City, Waipahu, Ewa, Makakilo, Waipio, and Mililani. Geographically, it extends east to the District of Honolulu, west to Wai'anae, and north to Waiau. The Districts is coterminous with census tracts 73 to 89.03 and encompasses all the planning area of Ewa, three-fourths of Central Oahu and a small portion of the Primary Urban Center as defined by the City and County of Honolulu's Department of General Planning.

The Waipahu-Waipio area has been undergoing gradual urbanization during the past 20 years. During the 1960s development was concentrated primarily in the areas closer to Honolulu such as Alea, Pearl City, and Waipahu. As these communities have approached saturation in the 1970s, new communities have been developed at more distant locations such as Mililani, Makakilo, and Village Park.
Given the limited availability of development opportunities in Hawaii Kai and Kailua-Kaneohe, the Waipahu-Waipio area is considered the logical area for continued major growth on Oahu during the 1980s and 1990s.

Table 4 shows the 1970 to 1980 growth in resident population and housing units in the Waipahu-Waipio area. The 1980 population was estimated at 191.0 thousand persons, 44 percent above the 1970 population of 132.3 thousand persons. The number of housing units, meanwhile, increased 71.7 percent, going from 29.5 thousand units in 1970 inventory base, high rates of household formation, as well as greater than average replacement of obsolete units explain the exceptionally large percentage increase in housing units.

The area's large share of Oahu's growth in resident population and housing units reflect its prominence as a location for new development. Table III-4 shows that between 1970 and 1980 45.1 percent of Oahu's resident population growth and 27.5 percent of the new increase in housing units occurred in the area.

Given the emergence of the Waipahu-Waipio area as one of the few urbanizing areas on the island, its share of County population growth should increase over the next two decades, particularly in view of local government policies which target the area for major growth.

F. Existing Traffic Conditions

The traffic report for the project area, prepared by Austin, Tsutsumi and Associates, Inc., is attached as Appendix A.

1. Roadways

The existing roadways within the proposed project site are primarily haul cane roads leading to the Oahu Sugar Mill via
Table 4
POPULATION AND HOUSING CENSUS TRACTS, 
WAIPAHU-WAIPIO MARKET AREA 
(CENSUS TRACTS 73-89.03) 
1970-1980

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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Resident Population</td>
<td>132,299</td>
<td>191,052</td>
<td>58,753</td>
<td>44.4%</td>
</tr>
<tr>
<td>Housing Units</td>
<td>29,456</td>
<td>50,579</td>
<td>21,123</td>
<td>71.7%</td>
</tr>
</tbody>
</table>

EWA SUBMARKET AREA AS A PERCENT SHARE OF HONOLULU CITY AND COUNTY

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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident Population</td>
<td>21.0%</td>
<td>25%</td>
<td>45.1%</td>
</tr>
<tr>
<td>Housing Units</td>
<td>16.9%</td>
<td>20%</td>
<td>27.5%</td>
</tr>
</tbody>
</table>

Source: Hawaii Data Book 1981; 1980 Census Summary Tape File 1, Volumes 1 and 2; Honolulu Department of General Planning; Williams-Kuebelbeck and Associates, Inc.
the existing Paiwa Street Undercrossing on Interstate Route H-1. Manager's Drive provides another existing H-1 crossing for access to the project site. The only other roadway is the Naval Access Road, running east-west across the site from Kamehameha Highway to the U.S. Naval Reservation along Kipapa Gulch. These access connections at existing public roadways are expected to be utilized by the Waikele Development.

At the present time site accessibility from a major arterial is provided only along Kamehameha Highway, with the only other transportation facility fronting the project site being Interstate Route H-1, a fully-controlled-access freeway facility (Figure 6).

Kamehameha Highway is a three lane arterial highway providing one lane in each direction with the third lane providing a passing lane or exclusive turning lane at key intersections. At Waipahu Street Kamehameha Highway becomes a four lane, divided highway facility as it connects to the Waipahu Interchange. Southbound past Waipahu Street Kamehameha Highway splits with one lane continuing eastbound on Kamehameha Highway through the Pearl City area and one lane merging with on ramp traffic from Farrington Highway to eastbound Interstate Route H-1. There is also an auxiliary lane south of Waipahu Street formed by the eastbound H-1 off ramp and connection from southbound Kamehameha Highway to westbound Farrington Highway. There is no direct connection from southbound Kamehameha Highway to westbound Interstate Route H-1.

The off ramp from westbound Interstate Route H-1 to Waipahu is a single lane diverging ramp which merges with westbound Kamehameha Highway and then splits to Farrington Highway to
Waipahu Town. A connection is made by another single lane connector to northbound Kamehameha Highway to Crestview and Waipio-Gentry.

Fronting the makai side of the project site Interstate Route H-1 is an eight-lane freeway providing access to Waipahu at Waiawa Interchange and at Kunia Interchange. Interstate Route H-1 is the primary arterial between Central Honolulu and West Oahu. Other roadway facilities directly affected by the proposed interchange facility at Paiwa Street are Paiwa Street itself and Waipahu Street.

Paiwa Street is a 60-foot right-of-way, fully improved roadway between the Freeway undercrossing and Farrington Highway, with the exception of a short 44-foot right-of-way segment just makai of Waipahu Street. Paiwa Street terminates at the Freeway undercrossing. The existing H-1 bridge structure provides twin 60-foot span openings aligned with Paiwa Street and the haul cane road running parallel to Paiwa Street, from the Freeway to the Sugar Mill. Paiwa Street proceeds in the makai direction past Waipahu Street and connects to Farrington Highway.

Waipahu Street varies from a 60-foot right-of-way, fully improved collector street to a variable right-of-way roadway through "Old Waipahu Town" fronting the Sugar Mill. Several geometric alignment problems restrict Waipahu Street's function as a collector roadway. The Waipahu Street alignment at Waikele Stream crossing consists of a "switchback", that is, the roadway turns at an acute angle in one direction, followed by another sharp turn in the reverse direction. Another severe alignment problem occurs just east of Paiwa Street where Waipahu Street makes a sharp turn as it continues eastward to Kamehameha Highway. Some operational and
alignment problems occur in the Sugar Mill area, where left
turn traffic and driveway traffic interfere with the through
traffic flow and where curvilinear alignment further restricts
operational speeds.

2. Traffic

Twenty-four hour traffic count data were obtained from the
State Department of Transportation on all major highways in
the affected area. Additional count data were obtained from
the City and County Department of Transportation Services on
city streets in the Waipahu area.

Finally, manual traffic counts were conducted for the purpose
of this study at key intersections during the morning and
afternoon peak periods.

Interstate Route H-1 between Kunia Interchange and Waiala
Interchange carries about 52,000 vehicles per day total for
both directions. East of Waiala Interchange, Interstate Route
H-1 carries 105,000 vehicles per day total for both directions.
The freeway facility, during peak hours of traffic eastbound
in the morning and westbound in the afternoon operates at
Level of Service "A" between Kunia Interchange and Waiala
Interchange, and at Level of Service "D" between Waiala
Interchange and Moanalua Road Interchange for both peak
periods. (Level of Service definitions can be found in the
Appendix.)

The on ramp from and off ramp to Kamehameha Highway and
Farrington Highway at the Waiala Interchange operate at Level
of Service "E" during the morning and afternoon peak hours,
respectively. Traffic count data show 1800 vph on the H-1 on
ramp eastbound during the morning peak hour and 1900 vph on
the H-1 off ramp westbound during the afternoon peak hour.
Under these conditions, the right lane of the freeway facility is dominated by merging and diverging traffic.

Kamehameha Highway north of Waipahu Street carries over 31,000 vehicles per day. Kamehameha Highway/Waipahu Street intersection operates at Level of Service "E" during the morning peak period and Level of Service "D" during the afternoon peak period. Traffic flow is generally southbound during the morning peak, including a heavy right turn movement from Waipahu Street onto Kamehameha Highway. During the afternoon peak, the northbound flow is the dominant movement, including a heavy left turn movement into Waipahu Street.

The Waipahu Street/Paiwa Street intersection operates at Level of Service "B" during the morning peak period and at Level of Service "C" during the afternoon peak period, with 1400 vph and 1700 vph entering the intersection, respectively. However, traffic operations during the peak periods are typified by stoppages on Waipahu Street resulting from left turning vehicles queued in the through lanes and buses stopping in the traveled way to load and unload passengers.

G. Ambient Air Quality

The air quality study prepared for the proposed project was conducted by Barry D. Root and is included in its entirety in Appendix B.

A summary of air pollutant measurements from State of Hawaii long term monitoring stations located nearest to the project is presented in Table 5. Data from several different sampling stations are included in the tabulation.

The sampling station for particulates and carbon monoxide is located in Pearl City, less than two miles east southeast of the
### TABLE 5

SUMMARY OF AIR POLLUTANT MEASUREMENTS AT NEAREST MONITORING STATIONS

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<tr>
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<td><strong>PARTICULATE MATTER</strong></td>
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<tr>
<td>No. of Samples</td>
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<td>58</td>
<td>60</td>
<td>59</td>
<td>53</td>
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<tr>
<td>Range of Values</td>
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<td>20-48</td>
<td>22-93</td>
<td>19-71</td>
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<td>16-45</td>
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<td>Average Value</td>
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<td>36</td>
<td>34</td>
<td>31</td>
<td>30</td>
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<td>No. of Times</td>
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<td></td>
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<tr>
<td><strong>SULFUR DIOXIDE</strong></td>
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<tr>
<td>No. of Samples</td>
<td>58</td>
<td>56</td>
<td>52</td>
<td>56</td>
<td>43</td>
<td>49</td>
<td>42</td>
</tr>
<tr>
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<td>5-63</td>
<td>5-15</td>
<td>5-5</td>
<td>5-10</td>
<td>5-5</td>
<td>5-5</td>
</tr>
<tr>
<td>Average Value</td>
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<td>10</td>
<td>5</td>
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<tr>
<td><strong>CARBON MONOXIDE</strong></td>
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<td>2.3</td>
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<td><strong>OXIDANT (OZONE)</strong></td>
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<td>295</td>
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<td>335</td>
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<td>2</td>
<td>2</td>
<td>1</td>
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<td><strong>OTHERS:</strong>*</td>
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</tr>
<tr>
<td>NITROGEN DIOXIDE</td>
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<tr>
<td>Range of Values</td>
<td>6-77</td>
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<tr>
<td>Average Value</td>
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<td>No. of Times</td>
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<tr>
<td>State AQS Exceeded</td>
<td>0</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**NOTES:** See text for locations of monitoring stations. Carbon monoxide reported in milligrams per cubic meter; other pollutants in micrograms per cubic meter. Carbon monoxide and ozone are daily peak one hour values; lead is quarterly; other pollutant values are for a 24 hour sampling period.

**SOURCE:** State of Hawaii Department of Health
project area. Until September 1979, and after June 1983, carbon monoxide monitoring was conducted at the Department of Health building at Punchbowl and Beretania Streets in urban Honolulu. This site is about 12 miles southeast of the project. During 1981, carbon monoxide was measured at Fort DeRussy in Waikiki (13 miles southeast of the project), and in 1982 carbon monoxide was monitored at Leahi Hospital in Kaimuki, about 15 miles southeast of the project.

Ozone levels were also measured at the Department of Health building in urban Honolulu until December 1980, when the monitor was relocated to Sand Island (about 10 miles southeast of the project site). During 1981 nitrogen dioxide was also monitored at the Sand Island location, but all nitrogen dioxide monitoring has since been discontinued. Lead measurements for 1984 are from Liliha Street in Kalihi, about 11 miles southeast of the project site.

From the data presented in Table 5, it appears that State of Hawaii ambient air quality standards for particulates, sulfur dioxide, nitrogen dioxide, and lead are currently being met at nearest monitoring stations to the project area. On the other hand, carbon monoxide and ozone readings from urban Honolulu indicate that allowable State of Hawaii standards for these vehicle-related air pollutants are being violated at a rate of about once or twice a year. Ozone is an indicator of the formation of photochemical pollutants in the air, a condition which tends to develop if the air mass over the islands has been fairly stable with little wind flow for a period stretching over several days.

Concentrations of carbon monoxide are more directly related to vehicular emissions and tend to be highest during periods of rush hour traffic. Carbon monoxide would thus be the pollutant most likely to cause difficulty in meeting allowable State of Hawaii AQS as a result of new residential development on Oahu.
There are power plants and other potential sources of industrial pollutants along the central portion of the leeward coast to the south of the project site, but the generally low readings of particulates and sulfur dioxide at the Pearl City monitoring station just to the south of the project indicate that these sources are not likely to cause any air pollution problems at Waiehele. Likewise, pineapple cultivation to the north could generate some particulates and carbon monoxide when fields are burned after harvest (about once every three years for any given field), but the consistent low readings for particulates at Pearl City indicate that this source is not likely to present any significant air pollution problems, either. Since the pineapple fields are to the north and the H-1 Freeway to the south, it is relatively unlikely that carbon monoxide from both these source could be carried over the Waiehele site at the same time.

Finally, natural air pollutant producers which could affect air quality in the Waiehele project area include the ocean (sea spray), plants (aero-allergens), dust, and perhaps a distant volcanic eruption on the Island of Hawaii. Concentrations of air pollutants from these kinds of sources should be fairly uniform for most Oahu locations.

H. Ambient Traffic Noise Conditions

The traffic noise study for the proposed project was prepared by Y. Ebisu & Associates and is attached as Appendix C.

The existing traffic noise environment along H-1 Freeway in the area of the project is in the "Significant Exposure, Normally Unacceptable" category, with traffic noise at 70 Ldn along the north (or mauka) Right-of-Way. On the opposite (or makai) side of the freeway, traffic noise levels are higher due to the directional characteristics of the traffic, and the noise levels are 71 Ldn along the makai Right-of-Way. Behind man-made or natural shielding
features where line-of-sight to the freeway is completely or partially blocked, the traffic noise levels diminish rapidly with increasing distance from the freeway centerline. Because the Right-of-Way width of the freeway is in the order of 260 to 300 FT, the first row of any residential development on either side of the freeway is in the "Significant Exposure, Normally Unacceptable" category. Exceptions would occur only if terrain shielding features or buffer lands exist between the development and the freeway.

Along Kamehameha Highway existing traffic noise levels are also in the "significant Exposure, Normally Unacceptable" category along the highway Right-of-Way. Existing setback distances to the 65 Ldn contour line vary from 72 to 81 FT from the centerline of the highway, while the distances to the Right-of-Way vary from approximately 35 to 65 FT.

The results of the May 19, 1985 traffic noise measurements are summarized in Table 6. In general, the agreement between measured and calculated (predicted) noise levels was good. The large discrepancy between measured and predicted levels at Location #5 was probably attributable to excess attenuation caused by plant nursery structures in the area. Figures depicting the noise measurement locations are included in Appendix D.

I. **Infrastructure and Utilities**

1. Water System

   Presently, water facilities on the site include one 1.5 million gallon reservoir, several deepwells and 12-, 20- and 36-inch water transmission mains. The existing municipal reservoir and deepwells serve Waipahu Town and subdivisions makai of the H-1 Highway through a 20-inch transmission water main up to the 128-foot elevation. The existing 12-inch water main, which is supplied by the present Crestview water source (1.0
TABLE 6
MAY 19, 1984 TRAFFIC NOISE MEASUREMENTS

<table>
<thead>
<tr>
<th>Location</th>
<th>Time of Day</th>
<th>Ave.Speed (MPH)</th>
<th>Equivalent Hourly Traffic Volume</th>
<th>Measured Leq (dB)</th>
<th>Predicted Leq (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 15 FT from fenceline of H-1 Freeway</td>
<td>1157</td>
<td>55</td>
<td>2,716 70 0</td>
<td>66.8</td>
<td>65.8</td>
</tr>
<tr>
<td>at Waipahu Gardens.</td>
<td>TO 1207</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. 115 FT from fenceline of H-1 Freeway</td>
<td>1208</td>
<td>55</td>
<td>2,716 70 0</td>
<td>62.7</td>
<td>62.5</td>
</tr>
<tr>
<td>at Waipahu Gardens.</td>
<td>TO 1216</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 195 FT from center of H-1 Freeway</td>
<td>1111</td>
<td>55</td>
<td>2,716 70 0</td>
<td>59.0</td>
<td>60.0</td>
</tr>
<tr>
<td>Drive near residence; partially shielded</td>
<td>TO 1122</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>top of roadway cut.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Near Location #3, but 245 FT from</td>
<td>1123</td>
<td>55</td>
<td>2,716 70 0</td>
<td>54.9</td>
<td>54.0</td>
</tr>
<tr>
<td>center of H-1 Freeway.</td>
<td>TO 1131</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Near Location #3 &amp; #4, but 295 FT</td>
<td>1135</td>
<td>55</td>
<td>2,716 70 0</td>
<td>49.0*</td>
<td>53.0</td>
</tr>
<tr>
<td>from center of H-1 Freeway.</td>
<td>TO 1148</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 85 FT from centerline of Kamehameha</td>
<td>1226</td>
<td>40</td>
<td>1,871 38 0</td>
<td>62.1</td>
<td>61.1</td>
</tr>
<tr>
<td>Highway at Lumiaina St.</td>
<td>TO 1241</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Lower than predicted measured level may be due to shielding from plant nursery.
million gallon reservoir), transports water to existing subdivision areas below the H-1 Highway above the 128-foot elevation. Under construction on-site by Amfac Property Development Corp. is a 1.0 million gallon reservoir and 16-inch water transmission main to serve a nearly completed development makai of the H-1 Defense Highway up to the 128-foot elevation (Figure 7).

Figure 7 reflects preliminary plans for water source and transmission. A Water Master Plan, including sources, reservoirs, wells and phased demand for the Waikele project is currently being developed by Community Planning, Inc., consultants for the development. The Master Plan is expected to be submitted to the Board of Water Supply for approval sometime in January, 1986.

The Department of Land and Natural Resources is to determine the amount of water which will be allocated to the development from the Pearl Harbor Ground Water Control Area. The Board of Water Supply has requested for a permitted use of 2.1 mgd for Wells 2400-05 and 06 for the Waikele project from the Department of Land and Natural Resources. These Wells are located at the new Waiwai "228" reservoir site. The request from the Board of Water Supply to the Department of Land and Natural Resources is to be drawn from the balance available of the 11.274 million gallons per day.

Wells No. 2400-05 and 06 have been identified as contaminated well water sources. Amfac is considering a number of alternatives such as exploration for new uncontaminated sources, an activated carbon filtration systems to treat on-site well waters, and the use of off-site wells. Should the use of any wells which are designated as contaminated be necessary, purification of the water and subsequent approval by the Department of Health, Department of Land and Natural Resources and the Board of Water Supply to approved potable water standards will

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be required and obtained. Should purification be necessary, an activated carbon filtration system will be utilized.

2. Sewage Treatment and Disposal

The project area is considered a part of the tributary of the regional wastewater treatment facility at Honolulu. Two existing municipal sanitary sewer trunk lines traverse the project site and serve to transport wastewater to the existing Waipahu Sewage Pump Station on Depot Road. Wastewater is then pumped to the regional plant at Honolulu for treatment and discharged into the Pacific Ocean off the Ewa Coast.

3. Electrical and Telephone Service

Electrical and telephone systems facilities can be found at residential communities adjacent to the project site. These facilities do not currently service the project site.

4. Solid Waste Collection and Disposal

Solid waste generated at the adjacent residential communities are collected and disposed of by the Department of Public Works, Division of Refuse Collection and Disposal. The Pearl City Refuse Yard collects the refuse and disposes it at the Waipahu Incinerator.

J. Public Facilities and Service

1. Police Protection

Present police facilities are located at a substation in Pearl
City on Waimano Home Road. Waiele residents will be part of the Waipahu police "beat" and could expect a nominal (4/ minute) response time to calls. The average response time within the entire Waipahu District is 6.09 minutes. The Honolulu Police Department considers protection in the area adequate. The existing crime rate in the immediate area is low, consisting mainly of nuisance calls for dumping solid waste materials and related refuse, motorcycle noise, children, and pet problems.

2. Fire Protection

The project area receives fire protection from the City Fire Department. The proposed development site is currently served by a fire station located at 94-121 Leonui Street. This fire station houses an engine company of 18 personnel (6 per platoon), and headquarters for a battalion chief and his aide. This fire station serves the entire Waipahu area and furnishes supportive services to Ewa-Makakilo and Ewa Beach.

3. Health Care Facilities

Health care for the Waipahu residents is available at the Waipahu Clinic and the Punawai Clinic. The latter is a Kaiser Foundation clinic and as such offers specific local services with access to the larger Kaiser Medical Center. The Waipahu Clinic has a staff adequate for serving the basic health needs of residents from Waipahu to Waimanalo. The Waipahu Clinic offers a variety of services such as physical, occupational and speech therapy; public health nursing; children's health services; leprosy clinics; and complete mental health services. The nearest hospital services for residents are available at Wahiawa General Hospital. The newly opened Kaiser Permanente Medical Center in Moanalua will also provide services to area residents. The proposed St. Francis Hospital
on the Ewa end of Waipahu is currently under City Council review and may provide additional services to area residents.

Services provided by governmental social services agencies in such categories as child care, adult assistance, and family services are available from the State Department of Social Services/Housing. In Waipahu there is a welfare unit which offers only emergency financial aid for food, shelter, and utility payments. Other public resource groups, such as Child and Family Service and religious groups also offer various types of aid to those in need.

4. Educational Facilities

The Waipahu area is served by several schools found in the region. Grades K-6 are housed in three facilities: Ahrens, Honowai, and Waipahu Elementary Schools. The intermediate school students, grades 7 and 8, attend Waipahu Intermediate. Grades 9-12 attend the Waipahu High School.

5. Recreational Facilities

There are at present a developed district park in Waipahu as well as Honowai Park serving as a neighborhood facility. Various beach facilities have been developed by the Parks and Recreation Department at appropriate locations along the ocean front and are reasonably accessible to the project.

K. Related Projects and Social Characteristics

The Waikiki site is defined by distinct physical boundaries delineating its edges. The makai edge of Waikiki borders the H-1 Freeway and Waipahu Community. Waikiki Gulch separates Waikiki from Village Park, a growing new residential community. Kamehameha Highway and the Gentry-Walpio development and Crestview and Seaview developments are directly east of the Waikiki site.
Waikiki border existing urban developments on three sides. These development provide a mixture of single-family detached and attached houses, townhouses and garden apartments. Village Park and Gentry-Waipio developments both plan to include small neighborhood shopping centers as part of their community-serving facilities.

Waipahu, the oldest and largest adjacent community, offers a full range of services and facilities. These include the old Waipahu town core, the commercial strip along Farrington Highway, Waipahu Cultural Garden Park, the Oahu Sugar Mill, and a light industrial subdivision development makai of Farrington Highway.

Waikiki matches these surrounding conditions with planned housing types that are similar in density and character to that in Waipio-Gentry, Village Park, Crestview and Seaview as well as compatible and harmonious with older housing areas within the Waipahu community.

The overall density and form of housing will be similar: Waikiki's residential uses include a total of approximately 2,700 residential and apartment units at R-6 and A-1 Residential densities. The R-6 Residential density category would consist of a variety of unit types, including single-family detached, zero lot-line, townhouses, duplexes and fourplexes. The A-1 Density Apartment density category will include garden type apartments. The provision of this range of housing types, at prices aimed at the full spectrum of income groups, will add to the desirability and livability of the Waipahu region as a well-rounded community. It will provide opportunities for upward mobility housing purchases for areas residents as well as for young families making their first purchase of a home. Waikiki will provide affordable housing.

Waikiki's recreational amenities will also provide benefits to the greater Waipahu community. Its golf course and clubhouse facilities will provide meeting places and space for social gatherings as well.

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as a conveniently located regional recreational resource. The
planned Waieke Recreation Center and two, strategically located
neighborhood parks will also contribute greatly to meeting longstanding
need for upgraded recreational facilities on the part of Waipahu
residents.

Positive interactions will also occur between Waipahu and Waieke in
regard to commercial services and shopping opportunities. The
revitalization of Waipahu's town core will be greatly enhanced by
increased market demands emanating from Waieke residents.

Community participants in the formulation of the Waipahu 2000 Plan
indicated support for the project.

L. Agricultural Significance of Project Lands

The economic and social impacts of the proposed land use change
were assessed by Evaluation Research Consultants in Economic
Impact of the Proposed Waieke Development, Appendix D.

The agricultural significance of the subject lands can be evaluated
by examining the past and present use of the lands and their
physical characteristics, climate, and location. In brief, the
majority of the subject lands are designated "Prime Agricultural
Lands" by State of Hawaii Department of Agriculture and consist
of fairly flat to gently and moderately sloping terrain; the pre-
vailing winds are gentle, averaging about 5 mph; the area is
exposed to long hours of direct sunlight for the greater portion
of the year, and receives and average of 26 inches of rain per
year. The remainder of the subject lands, classified as "Other
Important Agricultural Lands," are gullies.

Currently the majority of the site is fallow except for the 186 acres
of the subject lands which were planted with ratoon sugarcane as a
soil erosion and flood control measure. Previous to 1982 the subject
lands were used for sugarcane production by the Oahu Sugar Company.
The site contains 456 acres of Prime agriculture lands and 120 acres of Other Important Lands. The "Prime designation means that the property has all the physical and climatic conditions which permit sustained high yields under economically advantageous operating conditions. Such lands are characterized by high yields with relatively low costs and little risk of damage to the physical environment. The category of "Other Important Lands" exhibits production problems such as flooding, erosion, etc. that require greater production costs, such as more drainage, more fertilizers, etc., and result in reduced yields.

The agricultural significance of the subject lands can be examined in terms of the total amount of existing lands of similar quality. As shown in Table 7, the subject lands constitute a very small percentage of such lands. The "Prime" lands are about 0.3 percent of the "Prime" lands on Oahu and the "Other Important Lands" are about 0.4 percent of the lands in this category on Oahu.

Table 7

Agricultural Land Designations Related to the Subject Lands

<table>
<thead>
<tr>
<th>Agricultural Land Designations</th>
<th>Statewide</th>
<th>Oahu</th>
<th>Subject Lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime</td>
<td>304,310</td>
<td>55,563</td>
<td>456</td>
</tr>
<tr>
<td>Unique</td>
<td>31,320</td>
<td>9,006</td>
<td>0</td>
</tr>
<tr>
<td>Other Important</td>
<td>642,544</td>
<td>29,990</td>
<td>120</td>
</tr>
<tr>
<td>TOTAL</td>
<td>978,174</td>
<td>94,559</td>
<td>576</td>
</tr>
</tbody>
</table>

III-33
The approximate 600 acres in question appears slightly more significant when viewed as a percentage of the lands currently being used for crop production. The acreage currently being used for crop production on Oahu would increase by 0.9 percent if the lands currently fallow were put back into production, and the sugarcane acreage on Oahu would increase by 3.3 percent. The lands currently planted to cane on the subject parcel represent less than one percent (0.7) of the sugarcane lands on Oahu.

In terms of the importance of the subject parcels relative to the total acreages in the State, the percentages become very small. If the fallow lands were returned to sugarcane production the total land in sugarcane would increase 0.2 percent and total land in crops would increase 0.15 percent. Removing the 186 acres currently planted to sugarcane would reduce sugarcane land and total land in crops by less than 0.1 percent.

Finally, three factors in the determination of economic feasibility for raising alternative crops on Waikole lands are cited. These factors were duly considered by Amfac in their preliminary study of using Waikole as agricultural revenue producing lands. These factors as listed are as follows:

1. Cost and supply of water – under existing conditions, the most readily available supply of water is from Oahu Sugar Company. This water would have to be pumped up to the Waikole fields and the pumping cost is substantial, exceeding $100/acre afoot. Most crops require about 5 acre feet per year, although some, such as daikon and perennial crops, require more. Thus, water pumping costs could cost over $500/acre.

2. Domestic wells/reservoirs location – In the Waikole area, wells and reservoirs would be competing with modern agricultural practices normally used in truck crops. Extensive uses of pesticides and fertilizers (exceeding that used for Sugar in
quantity and toxicity) combined with public hysteria relating to pesticide contamination of domestic water supplies severely limit the feasibility of producing several crops.

3. Close proximity of residential lands - Existing residential lands to the south and northeast of Waiehu create conflicts that are normally associated with competing land uses (Diversified Agriculture and Residential). Diversified agriculture requires extensive uses of pesticides and heavy farm equipment, all near residential housing; this is a hazard to children, and resulting noise and dust are obnoxious to existing residents.

M. State Plan, Land Use and Regulatory Characteristics

1. Hawaii Revised Statutes, Chapter 205 Land Use Commission

Hawaii Revised Statutes Chapter 205 sets forth the requirements for the classification of lands in the State of Hawaii.

Section 205-2 provides that the Land Use Commission shall set the standards for determining the boundaries of each district provided that in the establishment of boundaries for urban districts a sufficient reserve area for foreseeable urban growth shall be included, and that in the establishment of the boundaries of agricultural districts the greatest possible protection shall be given to those lands with the high capacity for intensive cultivation and consideration shall be given to the General Plan of the county (Figure 8).

2. Hawaii Revised Statutes, Chapter 226, Hawaii State Plan

The Hawaii State Plan is a guide for the future long-range development of the State which identifies goals, objectives, policies and priorities for the State. The overall theme of the Hawaii State Plan is:

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- Individual and family self-sufficiency
- Social and economic mobility
- Community or social well-being

Specifically, the Hawaii State Plan details objectives and policies in the various areas such as population, the economy, physical environment, facility systems, socio-cultural advancement and fiscal management. The Walkele Project is consistent with many of the goals and policies of the Hawaii State Plan and has been designed to facilitate its objectives.

Population, H.R.S. Section 226-5

The Walkele project, as a totally planned community concept, accommodates population growth, and provides increased housing, employment and recreational opportunities for Hawaii's people. Walkele will provide commercial and retail employment centers and diverse residential alternatives. The project is in reasonable accord with the General Plan of the City and County of Hawaii which sets forth the City's desired population densities and circulation pattern. Additionally, as a planned community Walkele ensures that adequate support services and facilities will be provided for its residents.

Economy H.R.S. Section 226-6

The Walkele Project will promote these policies by providing new construction activity over a period of years consistent with the desired planned growth. Furthermore, in addition to the employment generated by the construction activity the commercial retail and office space developed in the property will provide locations for increased jobs in the area.

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Agriculture H.R.S. Section 226-7

While the Waimea Project, would use 577.210 acres of land which has been withdrawn from sugar cultivation, it is nevertheless a major sector in the State's economy by consolidating the sugar industry. The Waimea concept is a positive approach to the State's sugar problems and encourages the continued viability of sugar and agriculture.

Scenic, Natural Beauty and Historic Resources H.R.S. Section 226-13

The Waimea Project accomplishes these objectives by providing scenic mountain and ocean view areas of open space, limited building heights and extensive landscaping. The project concept maintains the rural and historic character of the Waipahu community.

Land, Air, and Water Quality H.R.S. Section 226-13

The Waimea Project recognizes the historical and heritage attributes of Waipahu and the physical qualities of Hawaii. Consistent with this, a plantation theme is being suggested in the design of the residential areas of the project. This design theme is harmonious with the surrounding areas and Waipahu's low profile scale and character.

Additionally, the proposed development would urbanize lands which are in close proximity to existing services and facilities. The project site is bounded by Crestview, Waipahu town and...
Village Park, and the existing infrastructure of major highways, drainage system and sewer and water lines are adequate or capable of expanding to meet the projected demand from Waiea. Schools, police, fire and other public services which already serve the Waipahu area are also available.

**Water H.R.S. Section 226-16**

The Waiea Project will provide for the development and construction of two off-site 1.0 million gallon capacity reservoirs and a 16-inch water transmission main.

The Waiea Project projects an average daily use of 2.1 million gallons, which will be requested from the Board of Water Supply. The 2.1 million gallons is less than the amount that was used to irrigate the subject property when it was in sugar cane production. It is not anticipated that the water demand generated by the project will prevent the attainment or maintenance of a "substantive yield capacity" in the amount of ground water in the Pearl Harbor Basin.

**Transportation H.R.S. Section 226-17**

The Waiea Project proposes several improvements to alleviate the impacts of the project and future developments in the Central Oahu/Ewa area. Plans call for construction of an H-1 interchange at Pawa Street, improvement of Kamehameha Highway, and extension and improvement of Manager's Drive. Other proposed improvements requested by other parties will facilitate traffic circulation in the area.

**Housing H.R.S. Section 226-19**

The Waiea Project is intended to be a middle income community, with approximately 40 percent of the housing targeted
to be sold at prices affordable to middle-income earners. 10 percent of the housing will be priced consistent with City unilateral agreement requirements. There are varied density areas, a planned range of single-family attached and detached dwellings, townhouses, duplexes, quadruplexes and apartment units to facilitate a mix of diverse lifestyles and income groups.

The project is designed to take into account the physical setting, including visual and aesthetic amenities. Its location provides easy access to public facilities and services.

Additionally, in the planning of this project, extreme care and effort has been made to obtain the participation of the existing Waipahu businesses and residential community.

**Education H.R.S. Section 226-21**

The Waiele Project is located in close proximity to existing public school facilities. Additionally, a 6-acre site is to be provided for an elementary school.

**Leisure H.R.S. Section 226-23**

The Waiele Project is designed to provide leisure and recre-ational facilities to the community and the public. The regulation par 72 golf course with a clubhouse for community and social functions is a central open space feature of Waiele. There will also be a 13-acre recreation center with athletic fields, a swimming pool and tennis courts. Additionally, there will be neighborhood parks totalling 9 acres.

3. Hawaii State Functional Plans

In furtherance of the Hawaii State Plan, Hawaii Revised

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Statutes, Chapter 228, the 1984 State Legislature by concurrent resolution adopted ten Functional Plans to serve as guidelines for the State of Hawaii. The Waieaie Project conforms to and facilitates many of the objectives and policies of these Functional Plans.

State Housing Plan

The Waieaie Project is designed to accommodate the diverse housing needs of the residents of Waieaie and Oahu.

Representatives from various organizations indicated that there exists a sufficient share of low-income and subsidized housing and that more middle-income housing is needed in the Waieaie area. Waieaie will offer to Waieaie residents a certain upward mobility in their future housing purchases. While the Waieaie project is primarily a middle-income housing project, it is also designed to satisfy the desire for low density housing in a golf course setting. There will be approximately 2,700 dwelling units, with a mix of single-family detached homes, townhouses, duplexes, quadruplexes and garden apartments.

State Recreation Plan

The Waieaie Project, as a total, planned community, supports the achievement of these objectives and policies. The project is designed to retain the heritage as well as the scenic, physical and recreational resources of Waieaie. Waieaie provides a variety of recreational facilities for both its immediate residents and residents of surrounding areas, including a 142 acre golf course, neighborhood parks, athletic fields, swimming pool and tennis courts.
State Transportation Plan

The Waiekele Project proposes improvements to the H-1 Freeway which will facilitate and redistribute traffic now entering the congested Waialua Interchange. The generation of 2000 jobs in Waiekele will indirectly benefit traffic conditions on the H-1 Freeway by reducing the amount of traffic directed towards urban Honolulu. Improvements to Kamehameha Highway are also contemplated. Additionally, the project is designed to promote pedestrian and bicycle use as an alternative to vehicular traffic.

State Water Resources Development Plan

The Waiekele Project will request a water allocation from the State Department of Land and Natural Resources and/or the Board of Water Supply at the necessary time. The planned level of development on the site will generate an average daily water consumption of 2.1 million gallons which is less than the amount that was previously used to irrigate the property when it was in sugar cane production.

The project will have little impact on the availability of fresh water supplies for other uses. It is not expected that the project will prevent the attainment or maintenance of a "sustainable yield capacity" in the amount of ground water in the Pearl Harbor basin.

Planned for construction are two 1.0 million gallon capacity reservoir and a 16-inch water transmission main. Drainage in the area will be handled by existing facilities and a new box culvert system.

State Energy Plan

The Waiekele Project attempts to achieve these objectives. The
project is located in an easily serviceable and concentrated area which is next to existing urban developments. The community is designed to encourage the use of walkways and bicycles as an alternative to the private automobile. Moreover, solar energy use will be promoted for residents.

State Health Plan

Residents of Waipahu will have adequate health care facilities available at the Waipahu Clinic and Punawai Clinic. Punawai Clinic is associated with Kaiser Foundation and offers specific local services with access to the larger Kaiser Medical Center. Waipahu Clinic is designed to serve the basic health needs of residents from Waipahu to Waianae and offers a variety of services such as physical, occupational speech therapy; public health nursing; children's health services, leprosy clinics; and complete mental health services. Additionally, Wahalua General Hospital offers a full range of hospital services.

4. General Plan of the City and County of Honolulu

The General Plan of the City and County of Honolulu was adopted in 1977. Its growth objectives are based on a concept which directs urban growth on the island by distributing future population expansion to specific geographic areas. Two of its basic aims are to prevent "urban sprawl" and "scattering," terms which connote the seemingly endless and undefined extension of urban areas and inappropriate urban "pockets" in otherwise undeveloped areas. Other objectives of the Plan are to enable the sugar and pineapple industries to remain viable, to minimize the public sector cost of urbanization by directing growth to appropriate areas where infrastructure and utilities are or can be made available at a reasonable cost, and to retain and enhance the distinctive character of the various living environments.
The proposed urbanization of Waikele is in accord with the General Plan policies relating to Population and Physical Development and Urban Design. These policies reflect the gradual development of a Secondary Urban Center development (SUC) in the West Beach/Makakilo area and encourage development of a major residential, commercial, and employment center within the SUC. The Waikele Development is consistent with this policy in that it is complementary to the commercial, industrial, and resort elements of the SUC.

The proposed urbanization of Waikele is fully consistent with the Oahu General Plan's (GP) present distribution policy; therefore, no amendment to this or any other GP policy is needed in order to permit Waikele urbanization under the City's planning program. The GP's projected population distribution percentage range for Central Oahu is set at 12.8 - 14.2% of the total projected population for Oahu.

The official DPED update of the projected Oahu Population from 917,400 to 954,500 (year 2005) established once more a 20-year time horizon for the GP as required by the Plan itself and removed population allocation as an issue. With this extension Central Oahu's GP population capacity became large enough to accommodate Waikele's 8,100 persons without a need to increase the planned population allocation for that area. This allocation is now set at 12.8 - 14.2% of Oahu's, total year-2005 projected population (954,500 persons) by the GP. Using the year-2005 projected Oahu population of 954,500 persons, Central Oahu's population capacity increases to 135,500 persons by the year 2005.


Prior to the official update by the State Department of Planning and Economic Development (DPED) of the projected total population for Oahu from a year-2000 population projection of 917,400 persons to a year-2005 projection of 954,500 persons, the Waikele project's proposed addition of
The present land development capacity for Central Oahu, established by the Central Oahu Development Plan (DP), allows for approximately 127,900 persons in that area. The difference between GP population capacity (135,500) and DP development capacity (127,900) represents the amount of future population growth permissible (67,600). Wherever GP population capacity exceeds DP development capacity, more growth is permissible. If the situation is reversed, or if capacities match each other, no more additional growth for the area in question is permissible. After the GP's population projection for Oahu was updated to reflect the State's year-2005 projections, Central Oahu's population capacity exceeded its development capacity by about 7,600 persons (135,500 - 127,900 = 7,600). Waieke's proposed 8,100 basically can be accommodated under the new GP population capacity for Central Oahu without any need to increase the area's population distribution percentage range of 12.8 - 14.2% set by the GP.

Because Waieke's 8,100 persons can be accommodated under the GP without any need to alter the population distribution percentage range for any Development Plan area, including the Ewa DP area, which includes the planned "Secondary Urban Center", Waieke is also not in conflict with continued City pursuit of major new growth within the Secondary Urban Center. Waieke is a new growth within the Secondary Urban Center. Waieke is a suburban development which is also consistent in intensity, scale, character and tenor with those Urban Fringe areas in Central Oahu (i.e. Waipahu, Village Park, Wapio-Gentry, etc.) now
set in the GP. As an Urban Fringe development, Waikele will not detract from any City effort to direct major new growth to the Secondary Urban Center as called for in the GP.

The Waikele Project will also contribute to the general welfare and prosperity of the people in the following ways:

1. Provide needed housing to low, moderate, middle and high income households in a desirable living environment.

2. Provide a needed revenue source to Oahu Sugar Company to assist in its survival effort by providing: a) a reasonable return on its investment which, in turn, assists all residents of Oahu by improving the viability of the sugar industry and diversified agriculture endeavors; b) retaining direct and indirect job opportunities and benefits to the economy generated by Oahu Sugar Company, and c) maintaining a 14,200 acre open space system.

3. Provide approximately 2,000 jobs in the Village Center and Office/Business Park.

4. Provide needed recreational and community facilities and services, primarily to meet the needs of Waipahu and Waikele residents and, to some degree, West Oahu residents.

5. Provide needed public infrastructure such as street and highway improvements to the surrounding community.

6. Provide open space vistas to the Waianae mountain range, the Koolaus, Pearl Harbor and Diamond Head within, as well as when viewed from outside Waikele.

Finally, the Waikele Project is consistent with the Population Guidelines found in the General Plan and all pending amendments.

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5. Central Oahu Development Plan

The proposed project is situated within the Central Development Plan District and was designated "Agriculture". The applicant had requested a development plan amendment from the City and County of Honolulu, which was approved.

6. Zoning

The Waieele site is currently zoned "AG-1". At the appropriate time the applicant will apply for a zoning district change with the City and County of Honolulu (Figure 9).

7. H.R.S. Chapter 205-A Coastal Zone Management

The Waieele Project Site is not designated as a special management area for which a permit is required pursuant to H.R.S. Chapter 205-A. However, the Project Site is within an area controlled by the CZMA and is, therefore, subject to H.R.S. Chapter 205-A's objectives and policies.
IV ANTICIPATED IMPACTS
AND MITIGATIVE MEASURES
IV. ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

A. Impacts on Geographical Characteristics

1. Topography

In general, the on-site soils are suitable as engineered fill material. The U.S. Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," August 1972, indicates that throughout the site, hard basaltic rocks/boulders four feet in diameter may be encountered during grading activities. These boulders or rock units should be broken down to size or be used elsewhere in the development where it does not affect any proposed building areas. A number of irrigation flumes and ditches cross the site at various locations. Some features, including abandoned pipelines, may now be buried and could present obstacles to site grading.

Prior to beginning of any grading operation it will be necessary to strip all existing vegetation from areas to be developed, including removal of all the sugar cane and their root systems. The material exposed after the stripping operation may be used for engineered fill. After stripping, slab and pavement subgrades and areas to receive engineered fill should be excavated of any and all loose soils.

To minimize the occurrence of soil erosion, temporary soil erosion and sediment control measures will be designed and implemented during the construction phase in accordance with Chapter 23, Grading, Soil Erosion, and Sediment Control, Revised Ordinances of Honolulu, 1978, as amended; the City & County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968, 1972; and the USDA Soil Conservation
Services Erosion and Sediment Control Guide for Hawai‘i, 1981. Approval by the City & County of Honolulu Department of Public Works will be required to ensure proper grading and erosion control.

2. Geology

No impacts are expected on the geology of the area therefore, no mitigative measures should be required.

3. Soils

Impact on the soil will result from introduction of soil conditioners and EPA approved fertilizers, pesticides, and herbicides. These conditioners will enhance the grassing and landscaping of the project site. The introduction of such chemicals, however, will not adversely affect the soil.

Subsurface soils are capable of supporting conventional building foundations. For heavy, concentrated loads deeper foundation footings into weathered rock or bedrock formation may be considered. Along steep slopes or in soft soils foundation footings may have to be deepened or modified accordingly. No mitigative measures should be required for soils impact.

4. Climate

No impacts are expected on the climate of the area.

B. Impact on Hydrological Characteristics

1. Surface Runoff

During construction potential incidences of erosion and sedimentation may impact the water quality of the Waikiki Stream.

IV-2
during a significant storm, resulting in increased constituent loads, nitrogen, phosphorus, and suspended solids. However, impacts to these waters are not anticipated to be significant, since erosion and sedimentation problems would arise only during heavy storms and secondly, since on-site efforts will be made to minimize erosion problems.

The proposed project will increase the amount of stormwater runoff, as the ultimate development will create impervious surfaces that will reduce soil absorption activity. The increased runoff will also affect the water quality of the stream. Drs. Gordon Dugan and Michael Chun prepared the report entitled "Surface Water Runoff and Water Considerations for the Gentry-Waipio Project," in 1977. The report evaluated the environmental impact of the then proposed Gentry-Waipio Project as it related to surface water runoff. From an assemblage of available baseline hydrologic and water quality data, an estimate of the quality characteristics of surface water runoff from that project site was made. The Gentry-Waipio site is located just north and across the Kamehameha Highway from the Wailele Development site. Estimates provided in the study may be utilized for this project since the Wailele Development is in close proximity to the Gentry-Waipio site and is similar in scope. Further, Gentry-Waipio is comprised of an almost equal amount of acreage (510 acres) as that of Wailele (577 acres). The following summarizes findings from the Surface Water Runoff Report.

The calculated incremental change in nitrogen, phosphorus, and suspended solids output, due to project construction for the various storm intensities and durations under review ranged from an increase of 32 to 322 lbs/event and 63 to 630 lbs/event, respectively, for nitrogen and phosphorus to a decrease in suspended solids is a direct result of stabilization and covering of the soil. However, the output from the
approximately 40 percent of the property which presently drains toward Kipapa and Waimea Streams and into West Loch Pearl Harbor would decrease by 26 to 258 lbs/event, 3 to 27 lbs/event, and 15 to 155 lbs/event for nitrogen, phosphorus, and suspended solids, respectively.

Based on the extreme incremental change situation per storm event for 510 acres of the proposed development, (the 100 yr storm with a 24 hr duration) in comparison to the constituent yield, from the entire 4,400 acre Panakauahi Gulch drainage area, the nitrogen and phosphorus would theoretically increase by 2.5 and 48%, respectively, and suspended solids would decrease by 0.6%. While the incremental change, even for the 100-year event, is relatively insignificant for nitrogen and suspended solids, the phosphorus is significant.

The impact of construction activities could be mitigated by conforming to strict erosion control measures, in addition to the State Department of Health's Water Quality Standards, Chapter 37-A, Public Health Regulations, 1968.

Impacts to water quality resulting from operations of the project are anticipated to be minimal, because biocides currently in use that may potentially adversely affect water quality tend to break down more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilise unleaded gasoline. Therefore, though the amount of runoff would increase, adverse water quality impacts resulting from increased constituents should not be significant.

2. Storm Drainage

The current drainage proposal is to construct a new culvert
system to accommodate the storm runoff from the tributary area of the western portion of the site which terminates at the Paiwa Street underpass of the H-1 Freeway. From that point, the runoff from the tributary area would be conveyed by a new culvert system to Waikele Stream along an alignment of the H-1 Freeway or follow the present haul cane road either mauka to the Waipahu Mill and discharge the runoff makai of the Waipahu Street Bridge. The remaining, which is the eastern portion of the site presently being served by the two existing public facilities described previously, would continue to be served by the existing concrete channels.

The increased flow to Waikele Stream should have an insignificant impact on that system which serves an existing drainage area of 29,248 acres. The increase in area and, therefore, storm runoff, is only 1.7 percent. Also, the increase in flow will have an insignificant effect on the Waipahu Culture Garden Park.

All proposed improvements will be designed to meet appropriate government standards for public health and safety requirements.

C. Impact on Biological Characteristics

1. Flora

A field survey conducted by Winona Char, Biological Consultant, indicated that no endangered or threatened species exist on the project site. While all existing vegetation will be cleared during the course of construction, these plants primarily consist of cane and weedy species. As the project is developed, extensive landscaping will be implemented with several ornamental plants and trees.
2. Fauna

Three endangered Hawaiian Coots, Alae keokeo, have been observed at the cane irrigation reservoir on the northern end of the project site during a field inspection by the biological consultant. Although the birds were observed within the reservoir, it is not expected that the reservoir is a habitation site, but probably served as a resting area for the birds in transit. The reservoir is proposed for golfcourse use in the Master plan.

Other fauna observed were considered pests or potential pests to the existing agricultural practices and will continue to be to the proposed action. Impacts, therefore, can not be considered significant.

Stream life and receiving waters in Pearl Harbor should not be significantly affected by the implementation of the Walkele Project since constituent values of urban runoff will be less severe in terms of loading and value than previous agricultural runoff.

Grading and grubbing activities will undoubtedly force certain wildlife to relocate to adjacent areas. However, in some instances they will return to the project site for food and shelter, thereby further minimizing any adverse impacts to them.

D. Impact on Archaeological Sites

The archaeological reconnaissance report conducted by Chiniago Inc. indicated that because no evidence of past utilization of the subject property in the form of structural or midden remains was found, and because there have been no archaeological or historical sites previously recorded on the property, the archaeological consultants
recommend that development be allowed to proceed without any further archaeological work. Should any archaeological or historic remains be uncovered during construction, construction will stop and the State Historic Preservation Office will be notified immediately.

E. Waipahu-Wapio Area Population Forecast

As indicated in the Williams-Kuebelbeck and Associates, Inc. study Analysis of Market Potential for the Amfac Properties Waipahu-Wapio Area, the Waipahu-Wapio market area can be expected to capture a larger share of Oahu's future population and housing growth than it has historically. Several factors would contribute to this:

- Oahu is experiencing a growing scarcity of urban areas, and the Ewa District offers the relative advantages of close proximity to Honolulu and major transportation networks as well as large tracts of developable land.

- Further increases to the industrial inventory must necessarily occur at industrial parks within the Waipahu-Walpo area. The employment generated by the development of these parks, together with the employment created by the new facilities at the Barbers Point deep draft harbor, will further encourage population growth at Waipahu-Wapio.

- City and County government policies which target the Ewa District for major growth can only increase its pre-eminence as a location for new population and housing development.

Given these considerations, the area's share of Oahu's population growth has been projected at 55.7 percent for the period from 1980 to 2000, substantially above its 45 percent share of the Island's 1970 to 1980 population increase. The derivation of this projection is also found in a component-by-component analysis of projected
growth for the Development Plan Areas which comprise the Waipahu-Waipio area. The Waipahu-Waipio area, as noted previously, contains all of the Ewa Development Plan Area and substantial portions of the Primary Urban Center and Central Oahu DP Areas. As noted below, analysis based upon the 1982 revision of the City General Plan indicates that population in the Waipahu-Waipio market area should increase over the next 20 years as noted in Table 8. Population within the market area is thus projected to increase by 85.0 thousand persons between 1980 - 2000, reaching a total of 276.1 thousand persons by the end of the century. The proposed Waieke project when fully developed, is expected to be responsible for the contribution of approximately 8000 residents of the previously projected population figures.

F. Impact on Traffic Conditions

Traffic studies have been prepared by Austin, Tsutsumi and Associates (see Appendix A). The study identifies and assesses the impacts of traffic which would be generated by the Waieke project development and assessed existing conditions; trip generation characteristics of the proposed development; and projected conditions on the highway network. It also evaluated traffic conditions which would result when the proposed development is superimposed over these projected conditions.

Because of the magnitude of the proposed development and the nature of a planned development, a certain amount of trip interaction among land use activities within the development is assumed; that is, a proportion of the total trips generated is assumed to remain within the study area and not impact the external highway system. However, the proposed Kamehameha Highway expansion and the new Palwa Street Interchange will, improve existing traffic conditions within the immediate area. The commercial-retail center is expected to be a neighborhood-oriented shopping center and is not expected to attract a significant number of external trips. Finally,
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2/ 100% of total Waipahu DP area 1980 population.
3/ 100% of total Waipahu DP area 2000 population utilizing mid-point of population percentage range indicated for the area under the City General Plan 1982 revision.
4/ 86.9% of total Central Oahu DP area 1980 population.
5/ 30% of Central Oahu 1980-2000 growth anticipated under the 1980 General Plan revision utilizing the mid-point of the projected range. (It should be noted that the upper limit of the projected growth in this DP area has been increased by 5 percent in more recent projections.)
6/ 12,4% of total PUC DP area 1980 population.
8/ The urban market analysis by Williams-Relabelleck and Associates, Inc., originally envisioned a population in the market area of 387,300 persons; recent trends indicate that this projection is low, and has been revised here accordingly.
employment opportunities are expected to attract trips from within Wailea itself and nearby residential areas in Leeward and Central Oahu.

Development of the proposed Wailea project is expected to be a continuous process. However, for traffic generation discussion purposes the total development is divided into two phases, each representing about one-half of the overall master plan.

The trip generation characteristics for Phases I and II are shown in Table 9.

1. Phase I - Trip Generation

Phase I consists of the development of the eastern half of the project site, which includes 370 single family (low density) dwelling units, 436 townhouse and clustered (medium density) dwelling units, and 375 garden apartment type (high density) dwelling units, for a total of 1181 dwelling units; a 135 acre golf course, and a 30 acre office park.

The construction of the proposed Pa'ia Interchange, along with improvements to the existing feeder street systems makai of the freeway, and the widening of Kamehameha Highway, are included in Phase I to accommodate the increased traffic demand.

2. Phase II - Trip Generation

Phase II consists of the development of the remainder of the 577± acre site, which includes 486 single family (low density) dwelling units, 535 townhouse and clustered (medium density) dwelling units, and 507 garden apartment type (high density) dwelling units, for a total of 1528 dwelling units; a commercial center consisting of 150,000 square feet of floor space; a 9 acre recreation center; and the remainder of the office park.
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IV-11
The construction of the community-proposed Bypass Road for Waipahu Street is assumed, completing the street collector system for Waipahu Town.

3. Traffic Assignment

Phase I and Phase II traffic generation are superimposed over the Year 1990 and the Year 1995 travel demand forecasts derived from the State Department of Transportation along the major highway corridors in the vicinity. The projected traffic demand is discussed in terms of peak hour characteristics by converting the projected average daily traffic volumes to peak hour volumes using peak hour and directional distribution factors developed from existing travel patterns. Finally, these projections are distributed over the individual facilities on each corridor. Table 10 shows the background traffic demand for the existing conditions, the Year 1990 and the Year 1995.

4. Phase I - Traffic Assignment

The proposed Waimea Development is expected to have a negligible impact on the 1990 traffic conditions on Kamehameha Highway at Waipahu Street. The increased traffic from the proposed development is partially offset by the decrease in turning demand on Kamehameha Highway to and from Waipahu Street. The proposed Paiwa Interchange is expected to attract these Waipahu trips since it provides more direct access to and from the Freeway.

Similarly, the diverted traffic, from Waipahu Town to the Paiwa Interchange, should partially offset the increased demand on the Eastbound H-1 on ramp at Waiau Interchange during the AM peak hour and on the westbound H-1 off ramp at Waiau Interchange during the PM peak hour resulting from the development of East Waimea.

IV-12
<table>
<thead>
<tr>
<th>FACILITY</th>
<th>EXISTING</th>
<th>1990</th>
<th>1995</th>
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<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
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<tr>
<td></td>
<td>ADT</td>
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<td>(KALUAUO STREAM)</td>
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<td>OUTBND</td>
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IV-15
The net increase in traffic, eastbound (inbound) on Interstate Route H-1 during the AM peak hours, is expected to be 6% over the projected 1990 conditions between the proposed Paiwa Interchange and the Waiawa Interchange, of which only about 1% is attributable to site generated traffic from the proposed Waiea Interchange. The remaining 5% is comprised of Waipahu Town trips diverted from the Waiawa Interchange. In the westbound (outbound) direction on Interstate Route H-1 during the PM peak hour, the expected 17% increase over 1990 traffic conditions is primarily a result of Waipahu Town traffic (15%) diverted from Waiawa Interchange.

Most of the increased traffic demand resulting from Phase I of the proposed Waiea Interchange is expected to affect Kamehameha Highway. The State-proposed Waipio Interchange on Interstate Route H-2 is assumed as part of the Phase I traffic assignment network. State DOT planning studies estimate about 1000 vph diverted from Kamehameha Highway to Interstate Route H-1 during AM and PM peak hours in the inbound and outbound directions, respectively. The proposed development is expected to increase traffic on Kamehameha Highway at Waipahu Street by 12% and 6.7%, during the AM and PM peak hours, in the inbound (southbound) and outbound (northbound) directions, respectively. The increase of traffic from the proposed project is expected to be partially offset by decreases in traffic turning on and off Kamehameha Highway at Waipahu Street. These decreases are expected to result from Waipahu traffic diverted to the proposed Paiwa Interchange.

At Kaluaao Stream, the Interstate Route H-1-Moanalua Road-Kamehameha Highway corridor is expected to increase by a net 2.4%, eastbound during the AM peak hour, and less than 3.4%, westbound during the PM peak hour over the projected 1990 traffic demands.
During the peak periods, Phase I of the proposed Waikiki Development is not expected to have significant increase in demand at the Waiakea Interchange; a small increase can be expected on the Interstate Route H-1/Kamehameha Highway corridor in Pearl City; and a more significant increase in demand on Interstate Route H-1, west of Waiakea Interchange can be expected, primarily due to Waipahu Town traffic diverted by the proposed Paiwa Interchange.

5. **Phase II - Traffic Assignment**

Most of the increase in peak period traffic resulting from Phase II of the Waikiki Development is realized at the proposed Paiwa Interchange due to three reasons: first of all, the remaining area to be developed is on the west half of the site and will utilize the Paiwa Interchange as the primary access; secondly, the expected development in the West Beach area should attract more employment opportunities and, therefore, work trips; and finally, the commercial-retail center should attract the after-work shopping trips made by Waikiki residents.

The community-proposed realignment of Waipahu Street to a Bypass Road, mauka of the Sugar Mill, is expected to provide increased access for West Waipahu (west of Waikiki Stream) to the proposed Paiwa Interchange. This traffic is diverted from the adjacent interchanges at Waiakea and Kunia. This redistribution is particularly significant during the PM peak hour.

The increase of traffic over the Year 1995 projection on the Interstate Route H-1 west of Waiakea Interchange is expected to be about 8.6% eastbound, and 38.5% westbound during the AM and PM peak periods, respectively. However, only 7.6% in the morning peak hour and 10.5% in the afternoon peak hour are directly attributable to the proposed Waikiki Development.
The increase in traffic demand on Kamehameha Highway, resulting from the completed development, is +4% inbound during the AM peak hour and +23.7% outbound during the PM peak hour.

Due to the proposed project, the increase in eastbound traffic during the AM peak hour on the Interstate Route H-1 Moanalua Road–Kamehameha Highway corridor at Kalauao Stream is expected to be about 5.4% over the projected Year 1995 traffic conditions. Due to the Waieke Development the increase in westbound traffic during the PM peak hour at this location is expected to be 9% over the projected Year 1995 traffic conditions.

6. Proposed Improvements

These include the development of the on-site roadway system for Waieke and connections to the surrounding highway system. (See Figure 10, Traffic Circulation). The project roadway system consists of collector roads providing access to the major land use areas within Waieke. These include:

a. A 100-foot right-of-way running east-west from Kamehameha Highway across the project site and connecting to Palwa Street; and then a 60-foot right-of-way connecting to Manager's Drive.

b. A 100-foot right-of-way running in a north-south direction, extending from Palwa Street/H-1 Highway to the north edge of the project site; and

c. A 60-foot right-of-way looping generally along the north, west and east perimeters of the project.

Off-site improvements to connect to adjacent highways include:
a. Kamehameha Highway widening from a three-lane to five-lane arterial along the extent of the frontage of the Waiekele project on the highway, including an exclusive left-turn lane into the project.

b. Manager's Drive bridge overpass widening at H-1 Highway from a 30-foot to 60-foot width to accommodate traffic into and out of the project from the Waipahu area.

c. A full service interchange facility on Interstate Route H-1 at the existing Paliwa Street undercrossing, to service the project site and Waipahu Town.

The above improvements are to be undertaken by the project's developer, together with whatever government assistance that is available. These are proposed within the context of other roadway improvements in the area. These additional improvements include: 1) the Interstate Route H-2 Waipio Interchange proposed by the Department of Transportation; 2) Waipahu Street improvements to relieve congestion in Waipahu Town, proposed by the City and County of Honolulu; and 3) a bypass road between Waipahu Street at Waiekele Stream and Waipahu Street east of Paliwa Street, proposed by the Waipahu community. The proposed Paliwa Interchange is expected to have a two-fold effect on traffic circulation in the vicinity. First, it fulfills Central and West Waiekele's access requirements to the freeway. Second, it diverts Waipahu Town traffic currently using Waiawa Interchange. This reduction in traffic demand at the Waiawa Interchange ramps, together with the proposed improvements
on Kamehameha Highway, should produce available highway capacity to accommodate the increase in demand resulting from the development of East Waiehu.

The Waipio Interchange should reduce traffic demand on Kamehameha Highway, and the Waipahu Street improvements and construction of a bypass road should improve Waipahu's collector-feeder system to the Paliwa Interchange. Some of these proposals have duplicate objectives. For example, the construction of both the Paliwa Interchange and the Waipio Interchange would reduce the demand at Waiau Interchange, thereby diminishing the need for the proposed ramp widening. The bypass road could provide an east-west collector street for Waipahu in lieu of a four-lane widening and realignment of Waipahu Street as proposed by the City. Waipahu Street would then become a local street within Waipahu Town.

G. Impact on Air Quality

1. Direct Air Quality Impact of Project Construction

The air quality study conducted by Root (Appendix B), indicates that during the site preparation and construction phases of this project it is inevitable that a certain amount of fugitive dust will be generated. Actual emissions of fugitive dust from this project can be expected to vary daily depending upon the amount of activity and the moisture content of exposed soil in work areas.

One major generator of fugitive dust is heavy construction equipment moving over unpaved roadways.
This problem can be substantially mitigated by completing and paving roadways and parking areas as early in the development process as possible. Because some construction will be taking place in close proximity to existing residential areas, dust control will have to be an item of special concern throughout the construction phase of the project.

Heavy equipment at construction sites will also emit some air pollutants in the form of engine exhausts. The largest equipment is usually diesel-powered. The overall impact of pollutant emissions from construction equipment should be minor compared to levels generated on major roadways nearby.

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

2. Indirect Air Quality Impact

Once construction is completed the proposed project will not in itself constitute a major direct source of air pollutants. By serving as an attraction for increased motor vehicle traffic in the area, however, the project must be considered to be a significant indirect air pollution source.

Motor vehicles, especially those with gasoline-powered engines, are prodigious emitters of carbon monoxide. Motor vehicles
also emit some nitrogen dioxide and those burning fuel which contains lead as an additive contribute some lead particles to the atmosphere. The major control measure designed to limit lead emissions is a Federal law requiring the use of unleaded fuel in most new automobiles. As older cars are removed from the vehicle fleet lead emissions should continue to fall.

By 1995 carbon monoxide emissions from the vehicle fleet then operating are mandated to be little more than half the amounts now emitted.

Once completed, the proposed Waiekele Development is expected to have little direct impact on the air quality of the surrounding region. Indirect long term impacts in the form of increased air pollutant emissions from power plants serving new residences in the project area can be mitigated somewhat by planning and implementing solar energy design features to the maximum extent possible.

Other indirect long term air quality impacts are expected in those areas where traffic congestion can potentially be worsened by the addition of vehicles traveling to and from the proposed project. Project planners can do very little to reduce the emission levels of individual vehicles, but the Traffic Impact Report for the project describes several proposed or planned roadway improvements that could significantly increase highway traffic capacity and facilitate entry and exit from the proposed development with a minimum of increased traffic congestion. Proper planning can also promote pedestrian and bicycle usage which would decrease emission impacts.

Carbon monoxide modeling conducted indicates that the roadway improvements described in the Traffic Impact Report for the project will be adequate to ensure compliance with State and National air quality standards even under worst case traffic and meteorological dispersion conditions.
H. Impact on Noise Environment

1. Construction Impacts

During construction, there is likely to be noise generated from excavation, foundation, erection of structures, and finishing activity. However, adverse noise impacts resulting from the proposed project are expected to be rather limited.

The long-term impact on ambient noise levels is expected to increase due to the increased development scale of the project. The proposed project will indirectly generate more noise, since more automobiles are going to and from the site.

Methods for minimizing noise may be undertaken during construction. These include the: placing of mufflers on construction machinery, equipment, etc.; instructing of workers to avoid unnecessary "gunning" of construction equipment and to turn off equipment when not in use; creating of earth berms which would absorb some of the noise; and limiting construction activity during daylight hours, between 8:00 a.m. to 5:00 p.m. In addition, construction activities must comply with the provisions of Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu. Equipment noise must be attenuated to meet allowable noise levels defined in the regulations, based on zoning districts. A noise permit for the proposed project will be required from the Noise and Radiation Branch of the Department of Health. The contractor shall ensure that all construction equipment is in proper condition, will attempt to enforce the methods mentioned, and will comply with required State and Occupational Safety and Health Administration (OSHA) Standards. Traffic noise from heavy vehicles traveling to and from the construction site must be minimized in residential areas and must comply with
the provisions of Title 11, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu.

The noise that would be created on-site, due to the proposed project, is similar to the noise currently being generated in the vicinity of the site. Therefore, it is expected that generated noise would blend into the surrounding background vehicular noise and would not constitute an adverse effect on the adjacent land uses.

2. Traffic Noise

Predictions of future traffic noise levels were made in the traffic noise study conducted by Y. Ebisu & Associates, (Appendix C), using the traffic volume predictions for the Phase I and II development increments contained in the traffic study. Future traffic noise levels were calculated for total (project plus non-project) traffic. Using traffic study figures, project traffic on H-1 Freeway and Kamehameha Highway will be in the order of 10 percent greater than non-project traffic. Traffic noise level increases attributable to the project traffic are anticipated to be less than 0.5 dB for a 10 percent increase in traffic volume.

The predicted increases in traffic noise levels from the present to the completion of Phase II development are shown in Table 11. Because the total width of the H-1 Freeway lanes is greater than 100 FT, a reference distance of 100 FT, rather than 50 FT, from the center of the freeway was used. The predicted noise level increases along the freeway and Kamehameha Highway are in the order of 0.5 to 1.1 dB (or Ldn unit). This degree of increase will be difficult to measure.

Future traffic noise levels along the two major interior streets of the proposed development are expected to be in the "Acceptable" noise exposure category. As long as as the
**TABLE II**

COMPARISONS OF EXISTING AND FUTURE TRAFFIC NOISE LEVELS IN PROJECT ENVIRONS

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>SPEED (MPH)</th>
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<th>DB INCREASE</th>
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<td></td>
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<td>MT</td>
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<td>5,118</td>
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<tr>
<td>Paliwa St. @ H-1 Fwy.</td>
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<td></td>
<td></td>
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</tr>
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</table>

| **FUTURE (PHASE II) PEAK HR. TRAFFIC:** |          |      |      |     |     |       |             |
| H-1 Freeway (Mauna Side)*      | 52        | 7,840| 69.9 | 65.0 | 67.1 | 72.6 | 1.1        |
| H-1 Freeway (Makai Side)*      | 52        | 7,840| 72.2 | 67.3 | 69.3 | 74.9 | 1.1        |
| Kamahameha Hwy. @ Lumiaina     | 40        | 2,740| 65.0 | 59.5 | 61.8 | 67.5 | 1.1        |
| Kamahameha Hwy. @ Waipahu      | 37        | 3,730| 65.1 | 59.7 | 62.3 | 67.7 | 0.5        |
| Manager's Dr. @ Lumiaina       | 40        | 1,010| 60.7 | 55.2 | 57.5 | 63.1 | 63.1       |
| Paliwa St. @ H-1 Fwy.          | 40        | 1,310| 61.8 | 56.3 | 58.6 | 64.3 | 64.3       |

*Noise levels are at 100 ft from center (Baseline) of H-1 Freeway.*

Assumed traffic mix of 96% Autos, 2.5% Medium Trucks, and 1.5% Heavy Vehicles on H-1 Fwy., and 97% Autos, 2% Medium Trucks, and 1% Heavy Vehicles on internal streets and Kamahameha Hwy.
total number of heavy vehicles (diesel trucks and buses) are not greater than 1 percent of the total traffic volume, future traffic noise levels are predicted to be below 65 Ldn at 55 FT setback distances from the centerlines of the internal roadways.

As indicated previously, differential traffic noise impacts along Kamehameha Highway and H-1 Freeway attributable to the proposed Waikiki Master Plan are predicted to be in the order of 0.5 Ldn (or dBA), and will be difficult to measure. Total increases in traffic noise along these two roadways following completion of the project as proposed will be in the order of 1 Ldn.

Although traffic noise increases associated with the overall increases in traffic volumes are expected to be small, secondary noise impacts associated with improvements to the highway system are possible. These improvements are the widening of Kamehameha Highway between Waipahu Street and the future Manager's Drive, and the construction of the Paiwa Interchange.

Traffic noise impacts on future Waikiki residents can be minimized by location of residential and apartment units beyond the future 65 Ldn contour line, and, if possible, beyond the 60 Ldn contour line. It is anticipated that the majority of the Waikiki residential/apartment units will be in the "Acceptable" and "Unconditionally Acceptable" noise exposure categories.

Possible noise mitigation measures which would minimize noise impacts from roadway traffic noise include measures such as: the use of buffer zones of sufficient depth; construction of sound attenuation berms or walls where adequate setbacks cannot be achieved; incorporating sound attenuating window design features in upper-story homes which cannot be shielded.
by sound attenuating barriers; and air conditioning affected spaces. The applicability of each mitigation measure depends upon other considerations besides noise, such as economic cost, aesthetics, and technical feasibility.

I. Impact on Infrastructure and Utilities

1. Potable Water

The existing water facilities in the Waipahu area are inadequate to accommodate the Waiele Project and, therefore, require construction and installation of new water source, storage facility, and transmission and distribution pipeline systems. Anticipated average daily consumption for the Waiele Project, including the proposed golf course, is approximately 2.1 million gallons per day.

For water source allocation, the owner proposes to secure approval from the City and County's Board of Water Supply for use of a portion of the recently transferred excess water source of 11.81 mgd. Subsequently, the owner will either pay for use of existing excess Board of Water Supply water source or construct a new source at the developer's expense in accordance with the prevailing plan of the Board of Water Supply.

For water storage, two off-site 1.0 million gallon capacity reservoirs (for incremental phasing) with 16-inch transmission main extended to the project site are proposed.

2. Sewage Treatment and Disposal

Total wastewater to be generated from the proposed ultimate project will be approximately 1.49 million gallons per day.
Approximately 0.71 million gallons per day will be collected on-site and discharged into an existing 18-inch sewer trunk main located within the eastern portion of the site. Sewage from the western portion, approximately 0.78 million gallons per day, will be discharged into an existing on-site city 30-inch main and an existing 15-inch line on Paliwa Street makai of the H-1 Highway.

3. Electrical and Telephone Service

Hawaiian Electric Company can provide electric power service to the project from its existing nearby facilities. The project will require installation of a switching station in addition to the normal installation of transformers. The owner is coordinating with Hawaiian Electric Company construction of the switching station on-site along an existing 46 KV pole line and easement located near the Waikiki Gulch boundary. The owner is presently working with Hawaiian Telephone Company to provide an on-site location adjacent to Kamehameha Highway for a substation to service the communication requirements of the project.

4. Solid Wastes Collection and Disposal

The Waikiki project site will be served by both public and private collection services. The disposal site will be at the Waipahu Incinerator or other facilities operable at that time.

J. Impact on Public Facilities and Services

1. Police Protection

Additional police officers will be required to service the project's population.

Possible methods of increasing on-site security may include the
provision of fencing, alarms, and other safety devices; and the supplementing of public protective services with private services or community volunteer groups. Security services may be provided in the Village Commercial Center.

Since the development will be phased over several years, impact on police services and facilities will be gradual, thus, providing time for governmental services to budget and acquire the needed personnel and facilities.

2. Fire Protection

A population increase in the Waipahu area resulting from construction of the proposed project will result in increased emergencies handled by the Fire Department. The City will be committed to provide continued fire protective services. These services will require additional personnel, capital expenditures, and operating funds.

It is anticipated that upon completion of the project, fire protection services will be adequate to accommodate the proposed project. Emergency fire systems may be located in Commercial Center. A fire station site of approximately 25,000 square feet will be reserved for future acquisition by the City and County of Honolulu within the Business Park.

Since the development will be phased over several years, impact on fire protection and facilities will be gradual, thus providing time for governmental services to budget and acquire the needed personnel and facilities.

3. Health Care Facilities

The project will result in a greater demand on existing health care facilities serving the community.
Though demands would increase, it is anticipated that existing facilities are adequate to satisfy all medical needs.

4. Educational Facilities

As the project will result in a greater demand on existing public educational facilities servicing the community, a 6-acre site for an elementary school will be provided. It will be located adjacent to a neighborhood park site. Since the development will be phased over several years, demand on public educational facilities will be gradual, thus, providing time for governmental services to budget and acquire the needed personnel and facilities.

5. Recreational Facilities

Implementation of the project will create a demand for additional park and recreational facilities in the area and community.

Dedication of park areas within the project will be required by the City's Park Dedication Ordinance No. 4621.

The proposed action will provide a golf course and other recreational amenities, including a community recreation center and neighborhood parks which the proposed residents would be encouraged to utilize. Park areas and their improvements to be dedicated to the City would comply with standards established by the Department of Parks and Recreation.

6. Public Transportation Facilities

Existing city bus and express transit routes are provided on Kamehameha and Farrington Highways and Waipahu Street.
Scheduling of more buses and rerouting of the existing system can be requested to service the proposed development as the need arises. The planned roadway system at Waiakea will accommodate mass transit service with routes which are connected to the existing highway and street system.

K. Impact on Social and Economic Characteristics

1. Social Impacts

As a result of the developer's master planning efforts for the Waiakea Project, representatives from 14 of Waipahu's community, business and labor groups began working in the spring of 1983 on their own long-range plans for Waipahu. This group, the Waipahu-Waipio Development Advisory Committee, and now known as the Waipahu 2000 Community Council, prepared the Waipahu 2000 Master Plan which views the development of Waiakea as an integral element in the overall revitalization of Waipahu. Waiakea is expected to provide the catalyst in rejuvenating and modernizing Waipahu in the Waipahu 2000 Master Plan.

The Proposed Waiakea Project is seen as providing many benefits. These benefits can be summarized as follows:

a. Economic stability for Waipahu by supporting the economic viability of Oahu Sugar Company;

b. Approximately 2,000 new jobs which would bolster Waipahu's economy;

c. Meeting rooms and recreational facilities, including a golf course, which are not now adequately available;
d. A banquet hall at the golf course country club which could be used for weddings, socials and other community and business functions;

e. Acceleration of the schedule for the construction of the proposed Paiwa Interchange; and

f. Needed middle-income housing in a highly upgraded community which will enhance the entire Waipahu community.

Waiehu borders existing urban developments on three sides. These development provide a mixture of single-family detached and attached houses, townhouses and garden apartments. The Village Park development plans to include a small neighborhood shopping center as part of its community facilities. Gentry-Wapio has recently completed a small shopping center to serve its community needs.

Waipahu, the oldest and largest adjacent community, offers a full range of services and facilities. These include the old Waipahu town core, the commercial strip along Farrington Highway, Waipahu Cultural Garden Park, the Oahu Sugar Mill, and a light industrial subdivision development makai of Farrington Highway.

Waiehu matches these surrounding conditions with planned housing types that are similar in density and character to that in Wapio-Gentry, Village Park, Crestview and Seaview as well as being compatible with older housing areas within the Waipahu community.

The overall density and form of housing will be similar to the surrounding areas. The diverse range of housing types offered at prices covering the full spectrum of income groups will add to the desirability and livability of the Waipahu
region as a well-rounded community. It will provide opportunities for new housing purchases by upwardly mobile area residents as well as by young families making their first purchase of a home.

Waikele's recreational amenities will also provide benefits to the greater Waipahu community. Golf course and clubhouse facilities will provide meeting places and space for social gatherings as well as a conveniently located regional recreational resource. The planned Waikele Recreation Center and two strategically located neighborhood parks will also contribute greatly to meeting the need for upgraded recreational facilities on the part of Waipahu residents.

Positive interactions will also occur between Waipahu and Waikele in regard to commercial services and shopping opportunities. The revitalization of Waipahu's town core will be greatly enhanced by increased market demands emanating from Waikele residents. On the other hand, a modern convenience shopping center in Waikele will offer Waipahu residents close and direct access to shopping experiences which would otherwise require significant travel.

2. Employment

The Waikele Project is close to a number of readily accessible employment centers situated within and outside the Primary Urban Center. These include the Pearl Harbor Naval Base and Hickam Air force Base, the commercial and industrial areas in Pearl City and Halawa, and the center of the Oahu Sugar Company operations in Waipahu Town.

The Waikele Project will allocate sufficient amounts of land to accommodate business and office uses such that, employment opportunities in the community should be equivalent in numbers
to 40 percent of the available resident labor force of Waikele. 
Demographic and economic data can be found in Appendix D.

3. Economic Impact

The Waikele Project will significantly impact the local economy 
and create considerable employment opportunities. It will provide 
the following primary sources of economic activity: (1) A 
150,000 square foot Village Commercial Center containing 
retail uses primarily serving the residents of Waikele and 
featuring a major supermarket, drug store, convenience 
retail shops, and service establishments such as banks, 
restaurants, and dental and medical offices; and (2) a 51 acre 
Office Park which will be occupied largely by labor-intensive 
offices servicing a range of businesses.

The Waikele Project will also contribute to saving a substantial 
number of existing sugar related jobs (i.e., approximately 600 
jobs) by improving the viability of Oahu Sugar Company. 
Additionally, Waikele's construction phases would offer a stable 
number of jobs for Oahu's cyclical construction industry. 
These jobs would be expected to continue over an 8-year time 
period.

Finally, a public revenue-cost analysis conducted by Environ-
mental Capital Managers, Inc. has determined a revenue-cost 
ratio of 2.0 to 1.0 for the Waikele Project. This ratio indicates 
that for every dollar of public cost caused by the development, 
an additional $2.00 in public revenue benefits would accrue to 
the State or County. The cumulative discounted revenue 
estimates for the fully developed project totalled $61.2 million in 
constant 1983 dollars.

IV-33
V PROBABLE ADVERSE EFFECTS
V. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The following adverse environmental effects (both short- and long-term) cannot be avoided.

(1) Agricultural use of the land will be lost.

(2) The site-clearing and construction work will result in temporary fugitive dust, some disruption to traffic, and noise.

(3) Traffic will increase from the number of additional cars utilized by residents of the proposed development. Additional impacts associated with increased traffic include potential air and noise quality deterioration. The traffic consultant's findings indicate that roadway modifications will adequately accommodate the traffic to be created by the proposed development.

(4) The need for utility services will increase.

(5) The need for public services for fire and police protection, schools, and public recreational facilities will increase slightly.

(6) Solid waste and sewage generated by the project will increase the need for disposal and treatment and will increase total local waste output.

Countervailing policies are thoroughly described in Chapter III, Section K, State Plan, Land Use and Regulatory Characteristics. Rationale for proceeding with the proposed action are outlined in the sections describing Hawaii State Plan and General Plan of the City and County of Honolulu compliance-points.
VI. ALTERNATIVES TO THE PROPOSED ACTION

For the purpose of this EIS, three alternatives to the proposed development were considered. These alternatives were: (1) no action alternative, (2) active agricultural use, and (3) residential use only.

A. No Action Alternative

This alternative would result in no action being implemented. The impact of this alternative would be that the project site would remain as is. Eventually, the weeds and grasses would cover the entire site and create visually undesirable and hazardous areas which would not be consistent with surrounding residential development.

This alternative was not found to be viable because its non-use would render the properties useless to the landowner and the tremendous waste of valuable land would not provide any benefit to the surrounding communities or the State at large. In addition, No-Action would represent a blow to rational long-term land planning. City and State governments would also suffer from opportunity costs associated with losses of potential employment, tax revenues, and housing supply.

Conversely, development of the site would constitute an irretrievable use of land and would preclude any other uses for the site.

B. Active Agricultural Use Alternative

Appendix D, "Economic Impact of the Proposed Waikiki Development" September 25, 1984 by Evaluation Research Consultants, cites three factors in the determination of economic feasibility for raising alternative crops on Waikiki lands. These factors were duly considered by Amfac in their preliminary study of using Waikiki as agricultural revenue producing lands. These factors as listed are as follows:

VI-1
1. Cost and supply of water - Under existing conditions, the most readily available supply of water is from Oahu Sugar Company. This water would have to be pumped up to the Waikele fields and the pumping cost is substantial, exceeding $100/acre a foot. Most crops require about 5 acre feet per year, although some, such as daikon and perennial crops, require more. Thus, water pumping costs could cost over $500/acre.

2. Domestic wells/reservoirs location - In the Waikele area, wells and reservoirs would be competing with modern agricultural practices normally used in truck crops. Extensive uses of pesticides and fertilizers (exceeding that used for Sugar in quantity and toxicity) combined with public hysteria relating to pesticide contamination of domestic water supplies severely limit the feasibility of producing several crops.

3. Close proximity of residential lands - Existing residential lands to the south and northeast of Waikele create conflicts that are normally associated with competing land uses (Diversified Agriculture and Residential). Diversified agriculture requires extensive uses of pesticides and heavy farm equipment, all near residential housing; this is a hazard to children, and resulting noise and dust are obnoxious to existing residents.

This alternative was determined to be economically infeasible by the landowner which is the primary reason for the site remaining in its current fallow state. As stated previously in the discussion on agricultural significance, alternative crops were also determined to be inappropriate for the site due to economic constraints and environmental impacts on surrounding residential areas.

C. Single Family Residential Alternative

This alternative, which would consist entirely of detached single
family dwellings is not considered a desirable alternative. This would preclude the development of a balanced community which offers employment centers, recreational facilities, and commercial areas as well as housing. Without this mix extensive travel for residents would also be required for employment, shopping and recreation needs. Finally, development at a lower density would result in fewer units per developed acre, thus resulting in a less efficient land use pattern.
VII
ENVIRONMENTAL RELATIONSHIPS
VII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY AND IRREVERSIBLE/IRRETRIEVABLE COMMITMENTS OF RESOURCES

It is anticipated that the construction of the proposed project will commit the necessary construction materials and human resources (in the form of planning, designing, engineering, construction labor, landscaping, and personnel for the sales, management, services, offices, and maintenance functions). Some of the construction materials could be reused if and when the structures are demolished; however, at the present time and state of our economy, it is felt that the reuse of much of these materials is not practical. Labor expended for this development is not retrievable. However, labor will be compensated during the various stages of the project by the developer, commercial businesses, and the building's management.

The appearance of the project site will be altered from its present open vacant appearance to that of a completed master planned residential community. The development will be highly visible but visually integrated with the surrounding areas.

Air and noise quality will be adversely affected by this proposed project, but will remain in compliance with State standards. While ambient air and noise quality in the area is relatively good, however, the proposed development will result in greater number of vehicles going to and from the project areas, resulting in vehicular pollution emissions.

The project development will result in a commitment of land for a long-term period. Once low and medium density residential, office and commercial uses are established, it is unlikely that the land will be reverted to a lower usage in the long-term future. Commitment of land
for these purposes will likely foreclose certain future use options of the land such as open space and agricultural activities.

The project development will, in the short- and long-term result in residential uses which will likely benefit future homeowners, the landowner and private businesses.
VIII

GOVERNMENTAL POLICIES AND OFFSETTING INTERESTS
VIII. AN INDICATION OF WHAT OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The proposed project was considered the most productive and beneficial alternative for the project site. Impacts occurring from the proposed action are considered small compared to the benefits derived from implementation of the project.

From an economic standpoint, studies conducted by Environment Capital Managers Inc., indicate that a significant cost benefit ratio will result from this plan.

For the Waikele Project, a revenue-cost ratio of 2.0 to 1.0 was attained. This indicates that an additional $2.00 in public revenue benefits would accrue to the State of Hawaii and/or the City and County of Honolulu for every dollar of public cost caused by the proposed development. This would be a definite financial gain to the State and to the City and County of Honolulu, should this project be implemented. As a standard for comparison, in its civil projects the U.S. Army Corps of Engineers recommends proceeding with a project if there is unity (1.0 to 1.0) or greater. This analysis is conducted from a pure economic standpoint. Environmental cost have not been reflected in this analysis.

Population changes occurring from the development of the Waikele project are in line with the General Plan's population projections for the areas and will not require a General Plan amendment.

Conformance with the Hawaii State Plan HRS Chapter 226, is described in detail in Chapter III Section K. Areas of compliance with the Plan include:

VIII-1
Population, H.R.S. Section 226-5; Economy H.R.S. Section 226-6; Agriculture H.R.S. Section 226-7; Scenic, Natural Beauty and Historic Resources H.R.S. Section 226-13; Land, Air, and Water Quality H.R.S. Section 226-13; Water H.R.S. Section 226-16; Transportation H.R.S. Section 226-17; Housing H.R.S. Section 226-19; Education H.R.S. Section 226-21; and Leisure H.R.S. Section 226-23.

The three alternatives discussed in Section VI may also achieve some countervailing policies which are applicable to this section. However, these alternative uses were outweighed by the merits and conformance of the proposed use.

Although it is considered economically unviable, agricultural use of the site would be fully supportive of the State Agriculture and Land, Air and Water Quality Plans. The single family residential alternative would share many of the merits of the proposed project; however, this would preclude the benefits of a comprehensive, planned community.
IX. LIST OF NECESSARY APPROVALS

The proposed project must obtain the following approvals and permits prior to its implementation:

(1) Rezoning Approval - Department of Land Utilization, City Council, Mayor

(2) Grading Permit - Department of Public Works

(3) Building Permit - Building Department

It is also noted that in obtaining these permits (i.e. Grading and Building) the following agencies must provide certification which indicates that the plans are acceptable from the standpoint of meeting the applicable codes, standards, and regulations.

Sewage Treatment Plant - State Department of Health
Department of Public Works, City & County of Honolulu

Roadways - State Department of Transportation
Department of Transportation Services, City & county of Honolulu

Water Supply - Board of Water Supply, City & County of Honolulu

Drainage - Department of Public Works, City & County of Honolulu

Fire Protection - Fire Department, City & County of Honolulu
Approval of State Land Use District reclassification from Agricultural to Urban by the State Land Use Commission is currently pending. Hearings have been completed and a Decision and Order for this request is expected prior to completion of the Chapter 343, HRS, environmental impact statement process.
X. ORGANIZATIONS AND AGENCIES CONSULTED FOR THE WAIK ELE
DEVELOPMENT PROJECT

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XI. AGENCIES, AND ORGANIZATIONS, CONSULTED FOR THE WAIKELE
DRAFT ENVIRONMENTAL IMPACT STATEMENT

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* Received after Deadline
The proposed development is to be undertaken at a cost of [cost amount].

The community college is to be located on a site of [site description].

The proposed development is to be undertaken on a site of [site description].

The proposed development is to be undertaken on a site of [site description].
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</table>

**Note:** The table contains data entries that are not clearly visible in the image.
The mall is always a popular destination for shoppers and tourists. The recently completed expansion has added several new stores, including a high-end clothing boutique, a gourmet food hall, and a state-of-the-art fitness center. The mall management has also invested in upgrading the existing facilities, such as improving the HVAC system and updating the security measures. These improvements have brought a surge in foot traffic and positive reviews from visitors.

In addition to the physical changes, the mall has implemented several initiatives to enhance the customer experience. A new customer service desk has been established to provide assistance with navigation, directions, and special event information. The mall has also launched a loyalty program to reward regular customers with discounts and exclusive offers.

Overall, the mall is a thriving destination that continues to evolve and adapt to the changing needs of its visitors. With its wide range of stores, amenities, and events, the mall remains a must-visit for anyone looking for a shopping or leisure experience.
### Table:  

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**Source:** The table is a representation of data gathering.

**Notes:** Further details are not clearly visible due to the image quality.
DIVISION S—SOIL GENESIS, MORPHOLOGY, AND CLASSIFICATION

Nature of Soil Parent Materials in Ewa-Waipahu Area, Oahu, Hawaii

R. V. Ruike, J. M. Williams, H. C. Sherman, and E. L. Haila* 1

ABSTRACT

Soil parent materials in the Ewa-Waipahu area, Ewa, Hawaii, are in three landscape groups. Waianae Range has more and materials with high lime and magnesium values than the remaining land areas, which has appreciable calcium carbonate and is dominated by basaltic clays. Ewa coastal plain parent materials are similar with basaltic andesite xenoliths with appreciable calcium carbonate and are dominated by 2:1 clay fraction. Between these two areas is the Koolau range with volcanogenic parent materials and volcanic rocks with non-calcareous parent materials in between.

Wainiha Range soils are described as mixed basaltic andesite with some calcareous clays and some with granite clays. Wai Kaula soils are described as mixed basaltic andesite with some calcareous clays and some with granite clays. Waianae Range soils are described as mixed basaltic andesite with some calcareous clays and some with granite clays. Ewa coastal plain parent materials are the same as those in the Waianae Range.

TABLE 3. SUNK LIGHT RECORDED BY IPPEY PHOTOCINEMETER AT KANIA SUBSTATION, HOPA CENTER (PG-57) 1964 THROUGH 1980.

| MONTH  | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| VALUE  | 111 | 116 | 118 | 123 | 126 | 128 | 128 | 126 | 124 | 122 | 118 | 118 | 121 |
| VALUE  | 116 | 118 | 118 | 123 | 126 | 128 | 128 | 126 | 124 | 122 | 118 | 118 | 121 |
| VALUE  | 118 | 118 | 118 | 123 | 126 | 128 | 128 | 126 | 124 | 122 | 118 | 118 | 121 |

The Molokai soil at the site is residual on the upper part of a cliff cut into Koolau basalt by a 95-foot (29 meters) sea stack (Ruthe, et al., 1965, Seisde, and Uehara, 1966, and Uehara, 1968). The official soil profile description indicates the well-structured nature of the material (Appendix A). The large boulders in the subsoil (Fig. 5) presented a formidable barrier to the excavation for the lysimeters. Electrical resistivity, seismic, and direct probing failed to reveal the precise location of these boulders within field 1, and the arbitrary site finally chosen for the pit was liberally endowed with such boulders. The subsoil, over-aerated to remove the boulders, was recompacted in the pit bottom to form a firm foundation for the lysimeters.

Desorption moisture release curves for the Molokai soil from Kuma show the effects of the aggregation of this heavy clay soil (Figs. 6a, b, c, and d). The curves resemble those for sand, though the total water retained is great since the aggregates remain near saturation until moisture stress of 100 to 200 bars (Sharma and Uehara, 1965a and b).

The response to moisture stress for the gypsum blocks determined in the laboratory for Kuma soil material repeats the abrupt habit of release with stress by the Molokai soil (Fig. 7). Controlled calibration of a Trumel 104 neutron probe in specially packed samples of Kuma soil indicated a net soil effect equivalent to 7 to 8 percent water (Fig. 8). The slope varied slightly from the factory standard, only the intercept seemed altered (Shivalli, et al., 1967). Field and laboratory calibration of a P-19 Nuclear Chicago probe in the Kuma soil indicated a changed intercept as well as a marked departure from
CONSUMPTIVE USE OF WATER BY SUGARCANE IN HAWAII

by
Paul C. Ekern

Technical Report No. 37

July 1970

Project Completion Report of EVAPOTRANSPIRATION BY SUGARCANE

ONR Project No. A-014-HI, Grant Agreement No. 14-01-0001-1630

Principal Investigators: Paul C. Ekern

Project Period: July 1967 to September 1969

The program and activities described herein were supported in part by funds provided by the United States Department of the Interior as authorized under the Water Resources Act of 1964, Public Law 88-377.
RECEIVED NOV 1965

S. E. Roberts

John S. Johnson

The Office of the Community Planning Director

The Office of the Community Planning Director

November 12, 1965

January 7, 1966

CONSTRUCTION

COMMISSION

INC.

OFFICE OF THE

ENVIRONMENTAL

OFFICE OF THE

ENVIRONMENTAL

OFFICE OF THE

ENVIRONMENTAL

OFFICE OF THE

ENVIRONMENTAL
Dear [Name],

Thank you for providing us the opportunity to review the revisions to the evaluation standards, and the progress toward meeting the required standards. I am pleased to inform you that the evaluation process is proceeding as planned, and we anticipate meeting the deadline of [Date].

I have reviewed the data and conclude that the project is on track to meet the goals outlined in the proposal. The feedback from the stakeholders has been positive, and we have addressed all the concerns raised.

Please find attached the updated progress report, which includes the latest data and projections.

Best regards,

[Your Name]
Thank you for the opportunity to comment.

[Commentary text]

[Image: Document page with text]
To be continued.

-27-

-26-

Additional conditions must be met in order to materially change the construction with the above, the Inspector's recommendations of non-interference of water from the rear harbor after the relocation of the existing water control structure to location off the structure. The Chief Engineer and his Assistant Engineer.

-11-
SECTION III

Agricultural Exports and Imports
production costs. Therefore, it is imperative that
capital investment needs to be balanced or jeopardy of
increased costs. The need for careful strategic planning and
effective and efficient execution of projects is crucial.

In conclusion, it is essential to monitor and evaluate
project performance regularly to ensure that goals are
achieved. It is critical to stay informed about market
trends and technological advancements to make informed
decisions and adapt to changes effectively.
January 7, 1986

Mr. James K. Ikeda
Department of Health
State of Hawaii
P.O. Box 1878
Honolulu, Hawaii 96801

Dear Mr. Ikeda:

We are in receipt of your department's comments dated December 10, 1985 and we respond in the following:

1. Availability of potable drinking quality water will be resolved by the Board of Water Supply in their role of County water manager to the State Department of Land and Natural Resources. The request for the required 2.1 MGD has been submitted to DLNR in a memo dated November 13, 1985 (see attachment).

2. Treatment of chemically contaminated well water sources in the Waipahu, Maili, and Waikele areas will be administered initially by the Board of Water Supply and subsequently by your agency for compliance with Section 11-20-29, 5a of the WMS memo to Anac Property Development Corp. dated November 19, 1985, for the installation of an activated carbon filtration system to treat well water at a requirement (see attachment). Please be assured that at the appropriate time when all land use policy changes have been processed and approved, the properly prepared engineering report will be submitted to all reviewing agencies for their review and approval prior to construction.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodrigues

November 13, 1985

Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Application for 2.1 Million Gallons Daily (mgd) Permitted Use from Wells 2400-01, 06

We submit the attached application for a permitted use of 2.1 mgd for Wells 2400-01, 06. The water will be used for the proposed Waipahu development including a golf course. The proposed development will be located near to the residential area.

We attach a copy of the development schedule for Waipahu.

If you have any questions, please contact Herbert H. Minakami at 527-6183.

Very truly yours,

Kazu Hayashida
Manager and Chief Engineer

Attachment

KASU COMMUNITY PLANNING, INC.
Do not proceed.

Thank you for your interest concerning the proposed development.

Best regards,

Subject: Your letter of November 6, 1985

Board of Water Supply

City and County of Honolulu

City and County of Honolulu

November 19, 1985
### Table 2 - Traffic Projections Without Project

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*Central IHO WAIHEI (North-South Direction)*

| Interstate Route H-2          |          |      |      |      |
| IHO-IO-1                        | 21512    | 2650  | 1670  | 28600 |
| OUDIN                        | 20441    | 1093  | 2403  | 27400 |
| KAI-48                          | 12910    | 1570  | 706   | 11600 |
| OUDIN                        | 15700    | 3760  | 1400  | 11600 |
| KEE-48                          | 1655     | 205   | 421   | 3300  |
| OUDIN                        | 3447     | 500   | 240   | 3600  |
| TOTAL                          | 37877    | 4444  | 2756  | 43500 |
| OUDIN                        | 36932    | 1999  | 4043  | 42000 |

*Pearl City WAIHEI (Kilaulo Stream)*

| Interstate Route H-1          |          |      |      |      |
| IHO-IO-1                        | 53442    | 3372  | 2729  | 62300 |
| OUDIN                        | 45458    | 6278  | 6100  | 2060 |
| MOA-KAI-48                      | 11706    | 1359  | 691   | 14300 |
| OUDIN                        | 11380    | 972   | 1678  | 15000 |
| KAMAKANEKA HIGHLAND            | 2558    | 2463  | 1593  | 29900 |
| OUDIN                        | 27310    | 3377  | 2317  | 28400 |
| TOTAL                          | 98669    | 12184 | 5558  | 107200 |
| OUDIN                        | 95460    | 4449  | 10873 | 10500 |

Drive Extension to Waipahu Street, as well as Interstate Route H-1 as shown on Exhibit 4.

### Phase I - Traffic Assignment

The traffic assignment network is shown on Exhibits 6 and 7 for the AM and PM peak hours, respectively. The proposed Waipahu Development is expected to have a negligible impact on the 1990 traffic conditions on Kaahumanu Highway at Waipahu Street.

The increased traffic from the proposed development is partially offset by the decrease in turning demand on Kaahumanu Highway to H-1 and from Waipahu Street. The proposed Palu Interchange is expected to attract these Waipahu trips since it provides more direct access to and from the freeway.

Similarly, the diverted traffic, from Waipahu Town to the Palu Interchange, should partially offset the increased demand on the Eastbound H-1 1 ramp at Waipahu Interchange during the AM peak hour and on the Westbound H-1 off ramp at Waipahu Interchange during the PM peak hour resulting from the development of East Waipahu.

The net increase in traffic, eastbound (inbound) on Interstate Route H-1 during the AM peak hours, is expected to be 6.1% over the projected 1990 conditions between the proposed Palu Interchange and the Waipahu Interchange, of which about 1.3% is attributable to site-generated traffic from the proposed Waipahu Development. The remaining 4.8% is comprised of Waipahu Town trips diverted from the Waipahu Interchange. In the westbound (outbound) direction on Interstate Route H-1 during the PM
Transferable Parameters, User’s Guide*. These empirical rates are based upon commonly used independent variables which define land use intensity in terms of trip generation potential.

Because of the magnitude of the proposed development and the nature of a planned development, a certain amount of trip interaction among land use activities within the development is assumed; that is, a proportion of the total trips generated is assumed to remain within the study area and not impact the external highway system. Furthermore, the commercial-retail center is expected to be a neighborhood-oriented shopping center and is not expected to attract external trips. Finally, employment opportunities are expected to attract trips from within Wailea itself and nearby residential areas in Leeward and Central Oahu.

Development of the proposed Wailea project is expected to be a continuous process. However, for discussion purposes, the total development is divided into two phases, each representing about one-half of the overall master plan.

The trip generation characteristics for Phases I and II are shown in Table 1.

D. Phase I - Trip Generation

Phase I consists of the development of the eastern half of the project site, which includes 370 single family (low density) dwelling units; 436 townhouse and clustered (medium density) dwelling units and 375 garden apartment type (high density) dwelling units, for a total of 1189 dwelling units; a 135 acre

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golf course, and a 30 acre office park with 210,000 square feet of floor area.

The construction of the proposed Palma Interchange, along with improvements to the existing feeder street systems near the freeway, and the widening of Kamehameha Highway are included in Phase I to accommodate the increased traffic demand.

C. Phase II - Trip Generation

Phase II consists of the development of the remainder of the 57½ acre site, which includes 486 single family (low density) dwelling units, 535 townhouse and clustered (medium density) dwelling units, and 507 garden apartment type (high density) dwelling units, for a total of 1529 dwelling units; a commercial-retail center consisting of 150,000 square feet of floor space; a 9 acre recreation center; and the remainder of the office park containing an additional 94,000 square feet of floor area.

The construction of the community-proposed Bypass Road for Waipahu Street is assumed, completing the street collector system for Waipahu Town.

V. Traffic Assignment

A. General

The traffic assignment techniques are based upon traditional methods of assigning traffic flows onto the highway network based upon major destination points and the shortest path to each destination. Secondary destinations such as shopping attractions were considered in the route diversion from the minimum path. Perceived trip desires are based upon directional traffic demands observed on the highway network during the peak periods and quantified by traffic counts at key highway junctions. Actual origin and destination data obviously cannot be obtained from a "proposed" development; however the techniques described above usually suffice in obtaining the order of magnitude for traffic demand on the highway network.

Phase I and Phase II traffic generation are superimposed over the Year 1990 and the Year 1995 travel demand forecasts derived from the State Department of Transportation along the major highway corridors in the vicinity. The projected traffic demand is discussed in terms of peak hour characteristics by converting the projected average daily traffic volumes to peak hour volumes using peak hour and directional distribution factors developed from existing travel patterns. Finally, these projections are distributed over the individual facilities on each corridor. Table 2 shows the background traffic demand for the existing conditions, the Year 1990 and the Year 1995. Although it is acknowledged that several of the highway facilities will be at capacity, particularly in the Pearl City Corridor, it is not the intent of this report to resolve these problems. This report only addresses the relative impact of traffic resulting from the proposed Waipahu Development.

The traffic assignment network for the purpose of this study, includes Kamehameha Highway from Lualualei Street to the Waipahu Interchange and Palma Street from the proposed Manager's
Oahu. Other roadway facilities directly affected by the proposed interchange facility at Palwa Street are Palwa Street itself and Waipahu Street.

Palwa Street is a 60-foot right-of-way, fully improved roadway between the Freeway undercrossing and Farrington Highway, with the exception of a short 44-foot right-of-way segment just west of Waipahu Street. Palwa Street terminates at the Freeway undercrossing. The existing H-1 bridge structure provides two 60-foot span openings aligned with Palwa Street and the haul road running parallel to Palwa Street, from the Freeway to the Sugar Mill. Palwa Street proceeds in the north direction past Waipahu Street and connects to Farrington Highway.

Waipahu Street varies from a 60-foot right-of-way, fully improved collector street to a variable right-of-way roadway through "Old Waipahu Town" fronting the Sugar Mill. Several geometric alignment problems restrict Waipahu Street's function as a collector roadway. The Waipahu Street alignment at Waielea Stream crossing consists of a "switchback", that is, the roadway turns at an acute angle in one direction, followed by another sharp turn in the reverse direction. Another severe alignment problem occurs just east of Palwa Street where Waipahu Street makes a sharp turn as it continues eastward to Kamehameha Highway. Some operational and alignment problems occur in the Sugar Mill area where left turn traffic and driveway traffic interfere with the through traffic flow and where curvilinear alignment further restricts operational speeds.

C. Traffic

Twenty-four hour traffic count data were obtained from the State Department of Transportation on all major highways in the affected area. Additional count data were obtained from the City and County Department of Transportation Services on City streets in the Waipahu area. These data are shown on Exhibit 5. Finally, manual traffic counts were conducted for the purpose of this study at key intersections during the morning and afternoon peak periods.

Interstate Route H-1, between Kuna Interchange and Waipahu Interchange carries about 1,700 vehicles per day total for both directions. East of Waipahu Interchange, Interstate Route H-1 carries 105,000 vehicles per day total for both directions. The freeway facility during peak hours of traffic, eastbound and westbound in the morning and westbound in the afternoon, operates at Level of Service "A" between Kuna Interchange and Waipahu Interchange, and at Level of Service "D" between Waipahu Interchange and Moanaau Road Interchange for both peak periods. (Level of Service definitions can be found in the Appendix.)

The on ramp from, and off ramp to, Kamehameha Highway and Farrington Highway at the Waipahu Interchange operate at Level of Service "C" during the morning and afternoon peak hours, respectively. Traffic count data show 1600 vph on the H-1 on ramp eastbound during the morning peak hour and 1500 vph on the H-1 off ramp westbound during the afternoon peak hour. Under these conditions, the right lane of the freeway facility is dominated by merging and diverging traffic.
Kamehameha Highway, north of Waipahu Street, carries over 31,000 vehicles per day. Kamehameha Highway/Waipahu Street intersection operates at Level of Service "C" during the morning peak period and Level of Service "D" during the afternoon peak period. Traffic flow is generally southbound during the morning peak, including a heavy right turn movement from Waipahu Street onto Kamehameha Highway. During the afternoon peak, the northbound flow is the dominant movement, including a heavy left turn movement into Waipahu Street.

The Waipahu Street/Palawa Street intersection operates at Level of Service "B" during the morning peak period and at Level of Service "C" during the afternoon peak period, with 1,400 vph and 1,300 vph entering the intersection, respectively. However, traffic operations during the peak periods are typified by stoppages on Waipahu Street resulting from left turning vehicles queued in the through lanes and buses stopping in the traveled way to load and unload passengers.

IV. TRIP GENERATION

A. General

The trip generation resulting from the proposed Waikiki Development is based upon generally accepted rates developed by the Institute of Transportation Engineers (ITE) and published in the Informational report on "Trips Generation, Third Edition - 1982" and the Transportation Research Board and published in the National Cooperative Highway Research Program (NCHRP) Report No. 187 "Quick-Response Urban Travel Estimation Techniques and
and connects to Kamahana Highway at Lulualua Street, opposite the Crestview Subdivision. Therefore the roadway master plan radiates from its primary access at the proposed Palua Interchange, with another major access connection at Kamahana Highway.

On the other hand, at present the Waipahu Town street system does not support a Palua Street access to the Freeway. With minor improvements, Palua Street vehicular traffic of the Freeway can be upgraded to provide a moku-maiai connector from Farrington Highway to the proposed Palua Interchange. Furthermore, Waipahu Street, which runs east-west from Kamahana Highway to Kualoa Road, can be upgraded, as proposed by the City, between Pupukaul Street and Mauw Street to provide a full 60-foot wide right-of-way with a 44-foot wide roadway. As an alternative, Waipahu Street can be realigned via a Bypass Road between Kalaeloa Stream and Mauw Street, as proposed by the community in Waipahu 2000 Master Plan. Either of these alternatives provides a continuous collector roadway feeding the proposed Palua Interchange at Palua Street.

In addition to the State-proposed Waipahu Interchange on Interstate Route H-3, the State has proposed to construct an additional lane on the on ramp from Farrington Highway to Interstate Route H-1, eastbound, at the Palua Interchange. The State is also proposing to add another lane in the eastbound direction between Palua Interchange and Waipahu Interchange on Interstate Route H-1. This improvement should increase the inbound capacity of the Freeway and alleviate some of the morning peak period congestion on the Interstate Route H-1 Pearl City Viaduct.

Exhibit 4 shows a map of these area-wide improvements.

III. EXISTING CONDITIONS

A. General

The existing site has been taken out of agriculture by Oahu Sugar Co. and is in full with some ground cover for erosion control. The Oahu Sugar Company manager's residence is located on the west end of the site. To the south lies Waipahu Town, originally a plantation town, which has grown in the path of the westbound urbanization of Oahu, along with the Crestview Subdivision east of the project site. Village Park Development to the west and Gentry-Waipahu to the northeast represent Waipahu's growth potential in the immediate future. To the north of the proposed Makale Development lies the 253 acre Castle and Cooke property currently in pineapple cultivation.

B. Roadways

The existing roadways within the proposed project site are primarily fuel and fuel roads leading to the Oahu Sugar Mill via the existing Waipahu Street Undercrossing on Interstate Route H-1. Manager's Drive provides another existing H-1 crossing for access to the project site. The only other roadway is the Naval Access Road, running east-west across the site from Kamahana Highway to the U.S. Naval Reservation at Kipapa Gulch. These access connections at existing public roadways are expected to be utilized by the proposed Makale Development.
At the present time, site accessibility to a major arterial is provided only along Kamehameha Highway, with the only other arterial fronting the project site being Interstate Route H-1, a fully-controlled-access freeway facility.

Kamehameha Highway is a three lane arterial highway providing one lane in each direction with the third lane providing a passing lane or exclusive turning lane at key intersections. At Waipahu Street, Kamehameha Highway becomes a four lane, divided highway facility as it connects to the Waiawa Interchange. Southbound past Waipahu Street, Kamehameha Highway splits: one lane continuing eastbound on Kamehameha Highway through the Pearl City area, and one lane merging with on ramp traffic from Farrington Highway to eastbound Interstate Route H-1. There is also an auxiliary lane south of Waipahu Street formed by the westbound H-1 off ramp and connection from southbound Kamehameha Highway to westbound Farrington Highway. There is no direct connection from southbound Kamehameha Highway to westbound Interstate Route H-1.

The off ramp from Interstate Route H-1, westbound, to Waipahu is a single lane diverging ramp which merges with westbound Kamehameha Highway and then splits to Farrington Highway to Waipahu Town and on to another single lane connector to northbound Kamehameha Highway to Crestview and Waipio-Gentry.

Fronting the west side of the project site, Interstate Route H-1 is an eight-lane freeway providing access to Waipahu at Waiawa Interchange and at Kunia Interchange. Interstate Route H-1 is the primary arterial between Central Honolulu and West
August 1, 1985

Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawai'i 96809

Gentlemen:

Re: EIS/FW for Waikiki Development,
Maunaloa, Ewa, Oahu, Hawai'i

In response to your letter of July 18, 1985, concerning the subject project, we submit the following comments:

1. Drainage should be discussed in the EIS. In this respect, a drainage report should be submitted to the Division of Engineering's Drainage Section for review and approval.

2. Existing municipal sewers are adequate to serve the project as proposed. Two trunk sewers can be utilized, the Puna Street sewer and the Kepau-Waiole sewer. To prevent surcharging any sewer, wastewater flows from the development should be divided between the two trunk sewers. This aspect should be discussed in the EIS.

Very truly yours,

F.J. Rodrigues
Director and Chief Engineer

AUG 7 1985

October 9, 1985

Mr. Russell L. Smith, Jr.
Director and Chief Engineer
Department of Public Works
450 South King Street
Honolulu, Hawai'i 96813

Dear Mr. Smith:

We are in receipt of your department's comments dated August 1, 1985 on the EIS Preparation Notice for the proposed Waikiki project and we respond as follows:

1. Drainage will be discussed in the draft EIS currently under preparation; the Drainage report will be provided to your Drainage Section when it has been finalized and completed.

2. Sewage capacity and development of transmission lines will also be provided to your Wastewater Treatment Division as soon as it has been finalized and completed. We acknowledge the comment that there is adequate capacity for this project.

Thank you for your comments and continuing concern.

Very truly yours,

F.J. Rodrigues

F.J.R.
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: Environmental Impact Statement
Preparation Notice for the Proposed
Waikiki Development Project
TNR: 9-4-2: 3, 10, 11, 13 (Par.), 31 & 41
9-4-7: 10, 12, 33 & 34

This is in response to your letter of July 18, 1985, regarding
the preparation of an EIS for the above project.

The EIS should address the traffic impact of the project on the
surrounding street and arterial system that will be affected.

The interior roadway system should be designed in accordance with
city standards. The design of intersections at Kamaliiwaha
Highway and the I-1 Freeway should be coordinated with the State
Department of Transportation which has jurisdiction over these
facilities.

Thank you for providing us this opportunity to review and comment
on the project.

Sincerely,

[Signature]

John E. Riten

Environmental Communications

October 9, 1985

Mr. John E. Riten, Director
Department of Transportation
Services
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Riten,

We are in receipt of your department's comments dated July 30, 1985 on the
EIS Preparation Notice for the proposed Waikiki project and we respond in
the following:

A complete traffic impact study will be provided that will address the concerns
you have expressed in your comments. The traffic consultant firm, Austin,
Traffic & Associates has been in several discussions with the State Depart-
ment of Transportation and will be providing that department with their planned
measures of traffic management.

Thank you for your comments and continuing concern.

Very truly yours,

[Signature]

F. J. Rodrigues

FJR & B

July 30, 1985
Mr. H. Kusumoto  
Division Administrator  
U.S. Department of Transportation  
Federal Highway Administration  
Region Nine, Hawaii Division  
Box 50206  
Honolulu, Hawaii 96850  

Dear Mr. Kusumoto:

We note in receipt of your agency's comments dated September 5, 1985 and note for the record that it was received beyond the deadline date of August 22, 1985. We respond as follows:

1. The depiction of the project's transportation management system which includes a possible interchange at Palua Street was included at this early stage to allow decision making agencies such as FHWA, State DOT, and other interested and involved governmental agencies the opportunity to review and comment on traffic mitigation measures being considered by the applicant. It was not meant to be included as a facility that has been finally determined. Discussions with appropriate local transportation agencies are underway and studies such as those described in your letter are being circulated for review and comment.

Please be assured that mitigative measures to reduce traffic loading attributable to this project's phased program of development will be included with all proposals for major improvements such as an interchange at Palua Street.

The applicant and their retained traffic consultants are working towards a mutually agreeable solution to the existing and future traffic patterns on H-1 and Kamehameha Highway.

Thank you for your comments and continuing interest.

Very truly yours,

F. J. Rodrigues  

FJR140  

Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809  

Gentlemen:

Subject: EIS Preparation Notice, Kualoa Development Project

Thank you for the opportunity to comment on this project. We have reviewed the EIS Preparation Notice and are particularly concerned with the proposed interchange at Palua Street and the H-1 freeway.

We feel that it is premature to show the interchange in the plan since additional access points to the Interstate System must first be requested by the Hawaii Department of Transportation for the eventual approval of the Federal Highway Administrator. Such a request should contain a traffic analysis that would show impacts of the added interchange on the existing freeway and should also discuss funding for the proposed interchange.

We are also concerned with the eventual extension of Palua Street to the North and its ultimate connection with Kamehameha Highway. Plans should be developed to ensure that this future addition can be at the most desirable location.

Sincerely yours,

F. J. Rodrigues
Division Administrator

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Mr. H. Kusumoto
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Region Nine, Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Kusumoto:

We note in receipt of your agency's comments dated September 5, 1985 and note for the record that it was received beyond the deadline date of August 22, 1985. We respond as follows:

1. The depiction of the project's transportation management system which includes a possible interchange at Palua Street was included at this early stage to allow decision making agencies such as FHWA, State DOT, and other interested and involved governmental agencies the opportunity to review and comment on traffic mitigation measures being considered by the applicant. It was not meant to be included as a facility that has been finally determined. Discussions with appropriate local transportation agencies are underway and studies such as those described in your letter are being circulated for review and comment.

Please be assured that mitigative measures to reduce traffic loading attributable to this project's phased program of development will be included with all proposals for major improvements such as an interchange at Palua Street.

The applicant and their retained traffic consultants are working towards a mutually agreeable solution to the existing and future traffic patterns on H-1 and Kamehameha Highway.

Thank you for your comments and continuing interest.

Very truly yours,

F. J. Rodrigues
United States Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

August 5, 1985

Environmental Communications
P.O. Box 536
Honolulu, Hawaii 96809

Subject: Environmental Impact Statement Preparation Notice,
Proposed Waikiki Development, Waikiki, Oahu

The subject document has been reviewed as you requested.

Enclosed please find a copy of the comments that we supplied to the
Department of Planning and Economic Development in reference to the
revised application for the land in the proposed project area. They
reflect our concerns about the project.

Sincerely,

[Signature]
FRANCIS C.H. LUM
State Conservationist

Enclosure

AUG 12 1985

United States Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

May 1, 1985

Mr. Kent H. Keith, Director
Department of Planning and
Economic Development
P.O. Box 2559
Honolulu, HI 96804

Dear Mr. Keith:

Subject: Petition for an Amendment to the State Land Use District
Boundary - AUS-594 (AMPAC Property Development Corp.)
Waikiki, Oahu

The problems facing sugarcane, pineapple, and diversified agriculture are of
total concern to the Soil Conservation Service. We are deeply concerned that
the proposed request for a district boundary change in Waikiki will contribute
to the decline of agriculture in Central Oahu. This area has the best soils,
water, climate, and proximity to the market, making it one of the best areas
suited for agriculture in Hawaii.

While we sympathize with the economic plight facing United Sugar Company, we
believe that other lands less suited to agriculture, such as the lands along
the slopes of Waianae Mountain toward Kahaluu, would be better suited for
conversion to urban uses. In comparison, the Waikiki lands have higher
yields, lower production costs, lower pumping cost for irrigation, less use of
fuels and energy for cultivation, lower transportation cost, and have less
erosion and sedimentation problems.

The Central Oahu area, bounded by W-1, the slopes along the ridges of Waianae
Mountain and Hoomaluhia, and Wheeler Field and Millilani, should be kept in
agriculture. In the long run, we feel that developing the slopes lands and
keeping the flatter lands of Central Oahu in agriculture will be in the best
interests of the state.

Thank you for the opportunity to review this document.

Sincerely,

[Signature]
FRANCIS C.H. LUM
State Conservationist

cc: Steve Whiting, DC, Honolulu PO
Mr. Francis C.H. Lum
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 5094
Honolulu, Hawaii 96810

Dear Mr. Lum:

We are in receipt of your department's comments dated August 5, 1965 in which you have transmitted copies of comments submitted to DEIS May 1, 1965 on the proposed Waikele project. We respond in the following to your comments:

1. We concur with your office's analysis that Waikele's agricultural elements of soils, water, climate, and proximity to the market make it one of the best areas for agriculture in Hawaii. It should also be pointed out however, that extensive study on alternative crops that could effectively use Waikele's acreage has been conducted by Amfac. Further, the continued survival of Ohau Sugar Company is predicated on the use of Waikele in a urban framework. Amfac Sugar testified at recent public hearings held before the State Land Use Commission that operational costs to harvest crops on a single field basis, made Waikele less cost effective than the economic climate. Further, installation of drip irrigation systems for the Waikele fields and the extremely expensive water transmission costs due to pumping from the base line source or the Makahiki Ditch have imposed increased costs that have made sugar cultivation at Waikele less than attractive from an economic standpoint. The draft EIS will include the Oahu Sugar Company Survival Plan as an attachment and references will be made from that document.

2. The possible use of other lands in that you describe the slopes of the Waianae Mountains towards Makahiki are not in fee ownership by Amfac and would lend themselves in an economic sense for urbanization and development. Unfortunately, the same reasons that make Waikele an attractive and viable site for agriculture, prevail for urbanization via residential and commercial usage.

3. We recognize your agency's role in maintaining agricultural lands in the prescribed use and also acknowledge the concerns being expressed are towards that goal. We will provide in the Draft EIS the Oahu Sugar Company's plan for survival that will demonstrate Amfac's efforts to achieve these same goals by urbanizing Waikele. We look forward to your comments on the Draft EIS.

Very truly yours,

F. J. Rodrigues

F J Rodrigues
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Re: Environmental Impact Statement Preparation Notice, Makaha Development Project, Waikiki, Oahu

Dear Sir:

The U.S. Fish and Wildlife Service has reviewed the referenced project and offers the following comment.

The Environmental Impact Statement should discuss the potential impacts on the water quality and na ha (Ostacolobus apopomus) fishery in Pearl Harbor from the increased runoff and stormwater discharges from the proposed development.

We appreciate the opportunity to comment.

Sincerely,

[Signature]
Ernest Kooaka
Project Leader
Office of Environmental Services

cc: NOAA - EIS
DEAR
GHC

October 9, 1985

Mr. Ernest Kooaka
Project Leader
Office of Environmental Services
U.S. Dept. of the Interior
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kooaka:

We are in receipt of your department's comments dated August 22, 1985 on the EIS Preparation Notice for the proposed Waikiki project and we respond to the following:

There will be a surface/drainage analysis provided in the draft EIS currently under preparation that will provide data on the runoff quantity and quality containment value. We would refer your agency to this report on that impacts on the water quality of Pearl Harbor and the more specific references to the na ha fishery can be evaluated.

We look forward to your comments on the draft EIS. Thank you for your comments at this time and continuing concern.

Very truly yours,

[Signature]
F. J. Rodrigues

P. J. Rodigues
FISH

AUG 23 1985

Save Energy and You Serve America!
Environmental Impact Statement (EIS) Preparation Notice for the Maili Development

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96829

Dear Sirs:

We have reviewed the EIS Preparation Notice for the proposed Maili Development Project forwarded to us on 18 July 1985, and provide the following comments for your consideration.

Since water conservation measures are encouraged by the Board of Water Supply, increasing the likelihood of water rationing, this additional development would adversely impact the Navy's mission in Hawaii. The Maili Interchange is already extremely congested. The proposed development will add to this traffic volume. What are the Maili developers proposing to address this problem?

A Navy-owned access road to the Maili Branch of the Naval Magazine, Iwakuni, traverses the development site. Occasionally the road is used to land ammunition. The Navy and NMAC are evaluating the possibility of entering into a land exchange whereby the present Navy road would be conveyed to NMAC for use in the development in exchange for a road easement to be provided to the Navy for access on Pauoa Street through the development. The EIS should address this proposal.

Because U.S. Navy property at Maili is adjacent to the proposed development, two copies of the EIS should be provided for review. In addition to the copy to this Command, please mail one copy direct to Commanding Officer, Naval Magazine, Iwakuni, Honolulu, Hawaii 96829.

The U.S. Navy appreciates the opportunity of providing guidance at this early stage in preparation of the EIS on the Maili Development.

Sincerely,

P. O'Connor
Commanding Officer, U.S. Navy
Naval Magazine, Iwakuni

Copy tot: w18 Jul 85 ltr
NAVMAC Iwakuni
PACIFIC COMMAND

Environmental Communications, Inc.

October 7, 1985

Capt. F. O'Connor
U.S. Navy Chief of Staff
Department of the Navy
Headquarters
Naval Base Pearl Harbor
Box 114
Pearl Harbor, Hawaii 96840-2015

Dear Capt. P. O'Connor:

We are in receipt of your agency's comments dated August 6, 1985 on the EIS Preparation Notice for the proposed Maili project and we respond to the following:

1. Water availability to the proposed project is a matter of serious concern to all involved not only on this project, but also to the adjacent land users. Please be assured that the Board of Water Supply and the Department of Land & Natural Resources will assure continuing water service to all current and future users in the Pearl Harbor Basin Water Control District.

2. A comprehensive traffic impact study is being prepared for inclusion in the Draft EIS currently under preparation. This document and its analysis will be reviewed by both the State and Federal agencies managing the traffic for Central Oahu and Ewa. We welcome your agency's comments on this traffic analysis.

3. The EIS will address to the extent possible, the negotiations between Amfac and the Navy on the Navy-owned access traversing the development site. The final determination of the easement negotiations will be determined based on the recommendations of an environmental impact due to the Navy hauling of ammunition since the location of the access easement exchange on Pauoa Street will relocate potential impact areas.

Thank you for your comments and we will advise the Environmental Quality Office that two copies of the Draft EIS need to be provided to the Navy for their review.

Very truly yours,

F. J. Rodrigues

FJR/16
DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
DEPARTMENT OF THE ARMY
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DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU

Mr. F. J. Rodrigues
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

July 31, 1985

October 9, 1985

Mr. F. J. Rodrigues
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Mr. Kiong Cheung
Chief, Engineering Division
U. S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Rodrigues:

Thank you for the opportunity to review and comment on the EIS Preparation Notice for the proposed Waikiki Development Project at Waikiki, Oahu. The following comments are offered:

a. The Department of the Army permit requirements are not applicable.

b. The proposed Waikiki Development Project is in an area where the flood hazard potential has not been identified and is therefore classified Zone D under the Flood Insurance Study for the City and County of Honolulu prepared by the Federal Insurance Administration.

Sincerely,

[Signature]
Chief, Engineering Division

Mr. Kiong Cheung
Chief, Engineering Division
U. S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

We are in receipt of your office's comments dated July 31, 1985 on the EIS Preparation Notice for the Waikiki project and we respond in the following:

a. No response required

b. We will identify the Flood Insurance Study designation of 'Zone D' as indicated in your letter.

Thank you for your comment and continuing concern.

Very truly yours,

[Signature]
F. J. Rodrigues
ENV 2-1

August 21, 1985

Mr. F. J. Rodriguez, President
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Environmental Impact Statement Preparation Notice for the Proposed Makaha Development Project, Makaha, Oahu

We have reviewed the above EIS Preparation Notice and offer the following comments:

On Page 8, reference is made that electric systems can be found in adjacent residential communities. This may be true; however, this comment was highlighted in a letter to you dated May 3, 1985, which we quote:

"Electrical service to the subject project will be made available, however, in view of the magnitude of the electrical load anticipated for the project, it is very likely that our company will require a substation site within the project development. The approximate dimensions of the substation site are 100' x 120'. The route of our 44 kv transmission line to the substation site needs to be resolved between HKO and AMFA. The lead time to design and construct the substation and to purchase the substation transformer is approximately 1-1/2 years."

Thank you for the opportunity to comment on this project.

Sincerely,

Brenner Manger, Ph.D., P.E.
Manager, Environmental Department

A Hawaiian Electric Industries Company

ENVIRONMENTAL
COMMUNICATIONS
INC.

October 9, 1985

Dr. Brenner Manger
Manager, Environmental Department
Hawaii Electric Company, Inc.
P.O. Box 2799
Honolulu, Hawaii 96804

Dear Mr. Rodriguez:

We are in receipt of your company's comments dated August 21, 1985 on the EIS Preparation Notice for the proposed Makaha project and we respond in the following:

Your prior comments dated May 3, 1985 have been provided to Amfac as well as the retained civil engineering firm who has included your comments in their future planning schedule. Please be assured that there will be more than adequate time in the future to meet and discuss this matter with HEI as the project continues through the lengthy land use policy review schedule.

Thank you for your comments and continuing concern.

Very truly yours,

Brenner Manger
Ph.D., P.E.
Manager, Environmental Department
CASTLE & COOKE, INC.

POST OFFICE BOX 2990  
HONOLULU, HAWAII 96802
TELEPHONE 848-2905

July 30, 1985

Environmental Communications, Inc.
1146 Fort Street Suite 200
Honolulu, Hawaii 96813

Gentlemen:

We note on the Register of Chapter 343, HRS Documents in the Office of Environmental Quality Control Bulletin No. 14 the proposed action on the Waikiki development at Waipahu, Oahu by Amfac Property Development Company.

Castle & Cooke, Inc. is the owner of adjacent property and requests to be consulted in the preparation of the EIS.

Please call the undersigned at 548-2905 if you have any questions.

Very truly yours,

CASTLE & COOKE LAND COMPANY

George Yim
President

co: Wallace Miyahira

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. Rodrigues
President

October 9, 1985

Mr. George Yim, President
Castle & Cooke, Inc.
P.O. Box 2990
Honolulu, Hawaii 96802

Dear Mr. Yim:

We are in receipt of your request to be a consulted party during the EIS process for the proposed Waikiki project. We will be requesting the Environmental Quality Office to include your firm on the draft EIS distribution list.

Very truly yours,

F. J. Rodrigues

FJR:la
Finally, the peak traffic characteristics resulting from trips generated from and attracted to the area can be expected to result in a broader peak period rather than the higher peak hour traffic conditions due to the nature of trip-making behavior of a "secondary urban center", resulting in "destination-type" peak traffic characteristics and shorter origin to destination trip lengths generally occurring later during the morning peak period and earlier during the afternoon peak period.

2. A Priori Highway Improvements

Because of the magnitude of the proposed development and the limited existing accessibility to the site from major arterial highways, some a priori improvements, i.e., improvements assumed without analysis, to the highway network were taken as given conditions to accommodate growth in this area. Given this premise, the master plan concept could be developed based upon certain requirements for accessibility to major arterial highways in the vicinity. It is not within the scope of this study to generate alternative schemes for comparison purposes, nor is its intent to provide a detailed analysis of each proposed highway improvement. Preliminary cost estimates for the proposed highway improvements can be found in the "Site Construction Cost Estimates for the Wekale Development", November 1983 by Community Planning, Inc. The proposals contained herein are discussed conceptually on a system-wide basis, within the context of an overall traffic master plan. While each improvement is analyzed as an integral part of the overall system, more detailed design analyses should be carried out on an individual basis.

II. PROJECT DESCRIPTION

A. Wekale

The proposed Wekale Development is a totally planned community providing a wide range of residential dwelling types, including single family detached units at 5 dwelling units per acre (DUA/AC), townhouse and clustered units at 10 DUA/AC, and low-rise garden apartments at 20 DUA/AC; a commercial development, including a 150,000 square foot neighborhood shopping center and a 42.6 acre office park containing 317,000 square feet of office space; and recreational facilities including an 18 hole golf course. Exhibit 3 shows the overall development master plan. For discussion purposes, the Wekale Development is divided into three areas; East Wekale, West Wekale and Central Wekale, roughly delineated by the proposed golf course.

The master plan concept consists of a core commercial community Village Center surrounded by a golf course, serving as a buffer to the residential areas on the periphery of the development. The development master plan is expected to span 8 years to completion, generally beginning from the east side along Kamehame Highway and spreading westward to Wekale Stream. For the purposes of this study, the development is divided into two phases: Phase I (Years 1 through 3) includes the golf course.
part of the office park in Central Waikiki and about one-half of the total residential development planned for Waikiki. Phase II (Years 4 through 8) includes the commercial-retail center and the remainder of the business park in Central Waikiki, the remaining residential areas in Waikiki.

B. Proposed Improvements to the Highway Network

The a priori highway improvements proposed in this report are discussed within the context of other proposals not yet realized. One such proposal involves the State-proposed Waiapulu Interchange on Interstate Route H-2 at the Millilani Cemetery Road Overcrossing. This facility, which is intended to service the Gentry-Waiapulu Development, can be expected to divert 3000 vehicles per hour from Kamehameha Highway to Interstate Route H-2, southbound during the AM peak hour and northbound during the PM peak hour.

In a similar situation, a full service interchange facility on Interstate Route H-1 at the existing Palua Street Undercrossing, proposed by this study, is intended to service the proposed Waikiki Development in addition to the established community of Waialea Town. The improvement of Kamehameha Highway is proposed to provide a second major access for the proposed Waikiki Development.

The master plan for the proposed Waikiki Development spreads outward from an extension of Palua Street much of the Freeway to the north end of the site. An east-west collector roadway extends from Manager's Drive at the existing Freeway overcrossing.
APPENDIX

LEVEL OF SERVICE DEFINITIONS

1. GENERAL

"Level of Service" (LOS) is a term which, broadly interpreted, denotes any one of a finite number of differing combinations of operating conditions that may occur on a given lane or roadway when it is accommodating various traffic volumes. Level of Service is a qualitative measure of the effect of a number of factors, which include speed and travel time, traffic density, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

Each "level of service" definition has two applications; the first is for continuous uninterrupted flow on a highway and the second is for signalized intersections.

2. LEVEL OF SERVICE "A"

A. Level of Service "A" describes completely free-flow conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway and driver preferences. Vehicles are spaced at an average of 440 feet, or 22 car lengths, at a maximum density of 12 passenger cars per mile per lane (pcr/mil). The ability to maneuver within the traffic stream is high. Minor disruptions to flow are easily absorbed at this level without causing significant delays or queuing.

B. At Level of Service "A", there are no loaded cycles (i.e., the "load factor" is 0.0) and few are even close to loaded. No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation, their only concern being the chance that the light will be red, or turn red, when they approach.

3. LEVEL OF SERVICE "B"

A. Level of Service "B" is also indicative of free flow, although the presence of other vehicles begins to be noticeable. Average travel speeds are somewhat diminished from LOS "A", but are still generally over 44 mph on sections with 30 mph design speed. Vehicles are spaced at an average of approximately 220 feet, or 13 car lengths, at a maximum density of 12 pcr/mil. Minor disruptions are still easily absorbed at this level, although local deterioration in LOS will be more obvious.

B. Level of Service "B" represents stable operation, with a load factor of not over 0.1; an occasional approach phase is fully utilized but a substantial number are approaching full use. Many drivers begin to feel somewhat restricted within platoon of vehicles, but under typical rural conditions, this frequency will be suitable operation for rural design purposes.

4. LEVEL OF SERVICE "C"

A. 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. Average travel speeds are reduced to about 30 mph on 30 mph design speed sections, and the average spacing of vehicles is reduced to approximately 175 feet, or 8.5 car lengths, at a maximum density of 30 pcr/mil. Minor disruptions may be expected to cause serious local deterioration in service, and queues may form behind any significant traffic disruption. Severe or long-term disruptions may cause the facility to operate at LOS "F".

B. In Level of Service "C", stable operation continues. Loading is still intermittent, but more frequent, with the load factor ranging from 0.1 to 0.3. Occasionally drivers may have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not subjectively so. This is the level typically associated with urban design practice.

5. LEVEL OF SERVICE "D"

A. Level of Service "D" borders on unstable flow. Speeds and ability to maneuver are severely restricted because of traffic congestion. Average travel speeds are approximately 35 mph on 50 mph design speed sections, while the average spacing of vehicles


The "load factor" is a measure of this degree of utilization of an intersection approach roadway during one hour of peak traffic flow. It is the ratio of the number of green phases that are loaded, or fully utilized, by traffic (usually during the peak hour) to the total number of green phases available for that approach during the same period.

A-1
is 120 feet, or 6 car lengths, at a maximum density of 42
pcu/mln. Only the most minor of disruptions can be absorbed
without the formation of extensive queues and the deterioration
of service to LOS "F".  

B. Level of Service "D" encompasses a zone of increasing restriction
approaching instability in the limit when the head factor reaches
0.70. Delays to approaching vehicles may be substantial during
short periods within the peak period, but enough cycles with lower
demand occur to permit periodic clearance of developing queues,
thus preventing excessive back-ups.

6. LEVEL OF SERVICE "C"  
A. Level of Service "C" represents operations at or near capacity,
and is quite unstable. At capacity, vehicles are spaced at only
80 feet, or 4 car lengths, at a maximum density of 67 pcu/mln.
This is the minimum spacing at which uniform flow can be main-
tained, and effectively defines a traffic stream with no usable
gaps. Thus, disruptions cannot be damped or dissipated, and any
disruption, no matter how minor, will cause queues to form and
service to deteriorate to LOS "F". Average travel speeds at
capacity are approximately 30 mph.

B. Capacity occurs at Level of Service "C". It represents the most
vehicles that any particular intersection approach can accommo-
date. Although theoretically a head factor of 1.0 would repres-
ent capacity, to practice full utilization of every cycle is
seldom attained, no matter how great the demand, unless the
street is highly friction-free. A head factor range of 0.7 to
1.0 is more realistic. In the absence of a local determination,
use of 0.85 is recommended for isolated intersections. For
interconnected signals a higher factor may be appropriate. At
capacity there may be long queues of vehicles waiting upstream
of the intersection, and delays may be great (up to several signal
cycles).

7. LEVEL OF SERVICE "F"  
A. Level of Service "F" represents forced or breakdown flow. It oc-
curs 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. While operations at such points (and on immediately
downstream sections) will appear to be at capacity or better,
queues will form behind these breakdowns. Operations within
queues are highly unstable, with vehicles experiencing short
spurts of movement followed by stoppages. Average travel speeds
within queues are generally under 30 mph, with densities higher
than 67 pcu/mln.
Ref. No. P-3204

December 19, 1985

The Honorable John P. Whalen
Director
Department of Land Utilization
City and County of Honolulu
660 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: DEIS for Waimolok Development, Hawi District, Oahu

We have reviewed the subject draft environmental impact statement (DEIS) and offer the following comments for your consideration.

Chapter II, Section A.5 identifies the soil classification and describes its qualities at the proposed project site. We note, however, that there is no discussion of the soil's susceptibility to erosion, although erosion is identified as a probable impact. Increased surface runoff can be expected from the land clearing and grading operations, which will flow to nearby streams and ultimately to the ocean. The coastal impacts may be significant and should be addressed in the report.

We also note that the applicant has not identified the Naval Magazine (Namokul) facility (Waimolok Branch) which is located along the western boundary of the project area. It encompasses 120 acres. Since sensitive areas, ammunition, and explosives are received, processed, maintained, stored, and issued at the Namokul, the existence of this facility should be indicated in the DEIS in the interest of public safety.

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

Very truly yours,

Kent M. Keith

cc: Mr. F. J. Rodrigues

DE 27 1985

January 7, 1986

Mr. Kent M. Keith, Director
Department of Planning and Economic Development
P.O. Box 2350
Hono1ulu, Hawaii 96804

Dear Mr. Keith:

We are in receipt of your department's comments dated December 19, 1985 and we respond in the following:

1. Increased surface runoff has been examined in detail by the study conducted by Dr. Gordon L. Dagan, Ph.D. and Dr. Michael J. Chua, Ph.D. The results of this work and the anticipated impacts on the receiving waters (Waimolok Stream and Pearl Harbor) are discussed in section IV-2.3.4.5 section 4.5. Impact on Hydrological Characteristics. Their conclusions are impacts to water quality resulting from operations of the project are anticipated to be minimal, because biologically and use that may potentially adversely affect water quality tend to break down more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline. Therefore, though the amount of runoff would increase, adverse water quality impacts resulting from increased constituents should not be significant.

2. The presence of the Naval facility located in Waimolok Gulch will be acknowledged in the Project Description section.

Thank you for your concerns and continuing interest.

Very truly yours,

F. J. Rodrigues
November 14, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Draft EIS to Waikale Development - Aolii, Waialae, Ewa District, Oahu

The Authority has reviewed subject draft EIS and has no further comments to offer relative to the proposed action at this time. Our previous comments during the preparation phase have been satisfactorily addressed by Environmental Communications, Inc.

Thank you for the opportunity to comment.

Sincerely,

Russell M. Fukumoto
Executive Director

CC: DHS
/Environmental Communications, Inc.
expected to allocate to the task of the proposed development. In the case of the proposed development, the allocation of resources will be determined based on the estimated requirements and priorities. The proposed development is expected to be completed within the next 12 months. The allocation of resources will be adjusted based on the progress of the project.

In the case of the proposed development, the allocation of resources will be determined based on the estimated requirements and priorities. The proposed development is expected to be completed within the next 12 months. The allocation of resources will be adjusted based on the progress of the project.
The project proposal for the proposed project will
include a description of the project's objectives, the
methods to be used, the expected outcomes, and the
expected benefits. The project proposal will also
include a budget, a timeline, and a plan for
monitoring and evaluating the project's progress.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Time (min)</th>
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<tr>
<td>Introduction and Scope</td>
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<tr>
<td>PROPOSED WATERSHED TREATMENT MASTER PLAN FOR THE</td>
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<td>Traffic Impact Report</td>
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<td>APPENDIX</td>
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</table>

*Note: Data exceeds the page limits.*

**Source:** Data from Human Ecosystems of Health
## Table 1

**Summary of Hawaii and National Ambient Air Quality Standards**

(Nanograms per Cubic Meter)

<table>
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<tr>
<th>Pollutant</th>
<th>Sampling Period</th>
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<th>National (Secondary)</th>
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<th>Hawaii</th>
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<tr>
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<td>Annual Arithmetic Mean</td>
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<td>--</td>
<td>55</td>
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<tr>
<td></td>
<td>Maximum 24-Hour Average</td>
<td>250</td>
<td>150</td>
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<tr>
<td>Sulfur Dioxide</td>
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<tr>
<td></td>
<td>Maximum 24-Hour Average</td>
<td>365</td>
<td>--</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum 3-hour Average</td>
<td>1300</td>
<td>--</td>
<td>400</td>
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<tr>
<td>Nitrogen Dioxide</td>
<td>Annual Arithmetic Mean</td>
<td>100</td>
<td>--</td>
<td>70</td>
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<tr>
<td>Ozone</td>
<td>Maximum 1-hour Average</td>
<td>--</td>
<td>--</td>
<td>100</td>
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<tr>
<td>Carbon Monoxide</td>
<td>Maximum 8-hour Average</td>
<td>10</td>
<td>5</td>
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</tr>
<tr>
<td></td>
<td>Maximum 1-hour Average</td>
<td>40</td>
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<td>1.5</td>
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</table>

**Notes:**
1. Carbon monoxide standards are in milligrams per cubic meter.
Thank you for your continuing interest and concern.

We are in receipt of your company’s estimate dated December 2, 1985 and we

accept the following:

Environmental

1985

January 7, 1986

Environmental

INC

INCO

August 5, 1985

December 2, 1985

C.C. F. Macgregor

President

Denny Morse

Environmental

INC

INCO

January 7, 1986

Environmental

INC

INCO

August 5, 1985

December 2, 1985

C.C. F. Macgregor

President

Denny Morse

Environmental

INC

INCO
Dear Mr. Weimer:

Thank you for your concern and interest.

We'll file these papers as you requested in your letter of August 25, 1995, and we'll keep a copy for our records.

Sincerely,\

[Signature]

Environmental Protection Agency

[Address]

[Date: September 20, 1995]
Please contact us, James Nogid, at our Housing Division, 1121-5533 Bishop Street, Suite 200, Honolulu, HI 96813, for further assistance in formulating a plan to meet the affordability housing requirements of the development.

Sincerely,

[Signature]

CITY AND COUNTY OF HONOLULU

December 11, 1985

Mr. J. J. Rodrigue
Director

The 180 Beretania Street housing requirement will be completed with 41% of the housing being affordable. However, the following criteria are applicable: The housing units must be affordable to moderate-income families as defined by the City and County of Honolulu's criteria in 1985 and the affordable housing units must be at least one bedroom and 500 square feet in size. The affordable housing units must be located in the same building as the non-affordable units. The affordable housing units must be reasonably accessible to non-affordable units.

We are in receipt of your department's comments dated December 11, 1985, and we are in agreement with the following issues:

1. The affordable housing units must be located in the same building as the non-affordable units.
2. The affordable housing units must be reasonably accessible to non-affordable units.
3. The affordable housing units must be at least one bedroom and 500 square feet in size.
4. The affordable housing units must be affordable to moderate-income families as defined by the City and County of Honolulu's criteria in 1985.

Thank you for your continuing support and assistance.

Very truly yours,

[Signature]

CITY AND COUNTY OF HONOLULU

January 7, 1986

Mr. J. J. Rodrigue
Director

The 180 Beretania Street housing requirement will be completed with 41% of the housing being affordable. However, the following criteria are applicable: The housing units must be affordable to moderate-income families as defined by the City and County of Honolulu's criteria in 1985 and the affordable housing units must be at least one bedroom and 500 square feet in size. The affordable housing units must be located in the same building as the non-affordable units. The affordable housing units must be reasonably accessible to non-affordable units. The affordable housing units must be located in the same building as the non-affordable units. The affordable housing units must be reasonably accessible to non-affordable units.

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4. The affordable housing units must be affordable to moderate-income families as defined by the City and County of Honolulu's criteria in 1985.

Thank you for your continuing support and assistance.

Very truly yours,

[Signature]
The text on the page is not legible due to the quality of the image. It appears to be a page from a document, but the content cannot be accurately transcribed.
November 21, 1985

MEMO TO: MR. JOHN WHALEN, DIRECTOR
        DEPARTMENT OF LAND UTILIZATION
FROM: HERBERT K. MURAKA,
      DIRECTOR AND BUILDING SUPERINTENDENT
SUBJECT: DRAFT NSS FOR WAIKELA DEVELOPMENT

We have reviewed the draft NSS for the Waikela Development
and have no comments.

Thank you for the opportunity to review the draft NSS.

HERBERT K. MURAKA
Director and Building Superintendent

[Signature]

cc: J. Harada
    Environmental Communication, Inc.
    (F. J. Rodrigues)

NOV 25 1985
residential units in the development. This will attract home buyers into the area who currently would be shopping elsewhere. It also will provide current upzoned mobile residents of the area the opportunity to purchase the housing they require without moving out of the neighborhood.

One major factor that will impact on the lifestyle and the quality of life of the residents of Waipahu and adjacent areas is the increased vehicular traffic the additional residents will generate. The existing congestion on the H1 freeway is partly due to the current residents high dependence on private vehicles for transportation to work. 84 percent of the residents of Waipahu travel to work in a private vehicle as compared to a 76 percent average for Oahu. The impact on traffic, however, will be mitigated by the development plans for another on-ramp to the freeway - which will serve all of Waipahu, not just residents of the proposed development, and the widening of H3 Highway.

4. Costs and Benefits. While it is not yet possible to determine the impact on the economy of the development, as many plans and schedules are not yet finalized, it is obvious that a development of this magnitude will contribute millions to the economy through the monies spend on labor, materials, and other development oriented expenses. In addition, the retail center and light industrial park are expected to create 2,000 jobs.

The total impact of these employment possibilities of the economy as a whole will be the creation of approximately 3,600 jobs and an annual increase in the gross domestic product of several million dollars.

5. Benefit of having more houses available. A study of the demand for housing in the project area indicates that between 1993 and the year 2000, over 23,000 new units will be required. If these units are not forthcoming, the demand will be reflected in increased housing prices. The proposed development will supply sufficient housing to meet about 12 percent of the projected demand.

6. As Waipahu is not a center of tourist activity, being primarily a residential and light industry community, the proposed development will have no or little impact on tourism.

7. Placing the subject lands in an urban use will have not significant impact on the agricultural sector of the county or of the State. Lands of similar quality and economic potential are currently lying fallow.

8. Arguments pro and con either status quo or growth can always be made, both have advantages and disadvantages, with identifiable socioeconomic benefits and costs. Which side which argument is the most plausible will depend on an individuals or on a communities social and economic values.

One resolution is to have selective, high quality developments which will preserve those values considered to be the most valuable to the people affected, while simultaneously providing social and economic benefits. Such developments would include well-planned and implemented projects, architecturally and tastefully appropriate to the environment, which would have minimal negative social impact on the community.

Evaluated in the above context, the benefits of the proposed Waipahu development clearly outweigh the costs. The integrity and consistent of ANFAIC is evidenced by their long-term involvement in Hawaii and in Waipahu, and their record of well planned and executed development projects in Hawaii. Waipahu is a logical location for the continued growth of Waipahu.
References


Appendix Table 1. Demographic Characteristics of the Waipahu CDP by Census Tracts - 1980

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<thead>
<tr>
<th>Age</th>
<th>Census Tracts</th>
<th>Age</th>
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<tr>
<td>Under 5</td>
<td>555</td>
<td>60-64</td>
<td>471</td>
<td>65-74</td>
<td>329</td>
<td>75 and Over</td>
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<tr>
<td>5-9</td>
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<td>75-84</td>
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<td>85 and Over</td>
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School Enrollment

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<tr>
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School Completed

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Journey to Work

<p>| Workers &gt; 15 Yrs 2120 | 1572          | 1572          | 1572          | 1572          | 1572          |
| Private Vehicle        | 2724          | 1159          | 1159          | 1159          | 1159          |
| Drive Alone            | 1780          | 1860          | 1933          | 2020          | 2120          |
| Car Pool               | 941           | 1243          | 1443          | 1643          | 1843          |
| Public Transport       | 287           | 287           | 287           | 287           | 287           |
| Other                   | 76            | 76            | 76            | 76            | 76            |
| Mean Travel Time       | 24.1          | 27.4          | 25.9          | 26.7          | 26.8          | 26.5          | 26.4          |</p>
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<td>97</td>
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<tr>
<td>1100-1200</td>
<td>40</td>
<td>1,337</td>
<td>97</td>
<td>2</td>
<td>61.9</td>
<td>56.4</td>
</tr>
<tr>
<td>1200-1300</td>
<td>40</td>
<td>1,236</td>
<td>97</td>
<td>2</td>
<td>61.9</td>
<td>56.4</td>
</tr>
<tr>
<td>1300-1400</td>
<td>40</td>
<td>1,437</td>
<td>97</td>
<td>2</td>
<td>62.3</td>
<td>56.8</td>
</tr>
<tr>
<td>1400-1500</td>
<td>40</td>
<td>1,742</td>
<td>97</td>
<td>2</td>
<td>63.0</td>
<td>57.6</td>
</tr>
<tr>
<td>1500-1600</td>
<td>40</td>
<td>2,318</td>
<td>97</td>
<td>2</td>
<td>64.1</td>
<td>58.6</td>
</tr>
<tr>
<td>1600-1700</td>
<td>40</td>
<td>2,363</td>
<td>97</td>
<td>2</td>
<td>64.5</td>
<td>59.1</td>
</tr>
<tr>
<td>1700-1800</td>
<td>40</td>
<td>2,415</td>
<td>97</td>
<td>2</td>
<td>64.3</td>
<td>59.0</td>
</tr>
<tr>
<td>1800-1900</td>
<td>40</td>
<td>2,086</td>
<td>97</td>
<td>2</td>
<td>63.0</td>
<td>58.4</td>
</tr>
<tr>
<td>1900-2000</td>
<td>40</td>
<td>1,608</td>
<td>97</td>
<td>2</td>
<td>62.7</td>
<td>57.2</td>
</tr>
<tr>
<td>2000-2100</td>
<td>40</td>
<td>1,132</td>
<td>97</td>
<td>2</td>
<td>61.2</td>
<td>55.7</td>
</tr>
<tr>
<td>2100-2200</td>
<td>40</td>
<td>1,026</td>
<td>97</td>
<td>2</td>
<td>61.0</td>
<td>55.5</td>
</tr>
<tr>
<td>2200-2300</td>
<td>40</td>
<td>702</td>
<td>97</td>
<td>2</td>
<td>59.1</td>
<td>53.8</td>
</tr>
<tr>
<td>2300-2400</td>
<td>40</td>
<td>426</td>
<td>97</td>
<td>2</td>
<td>56.9</td>
<td>51.5</td>
</tr>
</tbody>
</table>

KAMAHINEHA HWY @ WAIPAHU ST., STA C-13-1, (4/23-24/04)
TOTAL VEH: 31,047  LDM @ 50 FT: 65.8  60.4  62.6  68.3

APPENDIX C, WORKSHEET #3
the correlation of the local, regional and

are provided to be between 53 in. to 57 ft. No method of calculation from

pavement of the toilet or other room. Either select or other room. of heavy traffic (either traffic or number) one not of the local number. It

recommen'd'ed' under various conditions and be done on the local number.

The treatment of the proposed development are expected to be in the

extent of the proposed development are expected to be in the

area treated and the proposed development.
## Table 1

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing (150 ft)</th>
<th>Ex 1 (50 ft)</th>
<th>Ex 2 (100 ft)</th>
<th>Ex 3 (No Buffer)</th>
<th>Ex 4 (150 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Street</td>
<td>11.1</td>
<td>90.0</td>
<td>68.4</td>
<td>47.8</td>
<td>67.2</td>
</tr>
<tr>
<td>2nd Street</td>
<td>11.1</td>
<td>90.0</td>
<td>68.4</td>
<td>47.8</td>
<td>67.2</td>
</tr>
<tr>
<td>3rd Street</td>
<td>11.1</td>
<td>90.0</td>
<td>68.4</td>
<td>47.8</td>
<td>67.2</td>
</tr>
<tr>
<td>4th Street</td>
<td>11.1</td>
<td>90.0</td>
<td>68.4</td>
<td>47.8</td>
<td>67.2</td>
</tr>
</tbody>
</table>

Note: The table above illustrates the existing and future traffic noise levels in various locations. The columns represent different noise buffer zones, and the rows are different streets. The values indicate the noise levels in decibels. The future traffic noise levels are expected to decrease with increased buffer zones. The data is based on the assumption that the traffic volume and speed remain constant.
<table>
<thead>
<tr>
<th>Location</th>
<th>Time of Day (EST)</th>
<th>95th Percentile Speed (mph)</th>
<th>Exceedance Probability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 137 ft from beginning of HI 114/200 intersection at Waipahu, HI 114/200 (in a 60 mph zone)</td>
<td>7:00 AM</td>
<td>27</td>
<td>65.6</td>
</tr>
<tr>
<td>2. 137 ft from beginning of HI 114/200 intersection at Waipahu, HI 114/200 (in a 60 mph zone)</td>
<td>7:00 AM</td>
<td>27</td>
<td>65.6</td>
</tr>
<tr>
<td>3. 137 ft from beginning of HI 114/200 intersection at Waipahu, HI 114/200 (in a 60 mph zone)</td>
<td>7:00 AM</td>
<td>27</td>
<td>65.6</td>
</tr>
<tr>
<td>4. Near end of HI 114/200 at HI 114/200 (in a 60 mph zone)</td>
<td>7:00 AM</td>
<td>27</td>
<td>65.6</td>
</tr>
</tbody>
</table>

Note: The data is collected using traffic cameras and is subject to accuracy and reliability.
Table 1: Correlation of Across-Station Variation

<table>
<thead>
<tr>
<th>Station</th>
<th>Northward</th>
<th>Southward</th>
<th>Eastward</th>
<th>Westward</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.75</td>
<td>0.60</td>
<td>0.80</td>
<td>0.70</td>
</tr>
<tr>
<td>2</td>
<td>0.80</td>
<td>0.70</td>
<td>0.60</td>
<td>0.85</td>
</tr>
<tr>
<td>3</td>
<td>0.60</td>
<td>0.75</td>
<td>0.80</td>
<td>0.65</td>
</tr>
<tr>
<td>4</td>
<td>0.70</td>
<td>0.80</td>
<td>0.70</td>
<td>0.85</td>
</tr>
</tbody>
</table>

**Note:** The table above shows the correlation coefficients for different directions at various stations. The coefficients range from 0.60 to 0.85, indicating a strong correlation.
the use of educational software to enhance learning outcomes.

The effectiveness of these tools is often measured by the improvement in student achievement, which can be assessed through various methods such as standardized tests, teacher evaluations, or student self-assessment.

However, the integration of educational technology in the classroom requires careful planning and consideration of the specific needs of the students. A well-designed curriculum that includes technology integration can help to bridge the gap between traditional and digital learning approaches.

In conclusion, the use of educational technology offers numerous benefits in modern education. It not only enhances the learning experience but also prepares students for the digital age by equipping them with the necessary skills to succeed in a technology-driven world.

References:


Mr. F. J. Rodrigues, President
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodrigues:

Re: Environmental Impact Statement Preparation
Notice for the Proposed Waikale Development
Project; Waikale, Oahu
TEK: 94-02: 7, 10, 11, 12 (part.), 31 and 41
94-07: 10, 12, 13, and 32

This is to inform you that the Department of Agriculture
would like to be a consulted party in the preparation of the
subject Environmental Impact Statement (EIS). We will be
providing comments upon our receipt and review of the the Draft
EIS.

Sincerely,

Jack K. Suwa
Chairman, Board of Agriculture

---

October 9, 1985

Mr. Jack K. Suwa
Chairman, Board of Agriculture
Department of Agriculture
1428 S. King Street
Honolulu, Hawaii 96814

Dear Mr. Suwa:

We are in receipt of your request to be a consulted party in the preparation
of the Draft EIS for the proposed Waikale project. We look forward to your
department's comments during your review of the draft EIS.

Thank you for your continuing interest.

Very truly yours,

FJ Rodriguez

---

AUG 22 1985
August 19, 1985

MEMORANDUM

May 20, 1985

To: Mr. Donald A. Clegg, Chief Planning Officer
   Department of General Planning, City & County of Honolulu

From: Calvin Hiroshi
   Director of Health

Subject: EIS Preparation Notice for the Proposed Kukui Development Project

Thank you for allowing me to review and comment on the subject EIS preparation notice. Our staff has reviewed the materials and does not have any additional comments at this time. Please find attached our earlier comments, dated May 20, 1985, which were made as a written request for this project. These comments are still applicable.

Sincerely,

CALVIN HIRSHI
Acting Director of Health

Attachment

AUG 22 1985

May 20, 1985

MEMORANDUM

To: Mr. Donald A. Clegg, Chief Planning Officer
   Department of General Planning, City & County of Honolulu

From: Calvin Hiroshi
   Director of Health

Subject: EIS Preparation Notice for the Proposed Kukui Development Project

Thank you for allowing me to review and comment on the subject State Land Use Commission petition. We submit the following comments for your consideration:

Wastewater Treatment

Recently, there have been many proposed projects for West Oahu such as Ewa Marina, West Beach and the subject project. The accompanying report all states that no sewage flow will be directed to the Honolulu WWTP which has a capacity of 23 MGD. At the present, the average daily flow is about 16 MGD. It is estimated that the design capacity will be reached by 1992. The City should be asked whether the Honolulu WWTP has sufficient capacity to accommodate all of these projects.

Drinking Water

The developer proposes to construct a drinking water system which appears to be subject to our drinking water regulations (Chapter 22 of Administrative Rules). Section 22-20-19 of the Drinking Water Chapter 22 requires all new sources serving public water systems to be approved by the Director of Health. Such approval is based upon the satisfactory submission of an engineering report which adequately addresses all concerns as set forth in Section 22-20-19. The engineering report must be prepared by a registered professional engineer and must bear his or her seal upon submittal.

In addition, Section 22-20-10 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portion of the system is capable of delivering potable water in compliance with all maximum contaminant levels (MCLAs) as required in Chapter 22, Title II, Administrative Rules.
Mr. F. J. Rodrigues 
Environmental Communications, Inc. 
P.O. Box 516 
Honoalulu, Hawaii 96809

Dear Mr. Rodrigues:

SUBJECT: EIS Preparation Notice  
Kalalei Development Project

Our review of the proposed Kalalei Development project with its approximately 2,640 residential units indicates that the following student enrollment may be generated:

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>GRADE</th>
<th>APPROXIMATE ENROLLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kamehameha Kalalei Elementary</td>
<td>K-6</td>
<td>200 - 500</td>
</tr>
<tr>
<td>Highlands/Kalalei Intermediate</td>
<td>7-8</td>
<td>80 - 160</td>
</tr>
<tr>
<td>Pearl City/Haiku High</td>
<td>9-12</td>
<td>150 - 250</td>
</tr>
</tbody>
</table>

The assignment of schools to service the Kalalei students is subject to determination by our Leeward District Office. Enrollment growth will be monitored and assessed before any final commitment is made on the schools to service these students.

Should there be any questions, please contact Mr. Howard Lau at 737-4743.

Sincerely,

Margaret Y. K. Higa 
Frances W. Hatanaka

cc: V. Hana, OHS 
W. Arai, Leeward Dist.

October 9, 1985

Mr. Frances W. Hatanaka 
Superintendent 
Department of Education 
P.O. Box 2560 
Honoalulu, Hawaii 96804

Dear Mr. Hatanaka:

We are in receipt of your department's comments dated July 31, 1985 on the EIS Preparation Notice for the proposed Kalalei project and we respond in the following:

We have met with your department's planning staff to provide them with an initial preview of the proposed Kalalei project development plan. We will maintain contact with them and also provide in the Draft EIS currently under preparation, a phasing schedule for development which should prove helpful to your planning personnel. We look forward to your comments on the draft EIS and thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodrigues

PJRil
Mr. Donald A. Clegg  
May 20, 1985  
Page 2

It is a well publicized fact that some of the central Oahu wells are contaminated with organic compounds (e.g., EDI, DDEP, TCP, TCE, and PCE). The EA should indicate whether these wells are contaminated. In addition, an analysis of the EA should discuss the possibility of the new wells being located in an area of known groundwater contamination.

As a final note, page 65 of the Land Use Petition document should be revised to reflect current potable water use practices. The Waipahu wells described on this page have been closed due to EDI contamination.

Notice

1. The proposed project must be designed to comply with the provisions of Title II, Administrative Rules Chapter 43, Community Noise Control for Oahu. Noise from equipment, such as air conditioning/ventilation units and exhaust units, must be attenuated to meet the allowable noise levels of the regulations based on zoning districts.

2. Noise associated with the following areas or activities may have adverse impacts on the residents of the proposed project:
   a. Noise from agricultural activities, specifically from Castle and Cooke pineapple growing operations north of the proposed project.
   b. Noise from airport maintenance activities on the proposed airport.
   c. Noise from vehicular traffic travelling along Interstate Highway H-3.
   d. Noise from activities associated with the proposed commercial center, recreation center, planned recreation areas and elementary school.

3. Construction activities must comply with the provisions of Title II, Administrative Rules Chapter 43, Community Noise Control for Oahu:
   a. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the allowable levels of the regulations.
   b. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers.
   c. The contractor must comply with the conditions of the permit as specified in the regulations and conditions issued with the permit.

4. Traffic noise from heavy vehicles travelling to and from the construction site must comply with the provisions of Title II, Administrative Rules Chapter 43, Vehicular Noise Control for Oahu.

We realize that the statements are general in nature due to preliminary plans being in the early stages of development. We, therefore, reserve the right to impose future conditions on the project at the time final plans are submitted to this office for review.

[Signature]

N. S. Matsuura

NSLU, Matsuura
Mr. Leslie S. Matsubara  
Department of Health  
October 9, 1985

Dear Mr. Matsubara:

We are in receipt of your department’s comments dated May 20, 1985 previously transmitted to the Department of General Planning, City & County of Honolulu for the proposed Wai'ala project. We respond in the following:

1. Wastewater Treatment – The Department of Public Works has advised in their letter dated August 1, 1985 that sewers are adequate to provide service to Wai'ala.

2. Drinking Water – It is recognized that due to the location of the proposed project, the sale drinking water considerations for all new sources must be reviewed and approved by the Department of Health. The location of the source of water to be developed for use by Wai'ala is being investigated and coordinated with both the Board of Water Supply and the Department of Land & Natural Resources, Division of Land & Water Development. To the extent possible, a water plan will be provided in the Draft EIS so that source and storage can be identified for your review. All appropriate Title II Public Health requirements will be complied with during the appropriate review of water master plan engineering.

3. Noise – The general subject of compliance with the Title II, Chapter 43 Community Noise Control for Oahu will be met in terms of land use planning and attenuation measures. It can be stated that external noise impact sources existing in the Wai'ala area would parallel the residential community from the standpoint of adjacent pineapple cultivation and harvesting, golf course maintenance, vehicular traffic (H-2 and Kamehameha highway), commercial and educational facilities, etc. The land use plan will contain extensive landscaping elements to buffer the noise impacts from the external noise sources and also, there will be space corridors to further attenuate these impacts. A noise study will be provided in the draft EIS and will address these concerns.

Construction related noise will be the primary responsibility of the construction forces onsite during this phase; since it will be ongoing.

Very truly yours,

F. J. Rodrigues

FJR/la
Environmental Communications, Inc.
P. O. Box 526
Honolulu, Hawaii 96809

Gentlemen:

Subject: Environmental Impact Statement Preparation Notice - Waikiki Development

We have reviewed subject matter and offer the following comments for inclusion into the final EIS:

1. That housing for the low-moderate-gap group families be considered for this development.
2. That the specific types of housing units and the proposed sales prices be listed.
3. That the types of proposed long-term financing be listed, if known.

Thank you for the opportunity to comment.

Sincerely,

Russell N. Fukumoto
Executive Director

Mr. Russell N. Fukumoto
Executive Director
Department of Social Services and Housing
Hawaii Housing Authority
P.O. Box 17917
Honolulu, Hawaii 96817

Dear Mr. Fukumoto:

We are in receipt of your department's comments dated July 23, 1985 on the EIS Preparation Notice for the proposed Waikiki project and we respond in the following:

1. Housing for the low-moderate-gap group families are being discussed with the City & County Department of Housing & Community Development. At the present time, a definitive policy to meet this need is being formulated by that agency. As Waikiki proceeds through the Land Use Commission hearings and the City's Zoning process, please be assured that this subject will not be overlooked.

2. Specific housing types and sales prices have not been finalized to the point where they are available for review at this early stage. Again, as the land use policy review process is implemented, these specific details will be more clearly defined in terms of demand and prevailing financing costs for the market group involved.

3. At this early stage, this item is unresolved.

Thank you for your comments and wherever possible, the data requested in this EIS Preparation Notice will be provided to the best of our ability.

Very truly yours,

F. J. Rodrigues

FJR/12

JUL 26 1985
Mr. F. J. Rodriguez  
Environmental Communications, Inc.  
P.O. Box 539  
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: EIS Preparation Notice for the Proposed Waikele Development Project, Waipahu, Oahu

We have reviewed the subject environmental impact statement preparation notice (EISMN) and have the following comments.

The subject document fails to identify a number of aspects of the proposed project which will have significant effects on the environment. The first is the agricultural productivity of the soils within the project area. According to the Department of Agriculture, approximately two-thirds of the project site possesses some of the qualities that constitute the working definition of "important agricultural land." Practically speaking, the urban development proposed by this project will involve an irrevocable commitment to the loss of an important agricultural resource. Sections II.A.3. and II.A. of the preparation notice can be expanded to include a discussion of these impacts.

The second aspect of the proposed project which should be discussed is population change and its effect on the surrounding communities, especially Waipahu, and on the development of the secondary urban center at Hoa.

The third area which should be discussed relates to the Coastal Zone Management's (CZM) objective for coastal ecosystems: Protect valuable coastal ecosystems from disruption and minimise adverse impacts on all coastal ecosystems. The site is currently fallow and covered with salt marsh, "... Waikiki Stream flows by the western face of the project site." In order to minimise possible adverse impacts on Waikiki Stream and West Loch, Pearl Harbor, mitigating measures should be proposed for the period during which the fallow fields will be cleared for development.

Very truly yours,

Kent M. Keith

cc: Office of Environmental Quality Control
Mr. Kent W. Keith, Director
Department of Planning and
Economic Development
P.O. Box 2339
Honolulu, Hawaii 96804

Dear Mr. Keith:

We are in receipt of your department's comments dated August 15, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

1. The definitions for characteristics attributed to "important agricultural lands" will be included in the draft EIS currently under preparation. These will include the agricultural productivity of the soils as well as alternative crops that Amfac has explored as to use and economic viability. In addition to agricultural productivity, economic viability must be included in the total equation.

2. Impacts on adjacent communities from the standpoint of population increases will be discussed in terms of compliance with the population projections allocated to the District in the City & County Development Plan Land Use Policy Ordinance for Central Oahu and Ewa.

3. Mitigation measures for anticipated drainage from Waikele Stream to West Loch and other receiving waters will be described in the Drainage Master Plan that is required to meet building code for the City & County of Honolulu. All drainage will be in compliance with applicable City standards.

4. The relationship between Amfac and the Navy who is an adjacent neighbor in the Waikele and Kipapa Gulches is under review by both parties. It will be included to the extent possible in the Draft EIS.

5. Relationships to the Hawaii State Plan and State Functional Plans will be provided in the Draft EIS.

Thank you for your comments and we look forward to your office's review and further comments on the draft EIS.

Very truly yours,

F. J. Rodrigues
Mr. F.J. Rodrigues, President
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodrigues:

Waikiki Development
EIS Preparation Notice
THK: 2-4-2; 3,10,11,12 (Portion)
5-6-7: 10,12,13 and 32

Interstate Route H-1 and Kamehameha Highway are already congested in this area and the Waikiki development will contribute to further deterioration of operating conditions.

The EIS, in its discussion of traffic impacts, should contain a traffic analysis of the problems and mitigation measures based on the full development of Waikiki and the other major proposals for the Ewa area (i.e., Ewa Marina, West Beach).

The analysis may show that adequate access to the Waikiki Development may only be provided through an interchange at Palama Street and a widening of Kamehameha Highway. If so, the developer should be prepared to fully fund these improvements and should state his intentions in the EIS.

Very truly yours,

[Signature]

for Wayne J. Yamazaki
Director of Transportation

---

Mr. Wayne J. Yamazaki, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Yamazaki:

We are in receipt of your department's comments dated August 20, 1985, on the EIS Preparation Notice for the Waikiki project and we respond in the following:

There will be a traffic impact analysis conducted by the retained traffic consultant, Austin, Teutonik & Associates in the draft EIS. This document will discuss the current traffic conditions on H-1 and the thoroughfares into Honolulu and the mitigative measures that can be developed to meet those conditions.

Regarding the Palama Street interchange and the widening of Kamehameha Highway, this matter will be discussed with your office and the Highways Division staff in terms of timing and scheduling of the proposed facilities to ensure availability of improvements to meet the anticipated increases in traffic attributable to the full development of Waikiki.

Payment of the recommended improvements by the developer will be discussed in the draft EIS currently under preparation.

Thank you for comments and continuing concern.

Very truly yours,

P.J. Rodrigues

FJR/sa

AUG. 23 1985
Environmental Communications, Inc.
P. O. Box 530
Honolulu, Hawaii 96809

October 9, 1985

Mr. Edwin T. Murbayashi
EIS Coordinator
Water Resources Research Center
University of Hawaii
Hulana Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murbayashi:

We are in receipt of your Center's comments dated August 20, 1985 on the EIS Preparation Notice for the proposed Waikiki project and we respond in the following:

1. Traffic will be discussed in a Traffic Impact Analysis being developed by the retained traffic consultant, Austin, Texeck & Associates. We welcome your review and comments on this study.

2. Your suggested planning recommendation has been provided to the planning consultant for their consideration.

Thank you for your comments and continued interest.

Thank you for your opportunity to comment. This material was reviewed by WRC personnel.

Sincerely,

Edwin T. Murbayashi
EIS Coordinator

F. J. Rodrigues

AN EQUAL OPPORTUNITY EMPLOYER
Mr. F. J. Rodrigues, President
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodrigues:

Subject: Your Letter of July 18, 1985 on the Environmental Impact Statement (EIS) Preparation Notice for the Proposed Waikiki Development Project, ZHAs 9-4-0711, 1D-11, 1J-11 & 4 and 9-4-0712, 12, 13 & 32

Thank you for the opportunity to review and comment on the proposed development. We have no objections to the project, however, we have the following comments:

1. The Water Master Plan for the Waikiki Development must be submitted for our review and approval.
2. The developer will be required to install a complete water system including source, storage, and transmission facilities.
3. The project is located in our designated "no-pass zone" where on-site disposal of wastewaters is unacceptable. All wastewater disposal must be via the municipal sewerage system serving the area.

If you have any questions, please contact Lawrence Wang at 527-8138.

Very truly yours,

Kazu Hayashida
Manager and Chief Engineer

AUG 12 1985

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Rodrigues:

We are in receipt of your department's comments dated August 6, 1985 on the EIS Preparation Notice for the proposed Waikiki project and we respond to the following:

1. The Water Master Plan will be provided to your agency for review and comment upon the finalizing and completion of the document.
2. The applicant, Amfac will be in discussion and negotiation with your staff on these items for a complete water system (source, storage, and transmission facilities).
3. Department of Public Works has indicated that there is adequate capacity for wastewater treatment and disposal via City facilities. There will be no onsite disposal of wastewater.

Thank you for your comments and we look forward to your office's review and comments of the Draft EIS.

Very truly yours,

F. J. Rodrigues

October 9, 1985

FJRile
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: Environmental Impact Statement
Project: Waikoloa
THS: 5-6-02: 3, 10, 22, 12 (Portion), 31, 41
Area: 31 acres

Proposal: To create a new planned community which will include: (i) acres of residential use; 10-acre commercial center; 30-acre office center; 500-acre golf course; and 20 public facilities.

We appreciate the opportunity to comment during the preparation of the Environmental Impact Statement for the proposed Waikoloa Development project.

The proposed development of residential units in the agricultural district of the State Land Use District Map has been reviewed by the Department of Housing and Community Development. The Department has mandated to provide housing units for the low- and moderate-income families on Oahu. We note that a zoning change is needed, and in accordance with the current Departmental policy, we wish to request that at least ten (10) percent of all residential developments be set aside for these groups. This request applies to all zone changes, cluster and planned development-housing applications. Establishing such a requirement is a reasonable means of recapturing the economic benefit conferred by favorable land use allocations and distributing that benefit for the general public benefit.

We request that Awaic Property Development Corporation specify the location of the units, as well as the type of unit (1-bedroom, 2-bedroom, etc.) to be provided for the low- and moderate-income families.

If you have any questions, please contact Mr. James Miyagi of our Housing Division at 523-4264, who will assist the developer in formulating a program to provide these units.

Sincerely,

Alvin K. H. Pang

Mr. Alvin K. H. Pang, Director
Department of Housing and Community Development
659 South King Street
Honolulu, Hawaii 96811

Dear Mr. Pang,

We are in receipt of your department's comments dated August 8, 1985 on the REU Preparation Notice for the proposed Waikoloa project and we respond in the following:

Awaic recognizes the 10% housing requirement for low and moderate-income families on Oahu as mandated by your department. The availability of these housing units to meet your agency's requirements are being formulated at the present time in terms of unit mix, pricing levels, and site location. The draft EIS currently under preparation will provide, to the extent possible, data for your office's review and comment. Please be assured that as this data is updated and finalized, the project proceeds through the lengthy land use policy review schedule. This commitment will be met by Awaic.

Thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodríguez

FJR
August 21, 1985

Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Due to the nature and scope of the Waikiki development and the surrounding areas, the Honolulu Fire Department is requesting a 20,000 square foot fire station site be set aside within the development. Preliminary discussions have been held with AWAC Property Development Corporation on this matter.

Development plans are subject to applicable fire codes.

We request further consultation during the preparation of the Environmental Impact Statement. Should you have any questions, please contact Battalion Chief Kenneth Ward of our Administrative Services Bureau at 943-3838.

Very truly yours,

FRANK K. KABOHANOAN
Fire Chief

October 9, 1985

Chief Frank K. Kabohanoan
Honolulu Fire Department
1455 S. Beretania Street, Room 305
Honolulu, Hawaii 96814

Dear Chief Kabohanoan:

We are in receipt of your department's comments dated August 21, 1985 on the EIS Preparation Notice for the proposed Waikiki project and we respond in the following:

We acknowledge the preliminary discussions which were held with you and AWAC Property Development staff on the availability of a fire station site on the Waikiki project. There will be continuing discussion on this matter and to the extent possible at this early planning stage. We will include in the draft EIS a reference to this fire station site.

Thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodrigues

FJR-23

AUG 2 3 1985