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JOSEPH K. CONANT
EXECUTIVE DIRECTOR

IN REPLY REFER TO:

90:DEV/1214

March 15, 1990

MEMORANDUM

TO: Marvin T. Miura, PhD., Director
Office of Environmental Quality Control
Department of Health

FROM: Joseph K. Conant, Executive Director

SUBJECT: Negative Declaration for the Development of Wahiawa Elderly Housing (Additional Units); Wahiawa, Oahu; TMK: 7-4-12:12 and 10

Submitted herewith are four (4) copies of Environmental Assessment and one (1) copy of the Negative Declaration on the above project as required by the Office of Environmental Quality Control in compliance with EIS Regulations, Chapter 343, 1:31, HRS.

Should you have any questions, please contact Al Ahana, Project Coordinator, at 543-2940 or Wayne Nakamoto, Assistant Project Coordinator, at 543-2939.

Executive Director

Enclosures

1990-03-23-0A-FEA

FILE COPY

ADDITIONAL UNITS FOR THE WAHIAWA ELDERLY HOUSING PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

March 1990

PACIFIC PLANNING & ENGINEERING, INC.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR THE PROPOSED ADDITIONAL UNITS

FOR THE WAHIAWA ELDERLY HOUSING PROJECT

March 1990

This Report is prepared pursuant to Chapter 343, Hawaii Revised Statutes, and in accordance with the requirements set forth in "Administrative Rules, Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules."

Prepared for:

State of Hawaii
Department of Business and Economic Development
Housing and Finance Development Corporation

Prepared by:

Pacific Planning & Engineering, Inc.
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Honolulu, Hawaii 96816

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INTRODUCTION

This Report assesses the impact of 54 elderly housing units on the environment[1]. It was prepared pursuant to Chapter 343, Hawaii Revised Statutes, and in accordance with the requirements set forth in "Administrative Rules, Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules."

This assessment is based largely on a previous environmental assessment (EA) for the "Wahiawa Mix Use Project"[2] which is being developed by the State of Hawaii, Housing Finance and Development Corporation (HFDC) .

Background

The Wahiawa Mix Use Project is comprised of the Leileihua Village Subdivision and the Wahiawa Elderly Housing projects, which consist of 43 residential single family dwellings and 54 elderly rental apartments, respectively. The elderly apartments will be housed in a 6 story building, referred to in this report as "Building A". These projects are expected to be constructed by 1991. The Wahiawa Mix Use Project previously received a Negative Declaration by the approving agency, HFDC.

HFDC is now proposing to construct 54 additional units which will be housed in "Building B" for the Wahiawa Elderly Housing Project located within the Wahiawa Mix Use project site.

Proposing and Approving Agencies

The Housing Finance and Development Corporation of the State of Hawaii is the agency proposing the "Additional Units for the Wahiawa Elderly Housing Project". HFDC is also the approving agency for the proposed project.

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[1]Environment: man's surroundings including the natural, physical, economic and social conditions.

[2]"Wahiawa Mix Use Project - Environmental Impact Assessment Report", by Pacific Planning & Engineering, Inc., dated July 1988

Agencies Consulted

This environmental assessment for the "Additional Units for the Wahiawa Elderly Housing Project" is based on information from the following agencies that were consulted in the preparation of the Environmental Impact Assessment Report (EIAR) for the "Wahiawa Mix Use Project":

Federal:
U. S. Department of the Interior
Fish and Wildlife Service
Division of Water Resources
U. S. Army Engineering Division
U. S. Department of Housing and Urban Development

State:
Department of Education
Dept. of Land and Natural Resources
Department of Transportation
Department of Agriculture
Office of Environmental Quality Control
Parks Outdoor Recreation & Historic Sites
Office on Aging
Office on the Handicapped

City and County of Honolulu:
Department of General Planning
Department of Public Works
Department of Transportation Services
Division of Wastewater Management
Department of Land Utilization
Dept. of Housing & Community Development
Board of Water Supply
Honolulu Police Department
Honolulu Fire Department
Office of Human Resources
Department of Parks and Recreation

Utilities:
Hawaiian Electric Company
Hawaiian Telephone Company

Others:
Wahiawa Neighborhood Board
Wahiawa Community and Business Association
Wahiawa Rainbows c/o Wahiawa Recreation Center

PROJECT DESCRIPTION

The Housing Finance and Development Corporation of the State of Hawaii is planning to construct "Additional Units for the Wahiawa Elderly Housing Project". The project site is located in Wahiawa, adjacent to California Avenue and about a half mile east of Kamehameha Highway. Figure 1 shows the project location.

The project consists of 54 elderly rental apartment units that will be housed in a 6 story mid-rise building (Building B) within the Wahiawa Elderly Housing project site. The Wahiawa Elderly Housing will be built on a 1.5 acre parcel located within the Wahiawa Mix Use development site. The site is identified by Tax Map Key 7-4-12: parcels 10 & 12.

The "Wahiawa Mix Use" development consists of the "Wahiawa Elderly Housing" and the "Leileihua Village Residential Subdivision" developments which are expected to be completed by 1991. These developments consist of 54 elderly apartment rental units and 43 single-family housing units, respectively. The originally planned development for these units were 60 elderly apartment rental units and 40 single-family housing units. Figure 2 shows the site plan for the elderly housing. Figure 3 shows the site plan of the Wahiawa Mixed Use Project.

The existing vehicular access into the project site is provided by a undeveloped dirt road connecting with California Avenue. This dirt road is referred to as "Kopena Street" in Bryan's Sectional Maps of Oahu" (1988 Edition), but is not shown on Tax Maps for the project site. The existing road is located entirely within the project site, and will be referred to as Kopena Street in this Report. Vehicular access into the Additional Elderly Housing Project site will be from a newly developed access road connecting with California Avenue, previously Kopena Street, that will be constructed for the Wahiawa Mix Use development.

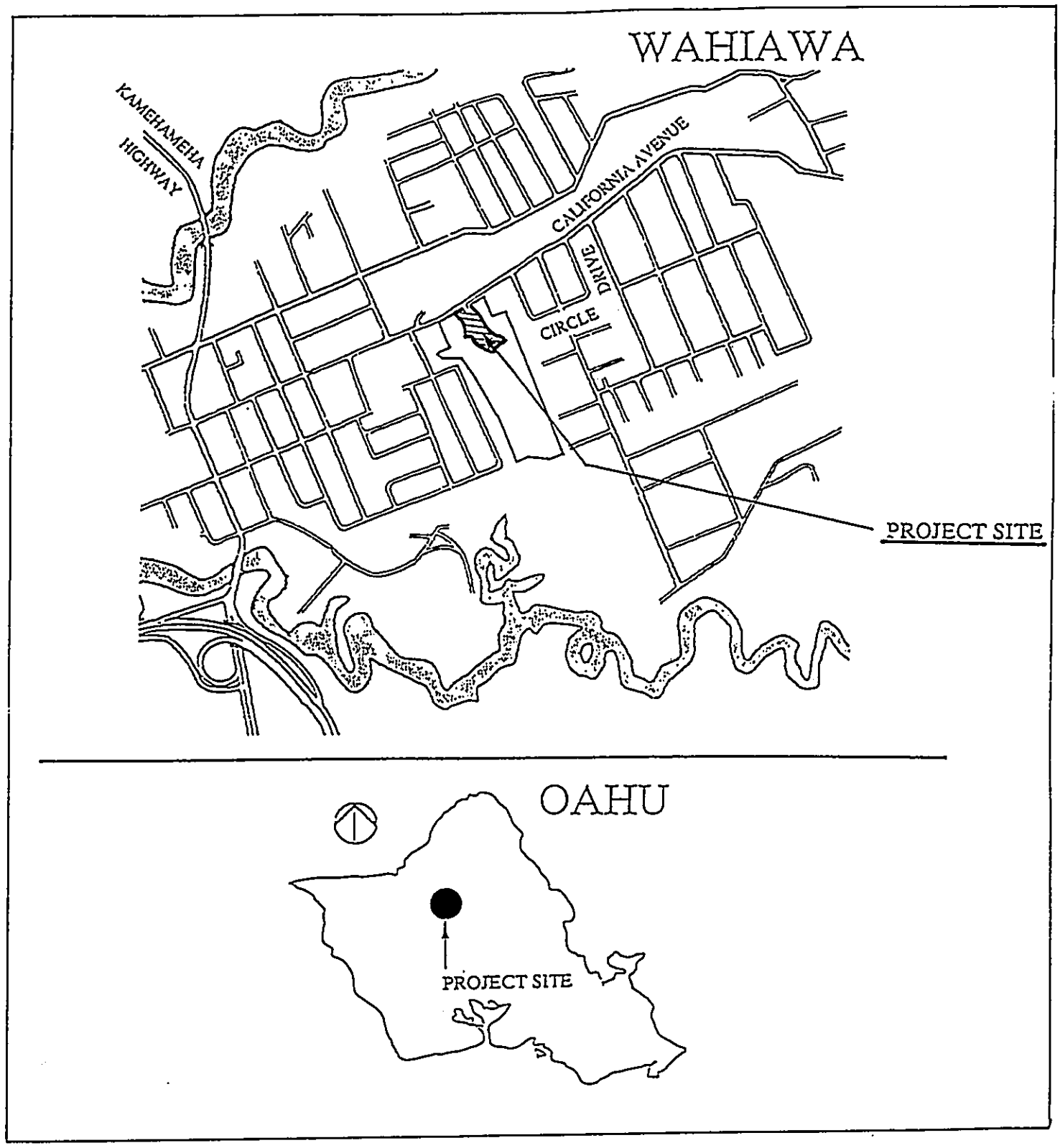


Figure 1. Project Location Map

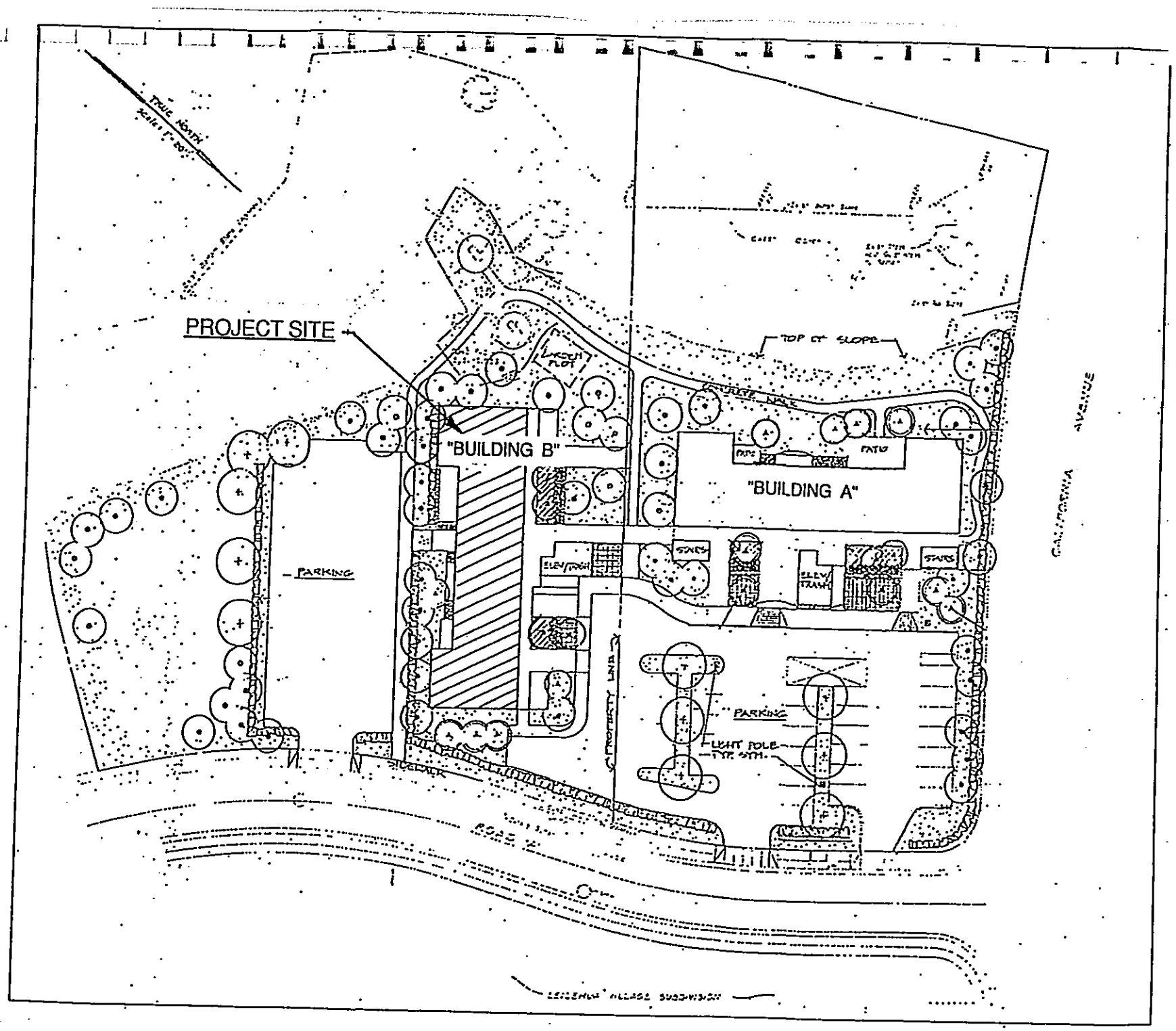


Figure 2. Wahiawa Elderly Housing Site Plan

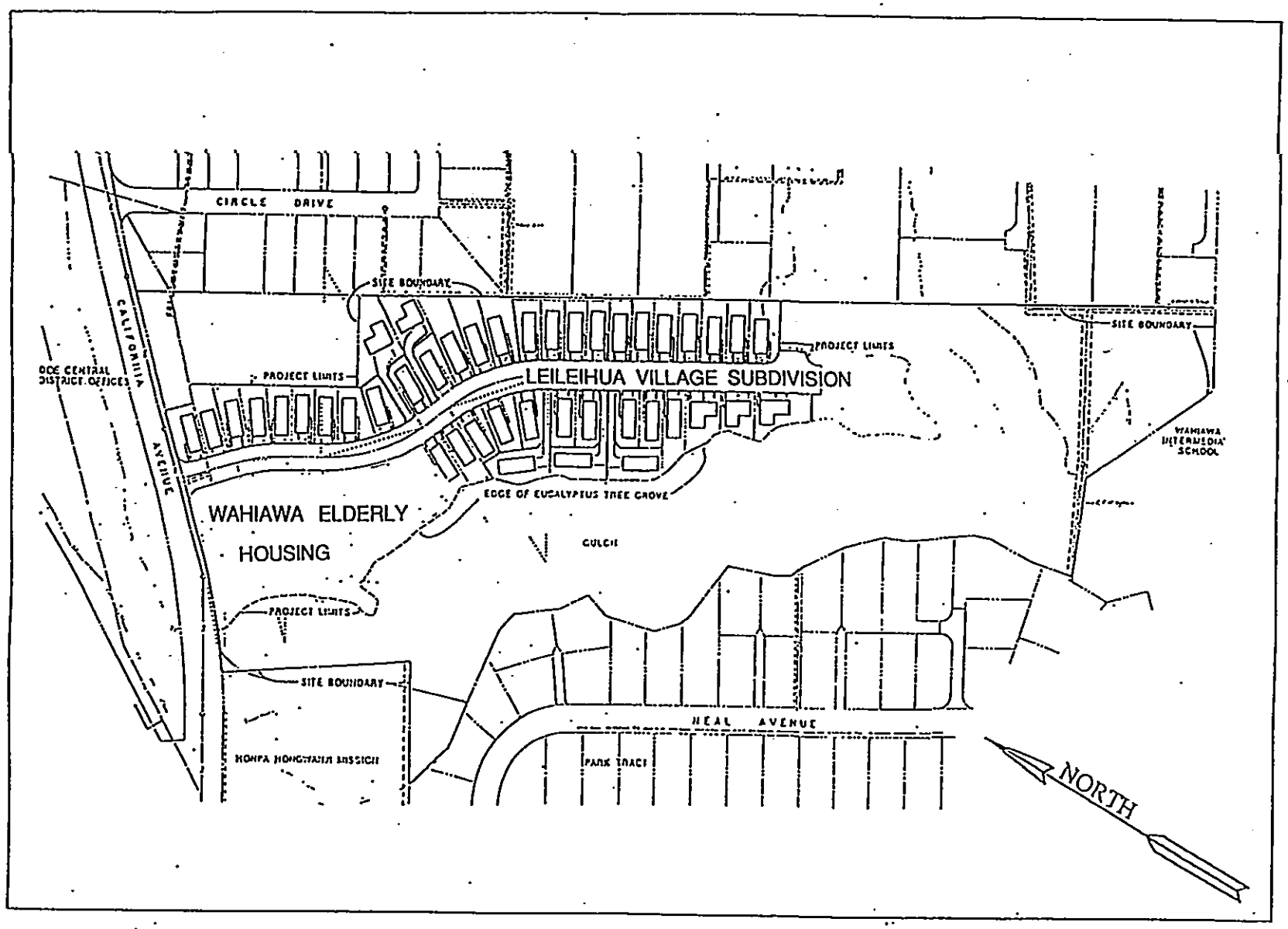


Figure 3. Wahiawa Mixed Use Project Site Plan

Description of Additional Elderly Housing Units

The elderly housing units will consist of a total of 24 one-bedroom and 30 studio units for a total of 54 units to be housed in a mid-rise building, Building B, similar in design to "Building A" of the Wahiawa Elderly Housing development. The mid-rise building, will be designed with six floors at a height of approximately 60 feet. This project will incorporate a multi-purpose room, laundromat, garden plots, attractive fencing, parking stalls and landscaping.

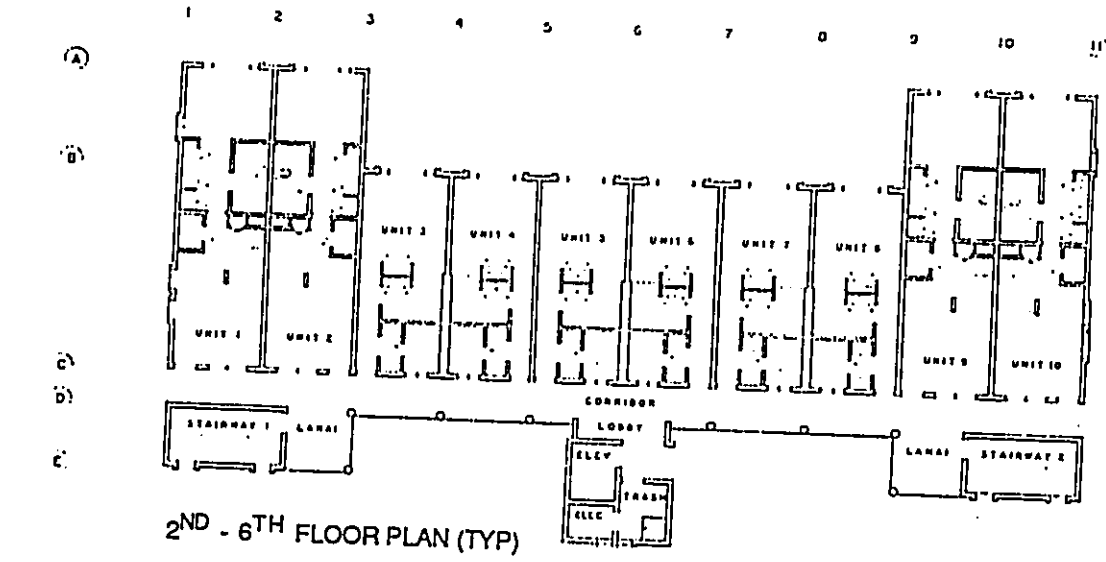
The addition of these project units will create a total of 108 elderly rental units for the Wahiawa Elderly Housing development that will be housed in two buildings, "Building A and B." The original design of the buildings for the Wahiawa Elderly Housing were 7 stories at a height of about 70 feet; as shown in Figure 4. However, due to cost considerations Buildings A and B will be built with only 6 stories to a height of approximately 60 feet.

Each one bedroom unit will have a living area of 520 square feet and will be equipped with apartment size appliances, vinyl floor covering and drapes throughout. Each studio unit will have a living area of 360 square feet with similar furnishing and appliances. Additional amenities to accommodate the elderly include extra large bathrooms to accommodate wheelchairs, doors wide enough to permit wheelchairs, and grab-bars in the bathrooms. An elevation view of the building and the floor plans are shown on Figure 4, and the floor plan of the individual studio and one-bedroom units are shown on Figure 5. Figure 6 provides a rendering of the completed Wahiawa Elderly Housing development.

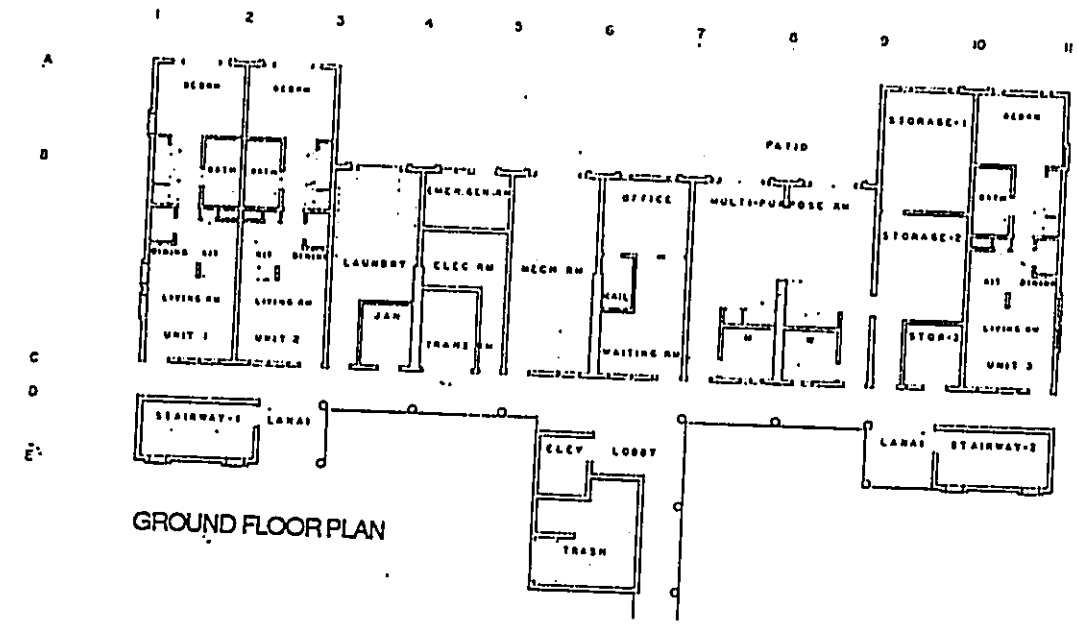
Handicapped applicants will be given priority for four one-bedroom units on the ground floor which will be designed in accordance with Uniform Federal Accessibility Standards to accommodate handicapped people.

For environmental security for the elderly housing, a chain link fence will be built separating the elderly rental units, the parking lot area, and the single family units from the gulch, which runs along the West side of the project site. Adequate lighting for the elderly housing and parking lot area will be provided during the hours of darkness. The fence and lighting will help provide security for the parking lot areas.

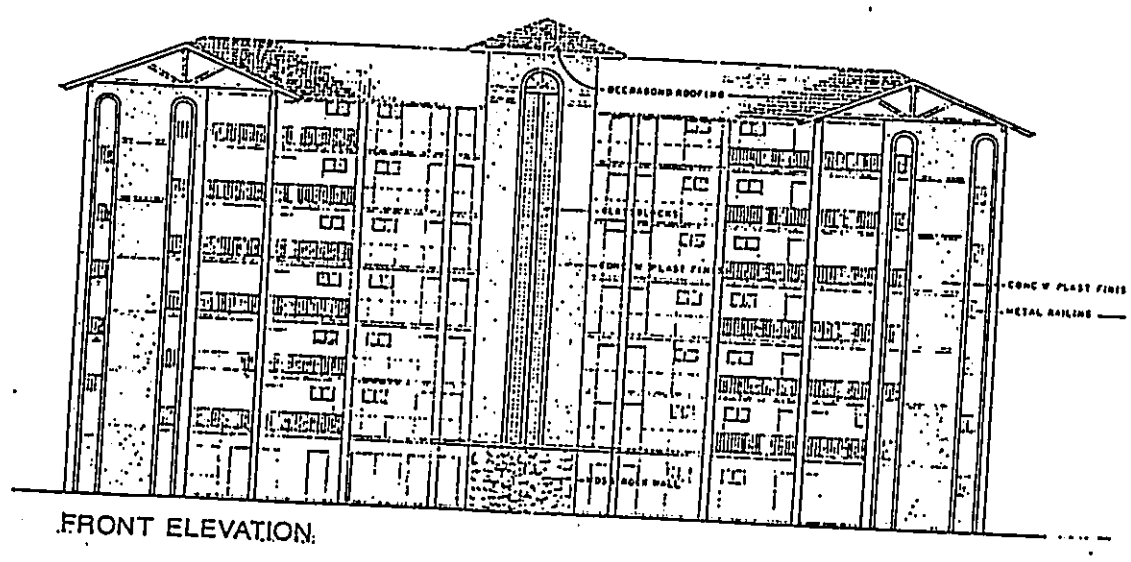
In the building, an enterphone system will be provided to prohibit free access to the occupants of the elderly housing. Each elderly rental unit of this project will be provided with window locks, a standard lock set for the entrance door and a sliding bolt for the entrance door to prevent unauthorized entry. The ground floor units, lobby, stairs and common areas of the elderly rental units will be secured to prevent unauthorized entry.



2ND - 6TH FLOOR PLAN (TYP)



GROUND FLOOR PLAN



FRONT ELEVATION

Figure 4. Building Elevation View and Floor Plan of Elderly Rental Units

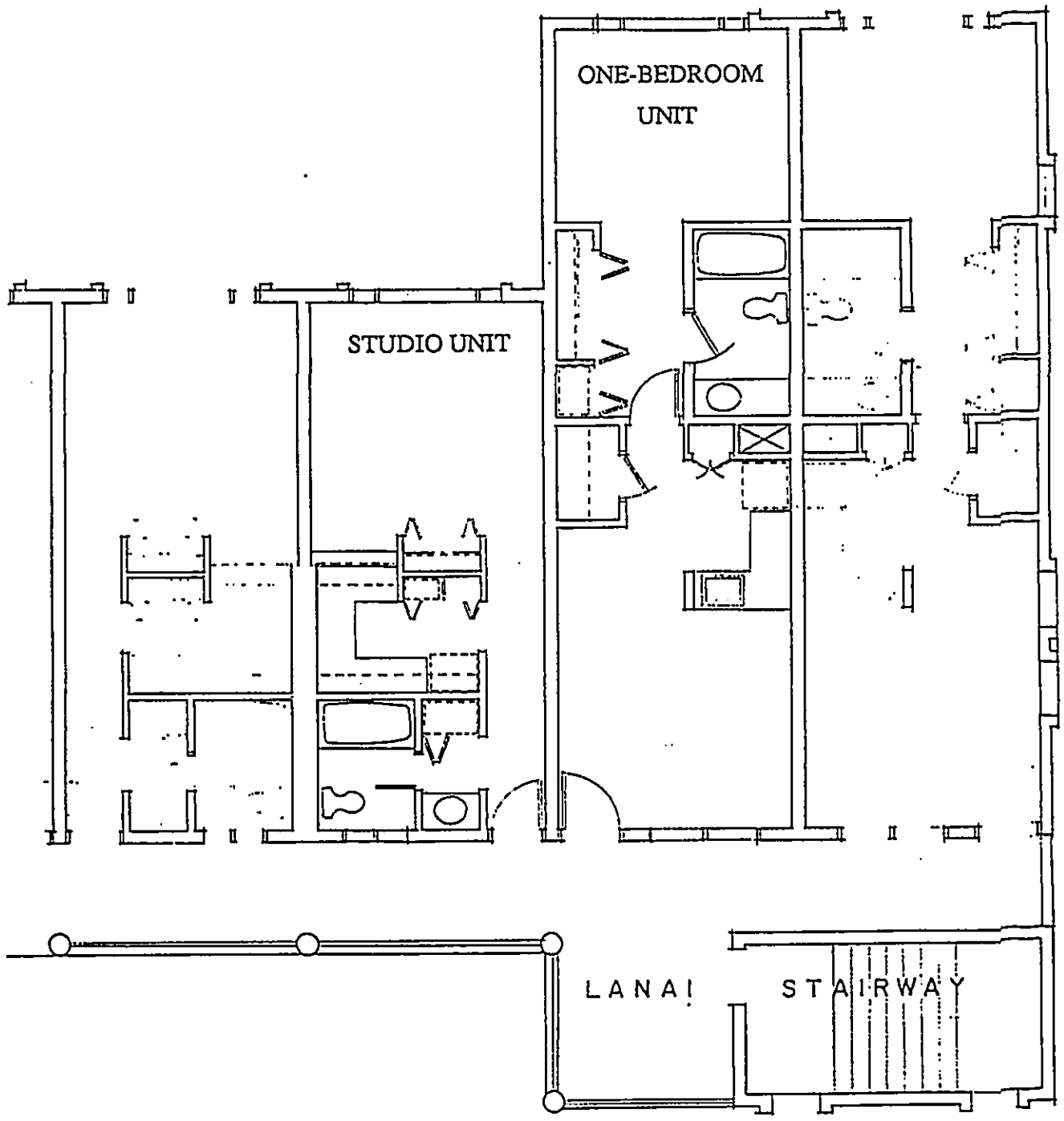


Figure 5. Floor Plan of Individual Studio and One-Bedroom Elderly Units

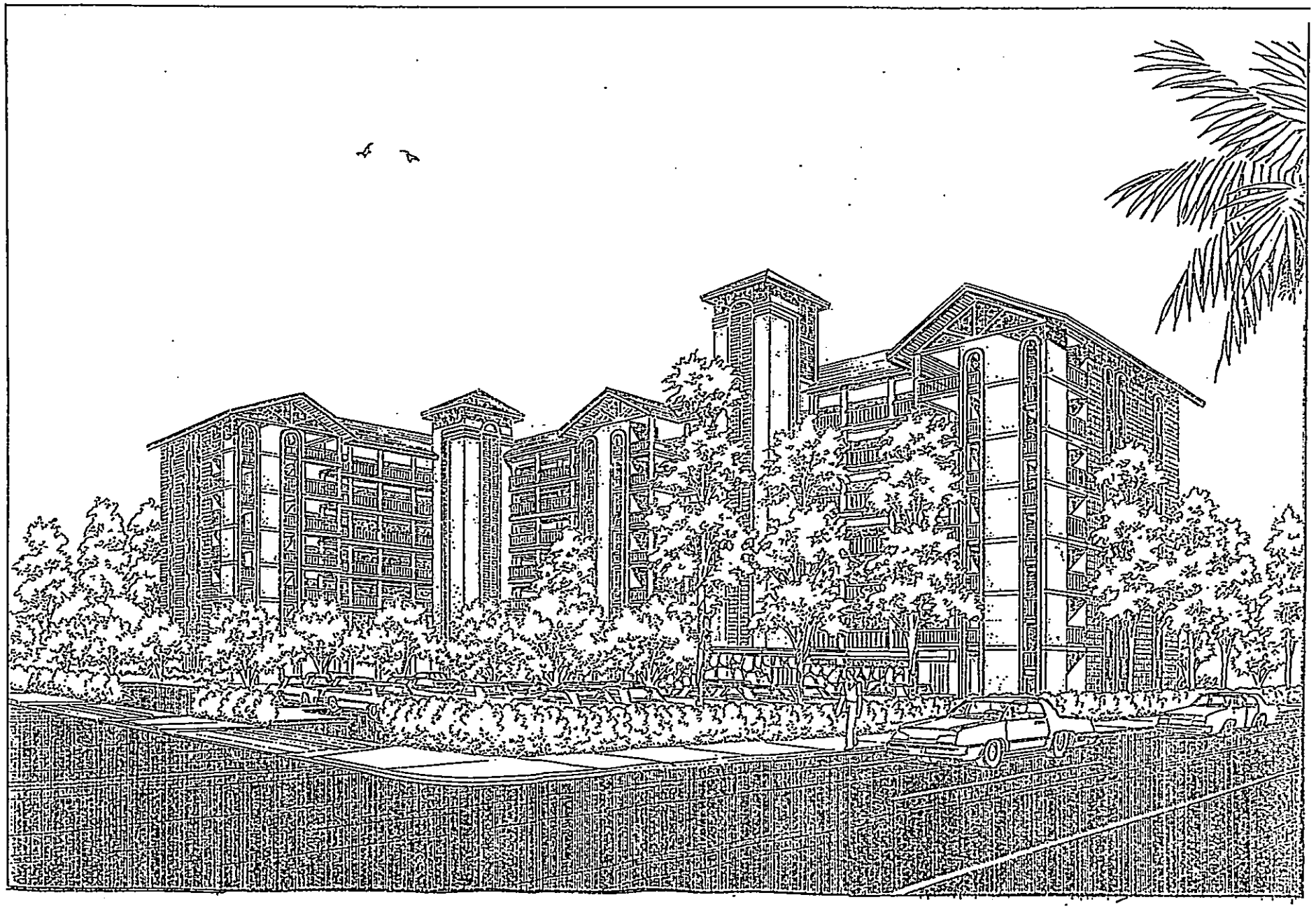


Figure 6. Rendering of Wahiawa Elderly Housing Buildings A and B
(View from California Avenue)

Public Facilities and Services

Potable Water: Water service for domestic consumption and fire protection will be made available from a connection to an existing 12 inch main located approximately 450 feet east at the intersection on California Avenue and Circle Drive. The project will install 12 inch water lines, fire hydrants, service laterals and other apparatus required by and in conformance with BWS standards. Plans will be submitted for approval for the connection to the Board of Water Supply (BWS) water system.

Wastewater: The project's 8 inch sewer system will connect to an existing 8 inch sewer main at the north-east end of the project site. The preliminary application for sewer connection for the project was approved by the Division of Wastewater Management.

Drainage: Presently, surface water run-off drains to the gulch on the west side of the property, and then flows to the Wahiawa reservoir. The project site will be graded to provide positive drainage toward the access road. The access road will be provided with a system of catch basins and drainage pipes to remove the surface run-off water and carry it via a 30 inch drain pipe to the lower portion of the gulch.

Power and Communication: Overhead electrical power and communication lines are available along California Avenue. The project will request a waiver for an overhead connection in order to keep costs at an affordable level.

Traffic and Roadways: The primary vehicular access to the proposed project will be from the new access road that connects with California Avenue. An estimated 15 vehicles will enter the project during the afternoon peak hour and 10 vehicles exit the project.

Social Characteristics

Potential Population: The total population resulting from the project is estimated to be between 81 to 108 senior citizens, based on studio and one-bedroom housing types and household sizes of 1.5 to 2 persons.

The total population resulting from the project and Wahiawa Mix Use development is estimated to be between 310 to 364 persons.

The total population resulting from the project and Wahiawa Mix Use development is estimated to be between 310 to 364 persons.

Recreational: No parks are planned for this development. A waiver of the park dedication requirements will be requested because of the type of project and the close proximity to the Wahiawa Recreational Center.

Economic Characteristics

This project will provide needed low-cost rental housing for senior citizens. The rental rate is estimated to be from a minimum of $150 for studios and $175 for one-bedroom units per month, up to 30% of annual gross income.

The source of funding for the total 108 elderly units of the Wahiawa Elderly Housing will be from the State capital improvements funds (CIP). The total estimated construction cost is $11,483,000. Construction is planned to commence in 1990 with project completion expected in 1991.

Environmental Characteristics

Landscaping and Visual Aesthetics: The project will provide landscaping in the form of ground cover and trees for the elderly housing. The elderly units borders a full eucalyptus grove which will provide a definite screen for the buildings mass. Additional lemon gum trees will be planted around the buildings to soften the transition between this project and the residences that borders this project to the North and East. The botanical gardens across the street will also act as a screen and a barrier for this project. The landscaping plan for the elderly housing is shown in Figure 7.

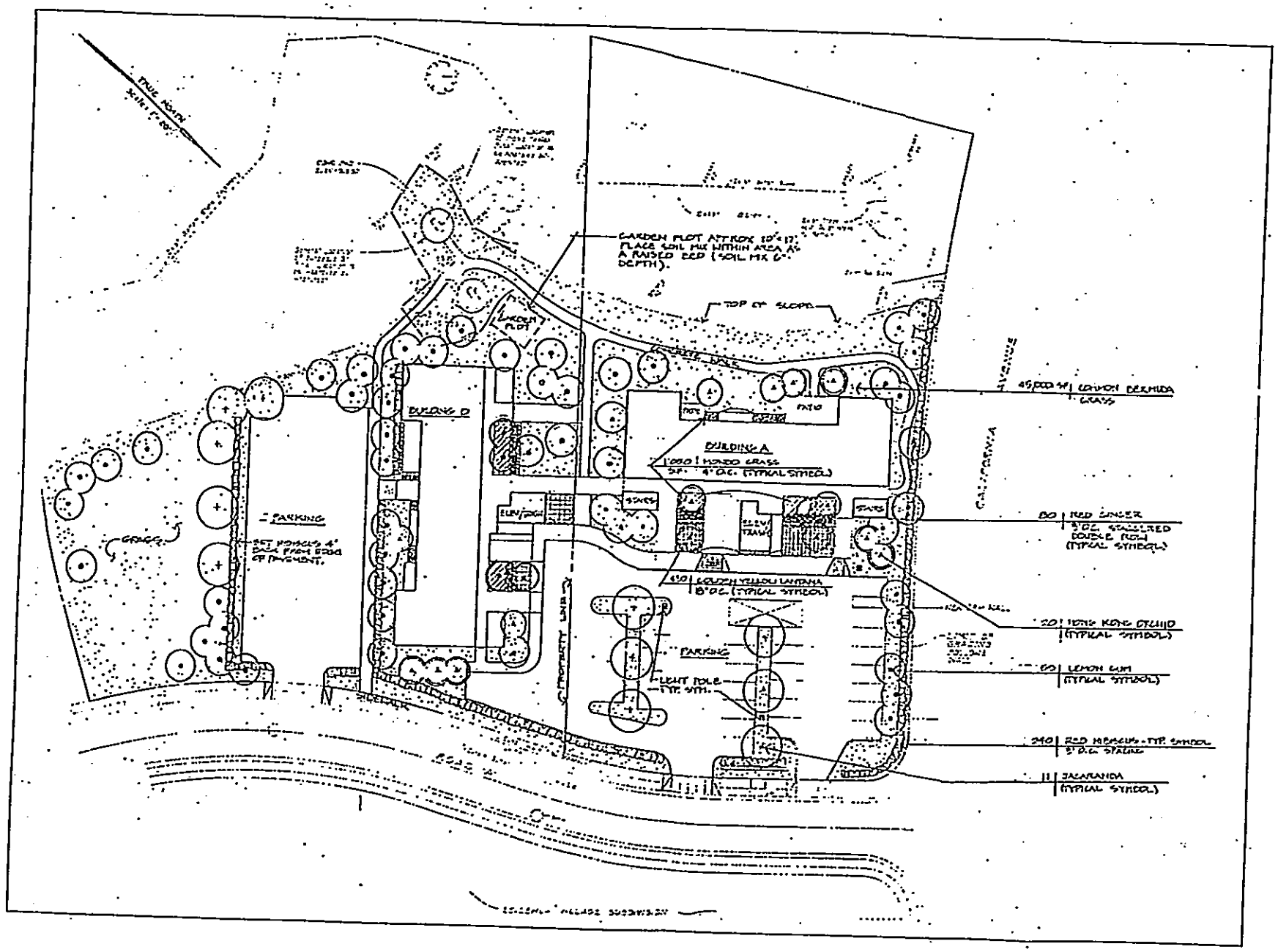


Figure 7. Landscaping Plan for Wahiawa Elderly Housing

Changes to County Land Use and Construction Regulations

The following is a list of waivers to county land use and construction regulations for the Wahiawa Elderly Housing and Leileihua Subdivision projects under, Act 15, Sessions Laws of Hawaii, 1988: Chapter 1515-73A, Hawaii Administration Rules; Chapter 201E, Hawaii Revised Statutes:

1. Rezone existing commercial portion of property from B-2 to A-2.
2. Rezone existing residential portion of property from R-7.5 to R-3.5.
3. Rezone existing residential portion of property from R-5 to R-3.5.
4. Rezone existing commercial portion of property from B-2 to R-3.5.
5. A waiver for minimum lot width and length requirements for R-3.5 zoning.
6. Revise Central Oahu Development Plan to allow mix-use on property.
7. A waiver of the parking requirements to permit a 1:4 ratio of parking stalls to units for the elderly rental units.
8. A waiver of the park dedication requirements due to the type of project and the close proximity of the existing Wahiawa Recreation Center.
9. A waiver of subdivision regulations to permit surface drainage and overhead electrical service.
10. A waiver of all park dedication fees, building permit fees, and grading permit fees.
11. A waiver of 2412 Ordinance requirements for street improvements.
12. Exemptions from Department of Public Works Standards to allow:
    a. The total driveway apron width for rolled curbs to be the driveway ramp width plus 2 feet on each side of the ramp.
    b. The driveway apron and flare to be allowed to extend 4 feet into the curb return area.
    c. Upstream transition gutters to catch basins to be 6 feet long.
    d. PVC sewer pipe conforming to ASTM D3034-SDR 35 to be allowed for this project.

DESCRIPTION OF THE PROJECT ENVIRONMENT

Natural Environment

Climate: The weather conditions in the project area are typical of sites located in Central Oahu. It is somewhat cooler and more humid than the more leeward areas. The tradewinds are from the northeast and between 25 to 300 inches of rain fall annually. The mean annual rainfall is 63.1 inches. Humidity is generally between 60 and 80 percent. Air temperatures range between the coldest and warmest months averages from 63.3° to 79.1° Fahrenheit. Tradewinds are the prominent winds with an average speed of 6.1 knots. 16.8% of the winds come from North-East, 12.6% of the winds from the East-North-East, and 12.1% of the winds from the East.

Geology: The project site rests on the Schofield Plateau, which was created by the overlapping lava flows of the younger Koolau shield volcano over the older Waianae shield volcano. Lava flows from the Koolau volcano banked against the previously eroded Waianae volcano to form the Schofield Plateau. The area is characterized by weathered basalt dissected by stream flow.

Soils: The soils on the project site consist of three different classifications including Helemano silty clay, Leilehua silty clay, and Wahiawa silty clay. These soils overlay the weathered basalt.

The Helemano Series consists of well-drained soils derived from basic igneous rock or basalt. They are deposited by running water on alluvial fans and on the side slopes of gulches. Helemano silty clay occurs on the sides of V-shaped gulches, which are steep to extremely steep, with 30 to 90 percent slopes. In a representative profile, the surface layer is dark reddish-brown silty clay about 10 inches thick. The subsoil, about 50 inches thick, is dark reddish-brown and dark-red silty clay that has subangular blocky structure. The substratum is soft, highly weathered basic igneous rock. The soil is neutral in the surface layer and neutral to slightly acid in the subsoil. Permeability is moderately rapid. Runoff is medium to very rapid, and erosion hazard is severe to very severe.

The Leilehua series consists of well-drained soils on uplands on the island of Oahu. These soils, also, developed from the weathering of basic igneous rock. Leilehua silty clay occurs in broad areas as well as narrow areas bordered by gulches. They are found in gently sloping to moderately sloping conditions, from 2 to 6 percent slopes. In a representative profile the surface layer is dark reddish-brown silty clay about 12 inches thick. It contains concentrations of heavy minerals. The subsoil, about 36 inches thick, is dark reddish-brown and dusky-red silty clay that has subangular blocky structure. The substratum is dark reddish-brown clay mixed with weathered gravel. The soil is extremely acid throughout the profile. Permeability is moderately rapid. Runoff is slow, and erosion hazard is slight.

The Wahiawa series consists of well-drained soils on uplands on the island of Oahu. These soils developed from residual and old alluvium derived from basic igneous rock. Wahiawa silty clay, occurs in broad areas as well as narrow areas bordered by gulches. They are found in gently sloping to moderately sloping conditions, from 3 to 8 percent slopes. In a representative profile, the surface layer is dusky red silty clay about 12 inches thick. The subsoil, about 48 inches thick, is dark reddish-brown silty clay that has subangular blocky structure. The underlying material is weathered basic igneous rock. The soil is medium acid in the surface layer and medium acid to neutral in the subsoil. Permeability is moderately rapid. Runoff is slow, and erosion hazard is slight.

Terrain: The terrain of the project site varies from gently or moderately sloping to very steep conditions. Between 2 to 8% slopes occur in the front and central portions of the site and a steep gulch runs North/South along the west side of the site. A smaller gulch branches off at the South portion of the site. Rainfall on the project site flows naturally to the gulch. Runoff water which runs through the gulch during times of heavy rain flows towards Wilson Reservoir.

Flora: The gulch is heavily wooded. The vegetation in the gulch system is largely one of a mixed, nearly closed-canopied forest of eucalyptus, kukui and iron wood 40 to 60 feet tall, with a secondary layer of avocado, banana, Java plum saplings and Cinnamomum burmannii. Christmas berry, octopus tree, gunpowder tree, silk oak and tall Java plum are occasional in the gulch. Two species of eucalyptus comprise a significant portion of the

upper canopy: Swamp Mahogany is common throughout the gulch while the second species tentatively identified as Murray red gum is predominant in the southern portion.

No standing or flowing water was seen in the gulch but the extremely moist conditions have resulted in well-developed shrub and herb layers. White shrimp plant and odontonema are dominant in the shrub layer. The layer which creates an almost complete ground cover throughout the gulch system, is dominated by dicliptera, wedelia and Ruellia graecizans. The common vines woodrose and taro vine festoon some of the shrubs and smaller trees, especially in the sunnier areas.

Vacant and abandoned sites are common along Kopena Street in the east portion of the site. The vegetation is dominated by Christmas berry, guava, Paragrass and Guinea grass. Sensitive plant, virgate mimosa, weed verbena and white shrimp plant are present in moderate numbers and weedy vines such as Ipomoea ochracea and Cardiospermum grandiflorum are found in smaller numbers.

Common ornamentals and fruit trees are cultivated at the existing residences. These include various cultivars of ti, hibiscus, bougainvillea, croton, snow bush and anthurium. Avocado, octopus tree, banana, papaya, coconut and mango are also grown. The lawns are generally a mixture of Hilo grass, Bermuda grass, goosegrass, drymaria and Calyptocarpus vialis. Comb hyptis, spiny amaranth, Spanish clover, ageratum, sensitive plant and virgate mimosa are among the common roadside weeds.

No native species were found in the project site. The vegetation is entirely secondary in nature.

Fauna: Six species of birds were heard or observed in the project site - the white eye, lace necked dove, barred dove, house sparrow, Kentucky cardinal and the common mynah. These are common species associated with urban or rural environments. The only other animals observed in the site were the cat and the small Indian mongoose. Neither the red-vented bulbul nor the red-whiskered bulbul were observed but the presence of one or both cannot entirely be precluded.

Dogs and chickens were also unrecorded although they too may be present in the site. In addition, because of the abundance of trash piles in the upper slopes of the gulch and in the vacant areas, there is the strong probability of the presence of one or more species of rats and/or mice.

No native animals were observed in the project site and the probability of even the most common native bird species occurring at or in the vicinity of the site is extremely remote.

Archaeological/Historical/Cultural: The presence of archaeological or historical resources of significance in the project site was discussed with the State Historic Preservation Office of the Department of Land and Natural Resources. After a survey of the project land by the a representative of the Office, they indicated that there are no resources of cultural or archaeological significance.

Visual: The project site consists of a relatively flat area and a steep gully. In and around the gully area is heavily vegetated with many trees. These trees range from 40 to 60 feet in height. Kopena Street which runs through the site is pot-holed and the pavement is deteriorating. After about hundred feet the road becomes a dirt road. The existing houses are old and dilapidated. Portions of the site are over grown with California Grass. There is an autobody shop and an auto repair shop adjacent to California Avenue on the project site. To the rear of the auto repair shop there is a parking lot containing cars, enclosed by a chainlink fence. The cars, some in disrepair, are visible from California Avenue.

Ambient Air Quality: The State Department of Health currently monitors only total suspended particulates (TSP) and particulates ten microns and smaller (PM-10) at the closest air monitoring site located about 8 miles to the southeast. Summaries are presented in the Appendix. From these tables and the fact that the project site is relatively undeveloped, both the National Ambient Air Quality Standards (NAAQS) and Hawaii Ambient Air Quality Standards (HAAQS) are being met at the monitoring site.

Ambient Noise: The existing traffic noise along California Avenue at the project site and at 50 foot setback distance from the roadway's centerline is in the "Significant Exposure, Normally Unacceptable" category for residential land use. Traffic noise level is 68.2 Ldn which is 3.2 Ldn above the 65 Ldn FHA/HUD standard. Residential land uses

are in the "Significant Exposure, Normally Unacceptable" category when Ldn levels are above 65 Ldn but not above 75 Ldn.

The existing setback distances of the 60, 65, and 70 Ldn contours from the centerline of California Avenue under worst case, unobstructed line of sight conditions are 176, 81 and 38 feet, respectively.

Public Facilities and Services

Potable Water: Water service for domestic consumption and fire protection is available from an existing 12 inch main located on California Avenue and Circle Drive.

Wastewater: There is an existing 8 inch sewer main at the north-east end of the project site.

Drainage: Presently, surface water run-off drains to the gulch on the west side of the property, and then flows to the Wahiawa reservoir.

Power and Communication: Overhead electrical power and communication lines are available along California Avenue.

Roadways: The primary vehicular access to the proposed project will be from California Avenue. California Avenue serves as a collector/distributor road for Kamehameha Highway, which is one of the major roads moving traffic in the north-south direction. The commercial section of California Avenue which extends from Kamehameha Highway to Palm Street is a four-lane undivided roadway with traffic signal lights at the major intersections. From Palm Street towards the project site, California Avenue narrows to a two-lane undivided road with an extra wide pavement consisting of a 19 foot-wide inbound lane (towards Kamehameha Highway), a 16 foot-wide outbound lane and a 10 foot-wide paved shoulder alongside the outbound lane. The general area is residential from the project site towards Wahiawa Heights. The posted speed limit is 25 miles per hour.

There are no sight distance or other physical constraints which would result in unusual traffic safety concerns or conditions at the Kopena Street intersection with California Avenue. Sight distance for drivers exiting from the proposed project is excellent in both directions.

Social Environment

The surrounding neighborhood of the project site offers a variety of uses, services and facilities. Along California Avenue, commercial and retail establishments are available for residents of nearby in single- and multi-family housing units. Public recreation areas area situated nearby, as well as schools and a hospital. Police and fire stations are also in proximity of the project site.

Population: Wahiawa and the project site are in the regional area of Central Oahu, which is based on the boundaries of the Central Oahu Development Plan. The Wahiawa Area consists of the Census Designated Places (CDP) of Wahiawa, Whitmore and Schofield. Table 1 presents the population growth of Oahu, Central Oahu region and the Wahiawa Area. This table shows that population growth in the Wahiawa Area is inconsistent with the island wide and regional growth between 1970 and 1985. In that 15-year period, Oahu's population grew by six percent; Central Oahu, by 13 percent. The Wahiawa Area population grew by only two percent, and on of its CDPs (Schofield) experienced a 0.4 percent decrease.

Table 1. Population Growth on Oahu, Central Oahu and Wahiawa Study Area, 1970, 1980, and 1985

Area	Population 1970	1980	1985	Percent Change 1980 - 1985
City & County of Honolulu	630,528	762,565	811,096	+6.0%
Central Oahu Development Plan Area	67,586	100,953	114,008	+13.0%
Wahiawa Study Area				
Wahiawa CDP	17,560	16,911	17,090	+1.0%
Whitmore CDP	3,410	3,339	3,943	+18.0%
Schofield CDP	13,582	18,899	18,814	-0.4%
Total Study Area	34,552	39,149	39,847	+2.0%

The project site is situated in Census Tract 93, which is part of the Wahiawa CDP. This Census Tract also experienced an overall decrease in population, from 4,875 people in 1970 to 4,425 people in 1985.

Another source of population information is the Neighborhood Statistics Program of the U. S. Bureau of the Census. This program produced demographic and economic information on the officially recognized neighborhoods, generally based on the boundaries of the Neighborhood Boards. It is noted that these boundaries differ from the aforementioned CDP boundaries, and such data is provided for informational, rather than comparison, purposes. According to this information, 41,562 persons lived in Wahiawa on April 1, 1980. They comprised 5.5 percent of the islandwide population of 762,534.

Housing: Currently, 21 households live on the project site. Further, four commercial activities operate on-site. Current residents have lived on the site for an average of 6.6 years. The longest length of stay is 20 years; the shortest, one year. The average household size is 4.14 persons.

Fire Protection: The project site is located within a mile of Wahiawa's one fire station which is located on California Avenue and is equipped with one pumper and one tanker. A normal 24-hour watch has six firefighters on duty at one time. The closest stations in nearby communities are located in Mililani and Waialua.

Police Protection: Wahiawa is located in District II which is managed by the Wahiawa Police Station, located less than a mile from the project site. The Wahiawa Station operates three shifts, providing constant protection for the area. Each shift operates with 12 to 13 police officers.

District II encompasses communities from Mililani to Mokuleia, and the North Shore to Waimea Bay. The Wahiawa District had the lowest overall number of major crimes reported during 1986, which is seven percent of the total islandwide number reported.

Public and Private Educational Facilities: The Wahiawa area has a total number of ten public and six private schools, as follows:

Public Schools:	Private Schools:
Hale Kula	King's Schools
Helemano Elementary	Leeward Adventist Mission School
Iliahi Elementary	Our Lady of Sorrows School
Kaala Elementary	Pacific-Islands Christian School
Sgt., Samuel K. Solomon Elementary	Ponomauloa School
Wahiawa Elementary	Trinity Lutheran School
Major Sheldon Wheeler Elementary	
Wahiawa Intermediate	
Major Sheldon Wheeler Intermediate	
Leilehua High	

Recreational Facilities: The City & County of Honolulu has seven parks in the Wahiawa region as follows:

Name of Park	Type of Park	Number of Acres
Iliahi Playground	Neighborhood	3.12
Kaala Playground	Neighborhood	2.16
Melemanu Park	Neighborhood	4.04
Whitmore Playground	Neighborhood	2.29
Whitmore Community Center	Community	0.92
Wahiawa Botanical Garden	District	26.92
Wahiawa Recreation Center	District	10.00

In addition, the State of Hawaii has the 66 acre Wahiawa Freshwater Park located adjacent to the town.

Medical and Other Services: The 270-bed Wahiawa General Hospital, a full service hospital located approximately three blocks from the project site, offers a variety of private physician and dental offices, and ophthalmologists.

The project site is also located within a few blocks of the Wahiawa Shopping Center and various other commercial and retail establishment located on or near California Avenue.

Economic Environment

The annual household incomes of the current tenants on the project site were generally low, with only four families having annual incomes exceeding $20,000. The residential tenants currently pay an average monthly rent of $220, based on a range from $160 to $325.

The commercial uses include two auto body repair shops, one barber shop and one farming business. Current business rent ranges from $90 per year for a 144 square foot space (for the barber shop) to $150 per year for 1 acre (farm) to $550 per month for 5,000 square feet (one of the auto body repair shops).

Land Uses

Project Site Land Uses: The existing land uses on the project site consist of residential, commercial and agricultural uses. There are 21 residences on the site, three businesses and a farming operation. All tenants will be relocated except for the farming operation. The project site is presently zoned P-2, B-2, R-7.5 and R-5, as shown on the Zoning Map in Figure 8.

Surrounding Land Uses: The immediate surrounding areas are zoned for residential, apartment, business, and preservation uses, including the following land use designations R-5, R-7.5, A-1, A-2, and B-2.

To the North of the project site, as shown on the Zoning Map, is California Avenue,Wahiawa Recreation Center, and Wahiawa Botanical Garden. To the North of Wahiawa Recreation Center, there is a group of apartments that is six to seven stories in height. To the South is the Wahiawa Intermediate School.

Residential subdivisions along Rose Street and Neal Avenue are to the West and East, respectively. The residences are generally one story dwellings with a few two story dwellings. The Wahiawa Honpa Hongwanji Mission is located adjacent to the project to the West. The project is located East of Wahiawa Commercial Center, Wahiawa Civic Center, Wahiawa Police Station, and Wahiawa Fire Station.

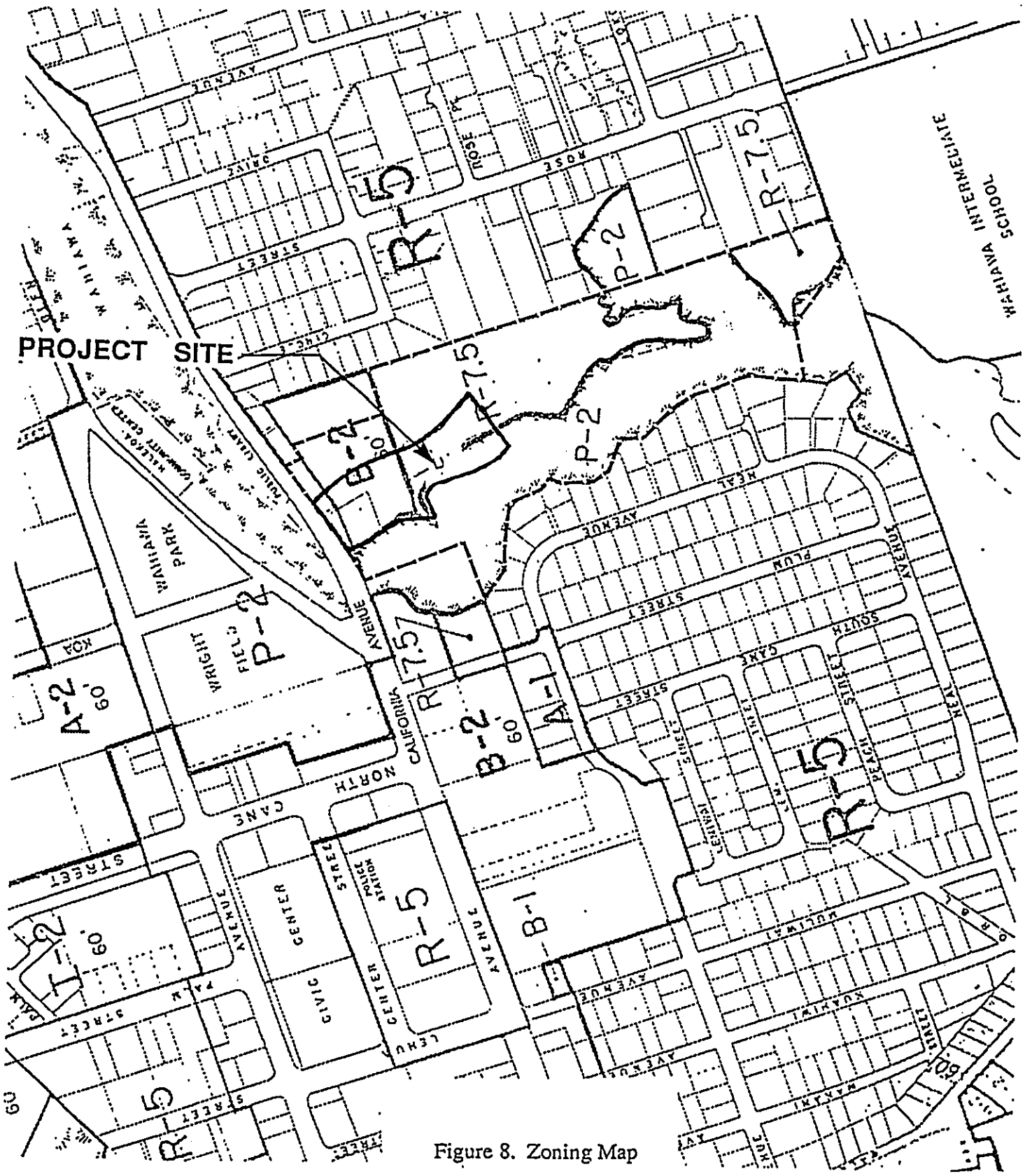


Figure 8. Zoning Map

MAJOR IMPACTS

Natural Environment

Terrain: The impact on the terrain of the project site should be minimal. The flat portions of the land will be graded to provide the pads for the elderly housing units.

Soils: To minimize soil erosion, temporary erosion and sediment control measures would be implemented during construction in accordance with "Chapter 23. Grading, Soil Erosion and Sediment Control." Approval from the City & County of Honolulu, Department of Public Works will also be required to ensure proper grading and erosion control measures. Grading will not occur in the gulch.

The State Department of Agriculture, Planning and Development Office indicated that there are no prime agricultural, unique or important lands in the project site.

Flora: No species of flora native to Hawaii were found in the project site. The vegetation is entirely secondary in nature and were not considered to be of any significance or environmental concern in the development of this site. Broad scale removal of vegetation, however, presents potential erosion problems and siltation problems whenever gulch systems are involved. There would be no significant impact on flora.

Fauna: No native animals were observed in the project site and the probability of even the most common native bird species occurring at or in the vicinity of the site is extremely remote. Development of the site will involve the removal of a certain amount of vegetation and thus the destruction of nests and breeding sites of one or more bird species but the impact on the total population in the region will be negligible. Development of the site will also involve the elimination of many trash piles which may serve as breeding sites for rats and mice.

None of the fauna were considered to be of any significance or environmental concern. The project would cause no impact on the fauna of the site.

Archaeological/Historical/Cultural: No resources of historical or archaeological significance will be impacted by this project.

Visual: The site is presently in commercial and residential use. Some of the visual aspects of the present uses include old dilapidated houses, a dirt road, overgrown California grass, and parked cars, some in disrepair. The proposed project may present a general improvement in the visual aesthetics over the existing visual features.

The elderly housing building (Building B) will present a noticeable and long term visual impact due to its height. However, the elderly housing building originally designed with 7 stories about 70 feet in height will be constructed to 6 stories at a height of approximately 60 feet due to cost considerations. It also borders a full eucalyptus grove, with trees 40 to 60 feet in height, which will provide a definite screen for the building mass.

Lemon gum trees (a type of eucalyptus tree) will be planted around the building to soften the transition between this project and the residences that borders this project to the East. The botanical gardens across the street will also act as a screen and a barrier for this project. A person living North of the botanical gardens will probably not be able to see the elderly housing.

The views along California Avenue will probably not be significantly affected. A person travelling East along California Avenue towards the project could see the roof top of the elderly housing. The existing dense eucalyptus grove will completely obliterate the building mass. A person travelling West on California Avenue approaching the project from the botanical gardens will see the housing structure. Lemon gum trees (a fast growing and tall tree) will be planted around the building to act as a screen and transition planting to blend in naturally with the native eucalyptus trees in the background.

There are existing buildings approximately the same height as the proposed elderly housing in close vicinity. Across California Avenue from this project is the Wahiawa Recreation Center and to the North of the center there are apartments six to seven stories in height.

The proposed project would on the whole provide a positive improvement in visual aesthetics over the existing land uses and dilapidated structures.

Air Quality: The proposed project, with the additional 54 elderly housing units, will not significantly impact the air quality of the area due to the minimal volumes of traffic generated by the project.

The combined effect of the project and Wahiawa Mix Use development will result in increased air pollutant emissions due to its inherent traffic generation ability, and its requirements for electrical power and solid waste disposal. However;

--The addition of traffic will increase ambient concentrations of carbon monoxide in the vicinity of key roads and intersection serving the project but will not cause violation of federal air quality standards, and

--Annual emissions of criteria pollutants due to electrical generation and solid waste disposal attributable to the project will increase county emissions by less than 0.1%.

Noise: Except for noise generated by construction equipment, there would be no impact by the project on ambient noise.

Public Facilities and Services

Potable Water: Water service for domestic consumption and fire protection is available. Existing facilities should be adequate to serve the project.

Wastewater: There is an existing 8 inch sewer main at the north-east end of the project site. Existing facilities should be adequate to serve the project.

Drainage: The lots would be graded for positive drainage towards the new access street. Runoff water from rainfall on the project site will be collected by the drainage system in the street and routed to the gulch which runs through the project site. Presently, the runoff water runs into the gulch from the project site. The impacts of the project on runoff distribution would be negligible.

Power and Communication: Existing overhead electrical power and communication lines are available along California Avenue and should be adequate to serve the project.

Traffic and Roadways: The proposed project will not significantly impact traffic flow along California Avenue due to the minimal volumes of traffic generated. The Level-of-Service results indicate little impact on existing traffic. Most (85%) of the traffic entering the proposed project is approaching from the Kamehameha Highway direction, turning right into the new access roadway, and thus avoiding any conflicts with other traffic. The only movement which is expected to be operating at or near capacity level is the left turn movement out of the project (LOS E). However, this movement would operate at LOS E even without the project, and the effects of upstream traffic signals will cause traffic to arrive in platoons, giving left turning vehicles opportunities to proceed. The other turning movements, operating at LOS A or B should not have any significant impact on traffic along California Avenue or the new access roadway.

Social Impacts

Population: The Wahiawa Area has been experiencing very little growth over the last 15 years, as compared to Central Oahu region and Oahu. Because of a fairly stable population, a population increase due to the proposed project is not expected to cause excessive stress on public services or facilities, nor will it change the complexion of an already residential neighborhood.

Fire Protection: Fire protection services is not expected to be significantly impacted by the project because the project's population increase will not occur at an excessive rate.

Police Protection: The project is not expected to cause a significant stress on the delivery of police protection services, since the regional population is fairly stable in number and the project population increase will not occur at an excessive rate.

Public and Private Educational Facilities: The schools nearest to the project site are Wahiawa Elementary, Wahiawa Intermediate and Leilehua High School. The additional project is not expected to significantly impact the surrounding schools because these elderly housing units would have little or no children.

Medical Facilities: Wahiawa General Hospital is the nearest hospital located approximately 3 blocks west of the project site. The project is not expected to significantly impact the hospital's medical services because residents of these types of elderly housing projects tend to be qualified to care for themselves and adequately function within society.

Recreational: Recreational facilities should be adequate to serve the project. Residents of the proposed project will be within walking distance of the Wahiawa Botanic Garden and the Wahiawa Recreation Center including Wright Field.

State of Hawaii and City & County of Honolulu Objectives and Policies

Because the nature of the project is to provide affordable rental housing to senior citizens, HFDC is fulfilling its mission of meeting various state and city objectives. This project is in keeping with the following State and City goals:

State of Hawaii Objectives (The Hawaii State Plan, Chapter 226, HRS):

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

"The orderly development of residential areas sensitive to community needs and other land uses."

City and County of Honolulu Objective (General Plan, Objectives and Policies):

"To provide decent housing for all the people of Oahu at prices they can afford."

ALTERNATIVES

As part of HFDC's responsibilities, affordable housing for the elderly is a high priority. A do-nothing alternative is available but not in keeping with the Corporation's mandate to provide housing for senior citizens of Hawaii.

The project site has already been developed and affected by man's actions. The proposed project would generally improve the existing conditions of the parcel, while meeting acute housing demands by a less privileged segment of our community. Development of the already effected site would pose no significant consequences.

DETERMINATION AND MITIGATIVE MEASURES

The proposed addition of 54 elderly housing rental units, will not have a significant impact on the adjacent environment. *There are no major impacts on the environment, public facilities and services, and the Wahiawa community.* The more notable impacts are described below.

Adverse Impacts

Fugitive dust and sporadic noise arising from construction activities are likely. Construction management and contract specifications designed to control these problems should be sufficient to minimize any impacts. Landscaping will control dust in the long-term. Additional vehicles are predicted to use the adjacent roadways, however, the capacity of the roads are sufficiently large to permit an acceptable level of service.

Development of the apartment building for the 54 elderly housing units will have some visual impacts due to its height; however, the structure will be constructed to 6 stories instead of the original 7 stories planned due to cost considerations which help minimize the impact. In addition, Building B will be located near the center of the project site which will reduce its visibility from California Avenue. The planting of lemon gum trees, landscaping, and the existing botanical gardens across the street will also reduce the visual impact. The proposed project may present a general improvement in visual aesthetics over the exiting condition.

Traffic noise from California Avenue may cause unacceptable noise levels in the project units closest to California Avenue. The recommended mitigation measure is to install air conditioning units to allow window closure and reduced noise levels.

Beneficial Impacts

The proposed project is consistent with the mixed use character of the area, and is not expected to change current social patterns or impact existing levels of services. The Project will provide 54 families with affordable elderly rental units. Housing on Oahu is in short supply and is a critical social need for the Community. HFDC's project will assist in reducing the pressure for housing. The existing housing on the project site is in disrepair, and the site is inefficiently utilized. People in need of better homes, better living conditions will be assisted.

Thus, a conclusion of "Negative Declaration" is appropriate and warranted.

APPENDIX A

FLORA AND FAUNA STUDY

BIOLOGICAL SURVEY

WAHIAWA MIX USE PROJECT

WAHIAWA, OAHU

Prepared for: Pacific Planning & Engineering, Inc.

By: Kenneth M. Nagata

Date: 26 March 1986

INTRODUCTION

The project site, approximately 17 acres in size, is situated along California Avenue in Wahawa, Wahiawa District, Oahu. It consists of a heavily wooded gulch on the west side which intersects with another gulch in the south protion of the site, and residences, commercial lots and vacant sites on the east side. Residences border the east and west sides while Wahiawa Intermediate School forms part of the south boundary and California Avenue forms the north boundary.

A walk through survey was conducted on 25 March 1986 to determine the floristic and faunistic composition of the site.

FLORA

The vegetation in the gulch system is largely one of a mixed, nearly closed-canopied forest of eucalyptus, kukui (Aleurites moluccana) and ironwood (Casuarina equisetifolia) 40-60 feet tall with a secondary layer of avocado (Persea americana), banana (Musa x paradisiaca), Java plum saplings (Eugenia cumini) and Cinnamomum burmannii. Christmas berry (Schinus terebinthifolius), octopus tree (Brassaia actinophylla), gunpowder tree (Trema orientalis), silk oak (Grevillea robusta) and tall Java plum are occasional in the gulch. Two species of eucalyptus comprise a significant portion of the upper canopy: Swamp mahogany (Eucalyptus robusta) is common throughout the gulch system while the second species tentatively identified as Murray red gum (E. camaldulensis) is predominant in the southern portion.

No standing or flowing water was seen in the gulch but the extremely moist conditions have resulted in well-developed shrub and herb layers. White shrimp plant (Nicoteba betonica) and odontonema (Odontonema strictum) are dominant in the shrub layer. The herb layer which creates an almost complete ground cover throughout the gulch system, is dominated by dicliptera (Dicliptera

chinensis), wedelia (Wedelia trilobata) and Ruellia graecizans. The common vines woodrose (Merremia tuberosa) and taro vine (Scindapsus aureus) festoon some of the shrubs and smaller trees, especially in the sunnier areas.

Vacant and abandoned sites are common along Kopena Street in the east portion of the site. The vegetation here is dominated by Christmas berry, guava (Psidium guajava), Paragrass (Brachiaria mutica) and Guinea grass Panicum maximum). Sensitive plant (Mimosa pudica var. unijuga), virgate mimosa (Desmanthus virgatus), weed verbena (Verbena litoralis) and white shrimp plant are present in moderate numbers and weedy vines such as Ipomoea ochracea and Cardiospermum grandiflorum are found in smaller numbers.

Common ornamentals and fruit trees are cultivated at the residences. These include various cultivars of ti (Cordyline terminalis), hibiscus (Hibiscus x), bougainvillea (Bougainvillea x), croton (Codiaeum variegatum var. pictum), snow bush (Breynia disticha f. nivosa) and anthurium (Anthurium andraeanum). Avocado, octopus tree, banana, papaya (Carica papaya), coconut (Cocos nucifera) and mango (Mangifera indica) are also grown. The lawns are generally a mixture of Hilo grass (Paspalum conjugatum), Bermuda grass (Cynodon dactylon), goosegrass (Eleusine indica), drymaria (Drymaria cordata) and Calyptocarpus vialis. Comb hyptis (Hyptis pectinata), spiny amaranth (Amaranthus spinosus), Spanish clover (Desmodium canum), ageratum (Ageratum conyzoides), sensitive plant and virgate mimosa are among the common roadside weeds.

No native species were found in the project site. The vegetation is entirely secondary and can be disregarded as a major concern in the development of the site. Broad scale removal of vegetation always presents potential erosion and siltation problems whenever gulch systems are involved. If, however, the vegetation in the gulch is left intact and construction rubble and other debris are prevented from spilling into the gulch, such problems

can be averted.

FAUNA

Six species of birds were heard or observed in the project site - the white eye (Zosterops japonica japonica), lace necked dove (Streptopelia chinensis chinensis), barred dove (Geopelia striata striata), house sparrow (Passer domesticus), Kentucky cardinal (Richmondena cardinalis) and the common myna (Acridotheres tristis tristis). These are common species associated with urban or rural environments. The only other animals observed in the site were the cat (Felis catus) and the small Indian mongoose (Herpestes auropunctatus). Neither the red-vented bulbul (Pycnonotus cafer) nor the red-whiskered bulbul (P. jocosus) were observed but the presence of one or both cannot be entirely precluded. Dogs (Canis familiaris) and chickens (Gallus gallus) were also unrecorded although they too may be present in the site. In addition, because of the abundance of trash piles in the upper slopes of the gulch and in the vacant areas, there is a strong probability of the presence of one or more species of rats (Rattus rattus, R. norvegicus, etc.) and/or mice (Mus cusculus).

No native animals were observed in the project site and the probability of even the most common native bird species occurring at or in the vicinity of the site is extremely remote. Development of the site will involve the removal of a certain amount of vegetation and thus the destruction of nests and breeding sites of one or more bird species but the impact on the total population in the region will be negligible. Development of the site will also involve the elimination of many of the trash piles which may presently serve as breeding sites for rats or mice.

APPENDIX B

NOISE STUDY

TRAFFIC NOISE STUDY
FOR THE PROPOSED
WAHIAWA MIX USE PROJECT

PREPARED FOR
PACIFIC PLANNING & ENGINEERING, INC.

BY
Y. EBISU & ASSOCIATES

APRIL, 1988

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I. SUMMARY

The existing and future traffic noise levels in the vicinity of the proposed Wahiawa Mix Use Project on California Avenue, Oahu, were evaluated for their relationship to current FHA/HUD noise standards. The traffic noise level increases on California Avenue were calculated for the Year 1989 planning period. Increases in traffic noise of approximately 0.1 Ldn units were predicted to occur between now and the Year 1989 planning period as a result of non-project traffic. Project traffic is not expected to be a significant contributor to total traffic on California Avenue, with an additional 0.1 Ldn increase over existing traffic noise levels expected to be generated by project traffic.

Special sound attenuation measures may be required for project compliance with the 65 Ldn FHA/HUD noise standard if housing units are located within 85 FT of the centerline of California Avenue. The construction of a 6 FT high sound attenuating wall is recommended for the planned single family residence fronting California Avenue. A minimum increase by 15 FT in the planned setback of the midrise unit from California Avenue is recommended. If this increase is not practical, noise mitigation measures in the form of passive window sound attenuators or air conditioning is recommended for the end units (two per floor) of the midrise building which are located within 60 FT of the centerline of California Avenue.

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II. PURPOSE

The purposes of this study were to evaluate the existing and future traffic noise at the proposed Hawaii Housing Authority Wahiawa Mix Use Project development on California Avenue, in Wahiawa, Oahu, and to determine if noise attenuation measures are required to achieve the 65 Ldn FHA/HUD standard (Reference 1). Also, possible traffic noise impacts resulting from the proposed development were also to be evaluated. Recommendations for the implementation of noise mitigation measures were also to be provided as required.

III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by FHA/HUD to assess environmental noise in general is the Day-Night Average Sound Level (Ldn). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. The minimum averaging period for the Ldn descriptor is 24 hours (by definition). Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the Ldn descriptor. A more complete list of noise descriptors is provided in APPENDIX B to this report.

TABLE 1, derived from Reference 2, presents current federal standards and acceptability criteria for residential land uses exposed to various levels of environmental noise. As a general rule, noise levels of 55 Ldn or less occur in rural areas, or urbanized areas which are shielded from high volume streets. In urbanized areas, Ldn levels generally range from 55 to 65 Ldn, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 Ldn, and as high as 72 Ldn when the roadway is a high speed freeway. Due to noise shielding effects from intervening structures, residences which are located within interior lots are usually exposed to lower noise levels of 60 Ldn or less.

For the purposes of determining noise acceptability for funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 Ldn or lower is considered acceptable. This standard is applied nationally (see Reference 1), including Hawaii. Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 Ldn does not eliminate all risks of noise impacts. For these reasons, and as recommended in Reference 3, a lower level of 55 Ldn is considered

TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION
(RESIDENTIAL LAND USE)

Noise Exposure Class	Day-Night Sound Level	Equivalent Sound Level	Federal Standard (1)
Minimal Exposure	Not Exceeding 55 Ldn	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 Ldn But Not Above 65 Ldn	Above 55 Leq But Not Above 65 Leq	Acceptable (2)
Significant Exposure	Above 65 Ldn But Not Above 75 Ldn	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 Ldn	Above 75 Leq	Unacceptable

Note: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours.

Source: Reference 2.

as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 Ldn, government agencies such as FHA/HUD and VA have selected 65 Ldn as a more appropriate regulatory standard.

IV. METHODOLOGY

Traffic noise predictions were performed using the Federal Highway Administration (FHWA) Noise Prediction Model (Reference 4). September, 1985 traffic data on California Avenue at Kamehameha Avenue were obtained from Pacific Planning & Engineering, Inc. (Reference 5). The 24-hour traffic counts were used to calculate the relationship between peak hour Leq(h) and Ldn. Reference 6 was used to project future traffic volumes on California Avenue upon completion of the proposed Wahiawa Mix Use Project.

Existing traffic noise measurements along California Avenue were made in March, 1988 to calibrate the noise prediction model, and to refine predictions of future traffic noise levels. The results of these noise measurements and their comparison with noise model predictions are shown in TABLE 2.

The future (Year 1989) traffic noise levels were predicted for the various conditions of receptor setback distances and elevations. Additionally, existing and future setback distances from the California Avenue centerline to the 60, 65, and 70 Ldn iso-noise contour lines were also calculated for the worst case condition of unobstructed line-of-sight to the traffic lanes. The required setback distance to the future 65 Ldn contour line was used to determine the necessity of noise abatement measures for meeting the 65 Ldn FHA/HUD noise standard.

TABLE 2

MARCH 29, 1988 TRAFFIC NOISE MEASUREMENT RESULTS

Location	Time of Day (HRS)	Ave.Speed (MPH)	Equivalent Hourly Traffic Volume— Auto	Med.Truck	Heavy Truck	Measured Leq (dB)	Predicted Leq (dB)
50 FT from centerline of California Avenue, across the street from Wahiawa Rec. Center and Wahiawa Botanic Garden.	1530 TO 1600	32	1,277	16	16	66.4	66.2
50 FT from centerline of California Avenue, across the street from Wahiawa Rec. Center and Wahiawa Botanic Garden.	1600 TO 1700	32	1,415	17	17	66.9	66.8

V. EXISTING TRAFFIC NOISE ENVIRONMENT

The existing traffic noise environment along California Avenue at the project site and at 50 FT setback distance from the roadway's centerline is in the "Significant Exposure, Normally Unacceptable" category, with traffic noise at 68.2 Ldn and 3.2 Ldn above the 65 Ldn FHA/HUD standard.

TABLE 3 presents the PM Peak hour traffic volume, speed, and mix assumptions for the 1988 (existing) period, with computed hourly average noise levels (Leq) at 50 FT distance from the California Avenue centerline. From the hourly traffic volumes of Reference 5, it was determined that the the AM and PM peak hour Leq(h) to Ldn conversion factors for California Avenue were 1.6 and 1.4 dB, respectively. A 1.5 dB conversion factor was used to calculate the Ldn value from the PM Peak Hour Leq(h) values. The existing setback distances of the 60, 65, and 70 Ldn contours from the centerline of California Avenue under worst case, unobstructed line of sight conditions are 176, 81, and 38 FT, respectively. FIGURE 1 depicts the existing traffic noise contours on the project site under these worst case conditions. The planned midrise building and single family building are located within 81 FT of the centerline of California Avenue, and are expected to be exposed to traffic noise levels in the "Significant Exposure, Normally Unacceptable" category.

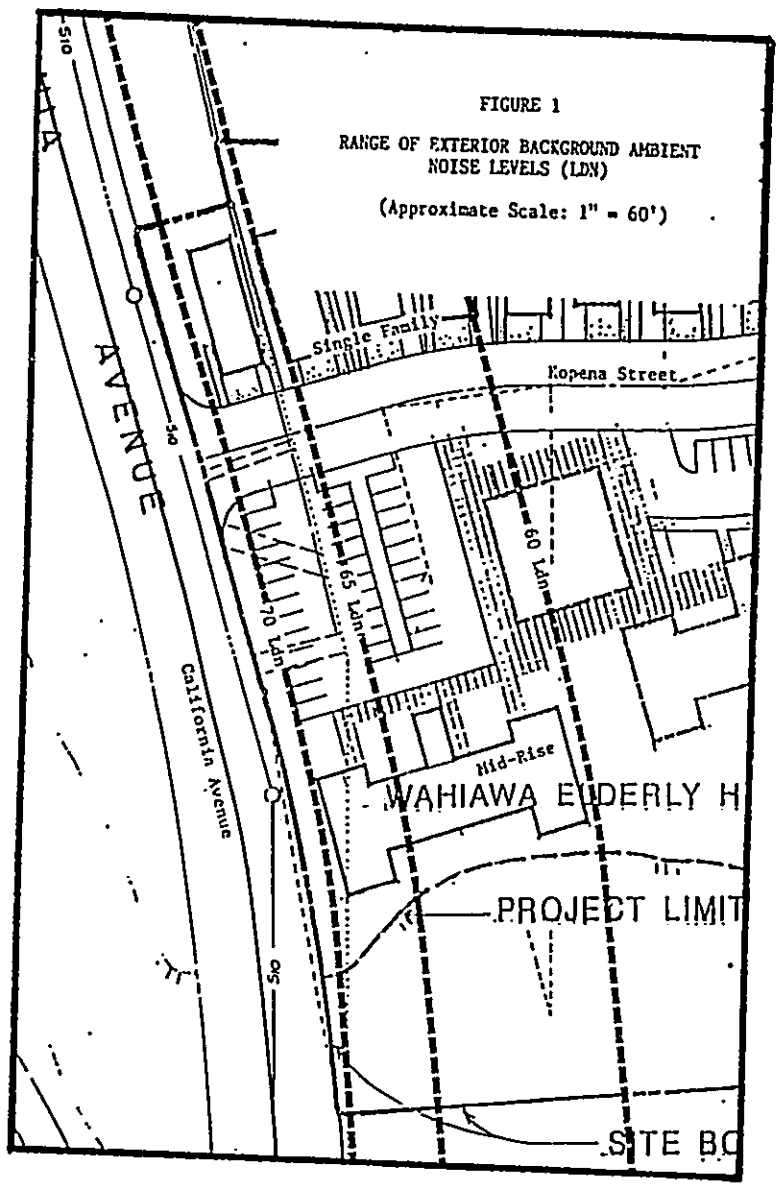
TABLE 3

COMPARISONS OF EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT PROJECT SITE

LOCATION	SPEED (MPH)	VPH	***** HOURLY LEQ IN dB **** AUTO	MT	HT	ALL VEH
EXISTING WEEKDAY PEAK HR. TRAFFIC:						
PM Peak Hr.; California Ave.	32	1,414	63.8	56.4	62.6	66.7
PM Peak Hr.; Kopena Street	25	19	42.1	35.1	42.3	45.6
FUTURE WEEKDAY PEAK HR. TRAFFIC (WITHOUT PROJECT):						
PM Peak Hr.; California Ave.	32	1,450	63.9	56.5	62.7	66.8
PM Peak Hr.; Kopena Street	25	19	42.1	35.1	42.3	45.6
FUTURE WEEKDAY PEAK HR. TRAFFIC (WITH PROJECT):						
PM Peak Hr.; California Ave.	32	1,500	64.1	56.6	62.9	66.9
PM Peak Hr.; Kopena Street	25	186	52.0	45.0	52.2	55.5

Note:

Assumed traffic mix of 97.6% Autos, 1.2% Medium Trucks, and 1.2% Heavy Trucks and Buses.



VI. FUTURE TRAFFIC NOISE ENVIRONMENT

Predictions of future traffic noise levels along California Avenue were made using the projected future PH Peak Hour traffic volumes shown in TABLE 3 on California Avenue and Kopena Street. Following completion of the project, the peak hour volumes on California Avenue and Kopena Street were projected to be 1,500 and 186 VPH, respectively. Project-related traffic contributions are not expected to be a significant portion of the future peak hour traffic volumes on California Avenue. From the present to the future, traffic noise levels on California Avenue are predicted to increase by only 0.2 Ldn units, as long as major street improvements (widening, realignment, etc.) are not undertaken in the future. Under these conditions, the future setback distances (from the centerline of California Avenue) to the 60, 65, and 70 Ldn contours were calculated to be 193, 85, and 39 FT, respectively. TABLE 4 summarizes the calculations of existing traffic noise levels vs. setback distance and receptor elevation above street level. Locations within 85 FT distance from the street centerline and with unobstructed lines of sight to the street will be in the "Normally Unacceptable" noise exposure category (greater than 65 Ldn noise level), with sound attenuation measures required.

The existing 65 Ldn traffic noise contour line shown in FIGURE 1 is expected to move approximately 4 FT into the project site as a result of future traffic increases on California Avenue by 1989. Because the noise levels at the single family residence and midrise building fronting California Avenue are predicted to be greater than 65 Ldn, noise mitigation measures will probably be required to meet the 65 Ldn standard.

TABLE 4

PREDICTED NOISE LEVEL VS. ELEVATION ABOVE CALIFORNIA AVENUE
(EXISTING/FUTURE)

DISTANCE FROM RWY. CENTERLINE (FT)	RECEPTOR ELEVATION ABOVE ROADWAY (FT)	PREDICTED LDN 180 DEG. FOV.	PREDICTED LDN 90 DEG. FOV.
25	0	71.2 / 71.4	68.2 / 68.8
25	10	71.1 / 71.3	68.1 / 68.7
25	20	70.7 / 70.9	67.7 / 68.3
25	40	69.8 / 70.0	66.8 / 67.4
25	60	68.8 / 69.0	65.8 / 66.4
50	0	68.2 / 68.4	65.2 / 65.8
50	10	68.1 / 68.3	65.1 / 65.7
50	20	68.1 / 68.3	65.1 / 65.7
50	40	67.7 / 67.9	64.7 / 65.3
50	60	67.2 / 67.4	64.2 / 64.8
70	0	66.7 / 66.9	63.7 / 64.3
70	10	66.7 / 66.9	63.7 / 64.3
70	20	66.6 / 66.8	63.6 / 64.2
70	40	66.4 / 66.6	63.4 / 64.0
70	60	66.1 / 66.3	63.1 / 63.7
75	0	66.4 / 66.6	63.4 / 64.0
75	10	66.4 / 66.6	63.4 / 64.0
75	20	66.4 / 66.6	63.4 / 64.0
75	40	66.2 / 66.4	63.2 / 63.8
75	60	65.9 / 66.1	62.9 / 63.5

NOTE: FOV. is abbreviation for receptor field of view to traffic.

VII. RECOMMENDED NOISE MITIGATION MEASURES

Because traffic volume and noise level increases caused by the project along California Avenue are predicted to be small, off-site traffic noise mitigation measures are not necessary. However, the planned setbacks of two of the Wahiawa Mix Use Project housing units (one single family and one midrise unit) are not adequate to meet the 65 Ldn noise standard, and special sound attenuation measures are recommended for these two units.

The construction of a 6 FT high sound attenuating wall is recommended for the planned single family residence which fronts California Avenue. The wall should be L-shaped, and run along the property lines at the rear and street sides of the lot. For the midrise unit closest to the California Avenue, a minimum increase by 15 FT in the planned setback of the unit from California Avenue is recommended. If this increase is not practical, noise mitigation measures in the form of passive window sound attenuators or air conditioning is recommended for the end units (two per floor) of the midrise building which are located within 70 FT of the centerline of California Avenue. The Kalakaua Housing Project on Kalakaua Avenue contains examples of passive window sound attenuators which may be used on the midrise end units of this Wahiawa project.

Short term construction noise impacts may occur with projects of this type. However, State Department of Health permit procedures would be applicable to this project, and if followed, should minimize noise impacts resulting from on site construction activities.

A. REFERENCES

(1) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.

(2) "Guidelines for Considering Noise in Land Use Planning and Control," Federal Interagency Committee on Urban Noise, June 1980.

(3) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," Environmental Protection Agency, EPA 550/9-74-004), March 1974.

(4) Barry, T. and J. Reagan, "FHWA Highway Traffic Noise Prediction Model;" FHWA-RD-77-108; Federal Highway Administration; Washington, D.C.; December 1978.

(5) September 5-6, 1986 24-Hour Traffic Counts, California Avenue at Kamehameha Avenue; State Department of Transportation.

(6) Manual Traffic Count Data and Future Projections California Avenue and Kopena Street; March 29, 1988; via transmittal from Pacific Planning & Engineering, Inc.

HNA

TEXT

APPENDIX B.
EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the L_{dn} with the LAdn.

Although not included in the tables, it is also recommended that "L_{PN}" and "L_{EPN}" be used as symbols for perceived noise levels and effective perceived noise level, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

> The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, L_{eq} is designated the "equivalent sound level". For L_d, L_n, and L_{dn}, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristic of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, dBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (L_{PN} was found to be 75 dB. L_{PN} = 75 dB.) This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., decl).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighted Loss of Hearing" (PHL_1) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

TABLE I: A-Weighted Recommended Descriptor List

	Term	Symbol
1.	A-Weighted Sound Level	L_A
2.	A-Weighted Sound Power Level	L_{WA}
3.	Maximum A-Weighted Sound Level	L_{max}
4.	Peak A-Weighted Sound Level	L_{Apk}
5.	Level Exceeded x% of the time	L_x
6.	Equivalent Sound Level	L_{eq}
7.	Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8.	Day Sound Level	L_d
9.	Night Sound Level	L_n
10.	Day-Night Sound Level	L_{dn}
11.	Yearly Day-Night Sound Level	$L_{dn(y)}$
12.	Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is L_{eq} (1)). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine.)

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APPENDIX B. (CONT.)

TABLE II: Recommended Descriptor List

TERM	A-WEIGHTING	ALTERNATIVE(1) A-WEIGHTING	OTHER WEIGHTING (2)	UNWEIGHTED
1. Sound (Pressure) (3) Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level Over Time(T) (4)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average value over (non-time domain) set of observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level exceeded x% of the total set of (non-time domain) observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown.. Applies also to C,D,E,..... weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine)).

- D -

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APPENDIX C

AIR QUALITY STUDY

AIR QUALITY IMPACT REPORT
WAHIAWA MIXED USE PROJECT
May 9, 1988

Prepared for

Pacific Planning & Engineering, Inc.

and

State of Hawaii
Department of Business and Economic Development
Housing Finance and Development Corporation

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4	Estimates of P.M. Peak-Hour Carbon Monoxide Concentrations at the Intersection of Kopena Street and California Avenue, 1988

AIR QUALITY IMPACT REPORT
WAHIAWA MIXED USE PROJECT

1. INTRODUCTION

The State Housing Finance and Development Corporation is proposing an affordable housing subdivision consisting of 40 single-family units and 60 elderly housing units. The project site is a 17.2-acre parcel located adjacent to California Avenue in Wahiawa on the Island of Oahu. Construction is planned to commence in 1988 with project completion expected in 1989.

The purpose of this report is to assess the impact of the proposed development on air quality both on a local and regional basis. The overall project is clearly an "indirect source" of air pollution as defined in the federal Clean Air Act [1] since its primary association with air pollution is due to its inherent generation of mobile source, i.e., motor vehicle activity. Much of the focus of this analysis therefore is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for 1988 and future (1989) conditions.

A residential project such as this also has off-site impacts due to increased demand for electrical energy which must be met through the combustion of some type of fuel. Disposal of the refuse generated by the residents will also result in offsite impact as it will most probably be burned in the City's proposed resource recovery facility (HPOWER). Both of these combustion processes result in pollutant emissions to the air which have been addressed.

Finally, during construction of the various buildings and facilities air pollutant emissions will be generated due to vehicular movement, grading and general dust-generating construction activities. These impacts have also been addressed.

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 1 [2, 3]. Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an

adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [4].

Some of Hawaii's standards are clearly more stringent than their federal counterparts but, like their federal counterparts, may be exceeded once per year. It should also be noted that in April, 1986, the Governor signed amendments to Chapter 59 (Ambient Air Quality Standards) making the state's standards for particulate matter and sulfur dioxide the same as national standards. In the case of particulate matter, however, this uniformity did not last long. On July 1, 1987, the EPA revised the federal particulate standard to apply only to particles 10 microns or less in diameter (PM-10) [5], leaving the state once again with standards different than the federal ones.

In the case of the automotive pollutants (carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox)], there are only primary standards. Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January, 1983 [6].

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings [7]. The last review resulted in the relaxation of the oxidant standard from 160 to 240 micrograms/cubic meter (ug/m3) [8]. The carbon monoxide (CO), particulate matter, sulfur dioxide (SO2), and nitrogen dioxide (NO2) standards are currently under review, but final action has not been taken yet [9].

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [10]. There simply can be no visible emissions from fugitive dust sources.

3. EXISTING AIR QUALITY

The nearest State Department of Health air monitoring station to the project area is located at Pearl City about 8 miles to the south southeast. The State Department of Health currently monitors only total suspended particulates (TSP) and particulates ten microns and smaller (PM-10) at the site. In the past sulfur dioxide was also measured. Summaries of the latest available

full year data are presented in Tables 2 and 3.

It is evident from the data in Tables 2 and 3 that both the National Ambient Air Quality Standards (NAAQS) and Hawaii Ambient Air Quality Standards (HAAQS) are being met at those monitoring sites.

Unfortunately, there are no routine monitoring data for the primary automotive pollutant, i.e., carbon monoxide. The nearest CO monitoring site is at the Department of Health building in downtown Honolulu some 14 miles southeast of the project area. Because the area is presently at a relatively early stage of development, it can be surmised that present CO levels are also relatively low.

4. CLIMATE & METEOROLOGY

Weather conditions in the project area are typical of sites located in central Oahu. It is somewhat cooler and more humid than the more leeward coastal areas. Average annual maximum and minimum temperatures are 79.1 and 63.3 degrees Fahrenheit, respectively. Mean annual rainfall is 63.1 inches, substantially greater, for example, than the 20.3 inches found at Barbers Point Naval Air Station only about 12 miles south of Wahiawa [11].

Annual rainfall is of interest because of its role in particulate matter removal from the atmosphere, while wind speed and direction are determinants of pollutant concentration and potential receptors, respectively. Atmospheric stability is another important factor in determining the potential for air pollution problems. It is largely a function of insolation and wind speed, and an objective methodology for determining it has been developed by Turner [12].

An annual wind rose for the U.S. Army's former Kipapa Army Airfield located south of Wahiawa confirms the prevailing northeasterly tradewinds, but also indicates relatively low winds speeds (Figure 1). Historical meteorological data from the nearby Wheeler Air Force Base were also reviewed to determine wind conditions during a.m. and p.m. peak traffic hours [13]. As is evident in Table 4, morning conditions are characterized by either calm or low wind speed conditions over 95% of the time while the afternoon peak hours (Table 5) experience very few calms and somewhat higher wind velocities.

5. MOBILE SOURCE IMPACT

5.1 Mobile Source Activity. A traffic assessment was prepared for

the proposed development [14] and served as the basis for this mobile source impact analysis. Existing (1988) and projected 1989 p.m. peak-hour volumes at the Kopena Street - California Avenue intersection were extracted from that report for use in the air quality impact model.

5.2 Mobile Source Emission Factors. Carbon monoxide (CO) emission factors for vehicles were generated for the years 1988 and 1989 using the MOBILE-3 emissions model [15]. The emission factors were localized by use of the age distribution of registered vehicles in the City & County of Honolulu [16]. Fraction of vehicle miles travelled (VMT) was assumed to be directly proportional to the registration distribution. Emission factors were based on an average traffic approach/departure speed of 25 mph.

5.3 Modeling Methodology. While emissions burden analysis is one means of evaluating a project's impact, it is generally more important to estimate the ambient impact since air quality standards are expressed as ambient concentrations, and it is the ambient concentrations to which living things are exposed. Computer modeling is normally employed to generate these ambient concentration estimates, most commonly with non-reactive pollutants. This is due to the complexity of modeling pollutants which undergo chemical reactions in the atmosphere and are subject to the effects of numerous physical and chemical factors which affect reaction rates and products. For projects involving motor vehicles as the principal air air pollution source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (about 1 month) [17], and it comprises the largest fraction of automotive emissions.

The intersection option of the EPA guideline model CALINE-4 [18,19] was employed to estimate maximum 1-hour CO concentrations at receptor locations 10 - 40 meters from the intersection during the worst-case p.m. peak hour traffic. Worst-case meteorological conditions were selected accordingly.

Because of the time of day of the analysis (p.m. peak hour), a neutral atmosphere (Pasquill-Gifford Class "D") [12] and 1 meter per second (m/sec) wind speed were assumed as worst case meteorological conditions. A nominal background CO level of 1.0 part per million (ppm) was also input to the model.

Wind direction was based on preliminary modeling with 10 - 45 degree wind-road angles and was selected based on its ability to produce the maximum pollutant concentrations at the intersection under study. Specifically, due to the traffic volumes, predicted

queuing, and intersection orientation, a northeast wind direction (45 deg) was used for the "worst-case" analysis.

5.4 Results: 1-Hour Concentrations. The results of the modeling for existing and projected conditions are presented in Figures 2 - 4 for the Kopena Street - California Avenue intersection. It is evident that both state and federal 1-hour CO standards appear to be met even under "worst-case" conditions of traffic, meteorology, and receptor location.

5.5 Results: 8-Hour Concentrations. Estimates of 8-hour concentrations can be derived by applying a "persistence" factor of 0.6 to the 1-hour concentrations. This "persistence" factor is recommended in an EPA publication on indirect source analysis [20] and has been further corroborated by analysis of carbon monoxide monitoring data in Honolulu which yielded the same 8-hour-to-1-hour ratio [21]. When using this approach any 1-hour CO concentration greater than 8.4 mg/m3 would indicate exceedance of the State's 8-hour standard. Similarly, any 1-hour concentration over 16.7 mg/m3 would indicate exceedance of the federal 8-hour standard.

Applying this factor to the 1-hour concentration estimates reveals results that suggest both current and projected compliance with the federal 8-hour standard. There appears to be a possibility, however, that the State's 8-hour standard may be exceeded within 10 meters of California Avenue (Figure 4).

6. STATIONARY SOURCE IMPACT

6.1 Electrical Generation. The estimated 636,000 kilowatt hours of annual electrical demand by the ultimate development will necessitate the generation of electricity by power plants. Currently, most of Oahu's electrical energy is generated at Hawaiian Electric Company's (HECO) Kahe Power Station located near Nanakuli southwest of the project site. This is currently a six-unit, approximately 650-megawatt facility firing low-sulfur fuel oil. A seventh 150-megawatt unit was proposed by HECO [22], but more recently two outside companies have proposed building new oil- and coal-fired power plants at Campbell Industrial Park and selling power to the utility [23]. For the purposes of this analysis, oil-firing was assumed. Estimates of annual emissions were computed based on EPA emission factors and the fuel required to meet a 636,000 thousand KWhr demand. The results are presented in Table 6.

6.2 Solid Waste Disposal. The refuse generated by the residents of the 100 new residential units in the proposed project will

require disposal. Presently, about 80% of Oahu's refuse is being landfilled with the remaining 20% being burned at the Waipahu Incinerator [24]. In the future, most refuse will be burned at the City's proposed resource recovery facility. Estimates of annual emissions attributable to the combustion of project-generated refuse at that facility are included in Table 6.

7. SHORT-TERM IMPACT

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along roads serving the area as well as in the vicinity of the project site itself. Because of the moderate existing off-peak traffic volumes, the additional construction vehicle traffic should not exceed road capacities although the presence of large trucks can reduce a roadway's capacity as well as lower average travel speeds.

The site preparation and earth moving will create particulate emissions as will building and on-site road construction. Construction vehicles movement on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 [25,26].

The predominant soils in the project area are silty clays thus indicating a silt content greater than 30% [27]. The calculated precipitation/evaporation (P/E) Index for the area is 92. Compared to the EPA estimates and conditions, it would appear that there is probably a lesser potential for fugitive dust due to the wetter local climate, i.e., P/E Index of 92 versus 50, despite the higher silt content of the local soils.

In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt concrete batching plants needed for construction. In this particular case, an estimated 960 cubic yards of concrete and 650 tons of asphalt concrete will be required for the construction of project roads. Since it is also too early to identify specific facilities that will be providing the concrete and asphalt, the discussion of air quality impacts is necessarily generic.

Design and operating features of a typical concrete batching plant were obtained for this analysis. This plant (Rex Transit Mix Batch Plant, Model LO GO 5) [28], is a portable unit capable

of producing up to 100 cubic yards of concrete per hour. With this design capacity, it is obvious that the road-building concrete requirement (960 yd3) would require a relatively short-time operation of the batch plant.

Assuming 8 hours/day operation and published EPA emission factors [25] for both direct plant emissions and fugitive dust emissions, estimates of worst case ambient impact were derived using the PTPLU screening model. Ninety percent control of particulate emissions from the plant itself and 60% control of fugitive dust emissions from the process were assumed. One-hour concentration estimates were adjusted to 8-hour averages using an EPA-recommended factor [29] and then to 24-hour averages based on a weighted averaging technique. The worst case concentration of total suspended particulates (TSP) was thus estimated to be 105 micrograms/cubic meter (ug/m3) due to the plant operation.

Since it is not known where exactly the plant will be located and thus what the background concentration of TSP will be, it is somewhat difficult to predict cumulative concentrations for comparison with standards. However, if the batch plant's 105 ug/m3 were added to the second highest 24-hour concentration from the Pearl City data, the sum would not exceed the State's 24-hour standard of 150 ug/m3.

Design and operating data for a typical asphalt concrete batch plant (Astec Industries Model PDM-636-C) were also obtained and reviewed. This plant has a production capacity of 186 T/hour and thus could provide the required 650 tons of asphalt within a few hours. The two primary emission sources associated with such a plant are the drum mix asphalt plant and a 600 Kw diesel generator.

The modeling technique employed for the concrete batch plant was again employed for the asphalt plant with the results as shown in the following table.

ESTIMATED IMPACT OF AN ASPHALT CONCRETE BATCH PLANT

Pollutant	24-hour Concen. (ug/m3)	Existing Concen. (ug/m3)	Total (ug/m3)
Total Suspended Particulate	34.9	23	57.9
Sulfur dioxide	13.6	<5	<18.6
Nitrogen dioxide	203	n/a	203+
Carbon monoxide	44.2	n/a	44.2+
Volatile organic compounds	16.2	n/a	16.2+

The results suggest compliance with state and thus federal standards, although there is some uncertainty about NO2 since the State ceased all NO2 monitoring in 1976.

8. DISCUSSION AND CONCLUSIONS

8.1 Mobile Source Impacts. The mobile source analysis indicated slight decreases in near-intersection CO concentrations from 1988 to 1989 without the proposed project but CO levels slightly higher if the project is implemented. The slight decline in CO despite projected increases in traffic over the 1988-89 period is due to reduced new vehicle emissions resulting from the federal motor vehicle control program [30] which is built into the MOBILE-3 model. The higher CO levels with the project are simply the result of rising traffic volumes overcoming the declining composite emission factors for the overall vehicle fleet. Currently, the principal means of controlling automotive emissions within the state is dependence on the federal motor vehicle control program [31].

The estimated exceedance of the State's 8-hour CO standard within 10 meters of California Avenue is somewhat problematic since the estimates without the project are close to the standard and the project appears to put the CO levels over the standard. It should be noted, however, that due to the federal motor vehicle control program effect on vehicle emissions, CO levels should be back within the State's standard by 1990 provided that traffic increases do not significantly exceed the 2.5% per year projected by the traffic consultant.

8.2 Stationary Source Impacts. The emissions estimates may be compared to the 1980 county emissions inventory in Table 7 in order to provide some perspective on their significance. The project's contribution to county emissions appears to be very small.

8.3 Short-Term Impacts. Since as noted in Section 7, there is some potential for fugitive dust due to the high silt content of onsite soils, it will be important for adequate dust control measures to be employed during dry periods. Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%. The soonest possible landscaping of completed areas will also help.

Offsite production of concrete and asphalt will also result in emission over which the project developer has no control. The principal means of insuring proper air pollution control and compliance with standards at such facilities is through the Department of Health's permitting and enforcement programs.

8.4 Conclusions. Based on the foregoing analysis, the following conclusions may be drawn:

- The proposed project will result in increased air pollutant emissions due to its inherent traffic generation ability, and its requirements for electrical power and solid waste disposal;

- The addition of project-related traffic will increase ambient concentrations of carbon monoxide in the vicinity of key roads and intersections serving the project but will not cause violations of federal air quality standards;

- Project-related traffic may contribute to exceedance of the state 8-hour CO standard in close proximity, e.g., 10 meters, to California Avenue in 1989. By 1990, however, due to the federal motor vehicle control program, the State standard should again be met; and

- Annual emissions of criteria pollutants due to electrical generation and solid waste disposal attributable to the project will increase county emissions by less than 0.1%.

REPERENCES

1. U. S. Congress. Clean Air Act Amendments of 1977 (P.L. 95-95, Section 110, Implementation Plans, August, 1977.

2. U. S. Government. Code of Federal Regulations, Title 40, Protection of Environment, Part 50, National Primary and Secondary Ambient Air Quality Standards.

3. State of Hawaii. Title 11, Administrative Rules, Chapter 59 Ambient Air Quality Standards, as amended, April, 1986.

4. Library of Congress, Congressional Research Service. A Legislative History of the Clean Air Amendments of 1970, Volume 1, p. 411, January, 1974.

5. U.S. Environmental Protection Agency. Revisions to National Ambient Air Quality Standards for Particulate Matter, Federal Register, Vol. 52, p. 2463, July 1, 1987.

6. U. S. Environmental Protection Agency. National Ambient Air Quality Standards for Hydrocarbons: Final Rulemaking, Federal Register, Volume 48, No. 3, p. 628, January, 1983.

7. U. S. Congress. Clean Air Act Amendments of 1977 (P.L. 95-95) Section 109, National Ambient Air Quality Standards, August, 1977

8. U. S. Environmental Protection Agency. National Ambient Air Quality Standards for Photochemical Oxidants: Final Rulemaking, Federal Register, Volume 44, No. 28, p. 8202, February 8, 1979

9. U. S. Environmental Protection Agency. Regulatory Agenda, Federal Register, Volume 50, No. 82, p. 17784, April 29, 1985.

10. State of Hawaii. Title 11, Administrative Rules, Chapter 60, Air Pollution Control.

11. U.S. Air Force, Environmental Technical Applications Center. AWS Climatic Brief: Barbers Point, Oahu, Hawaii.

12. U. S. Environmental Protection Agency. Workbook of Atmospheric Dispersion Estimates, AP-26 (Sixth Edition), 1973.

13. National Climatic Center. Hourly surface observations for Wheeler Air Force Base, Oahu, Hawaii, 1975.

14. Pacific Planning & Engineering, Inc. Traffic Impact Assessment Report for the Proposed Wahiawa Mix Use Project (Draft), February, 1988.

15. U. S. Environmental Protection Agency. User's Guide to MOBILE-3 (Mobile Source Emissions Model), EPA-460/3-84-002, June, 1984.

16. City & County of Honolulu, Department of Data Systems. Age Distribution of Registered Vehicles in the City & County of Honolulu (unpublished report), September, 1986.

17. Seinfeld, John H. Air Pollution: Physical and Chemical Fundamentals, p. 69, McGraw-Hill Book Company, 1975

18. U.S. Environmental Protection Agency. Guideline on Air Quality Models (Revised), EPA-450/2-78-027R, July, 1986.

19. California Department of Transportation. CALINE4 - A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways (Final Report), November, 1984.

20. U.S. Environmental Protection Agency. Guidelines for Air Quality Maintenance Planning and Analysis: Indirect Sources Volume 9 (Revised), EPA-450/4-78-001, September, 1978.

21. Morrow, J. W. Air Quality Impact Analysis: Kaka'ako Redevelopment District Plan, July, 1984.

22. Hawaiian Electric Company. Environmental Impact Statement Preparation Notice: Kahe Unit 7 Project, July 2, 1987.

23. Kaser, Thomas. "HECO Planning to Buy Power", Honolulu Advertiser, October 3, 1987.

24. City & County of Honolulu, Department of Public Works. Revised Environmental Impact Statement for the Proposed Solid Waste Processing and Resource Recovery Facility, August, 1983.

REFERENCES (Con't)

25. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, Third Edition, with Supplements 1 - 15, 1984.

26. Thornwaite, C. W. Climates of North America According to a New Classification, Geog. Rev. 21: 633-655, 1931.

27. Buckman, H.O. and Brady, N.C. The Nature and Properties of Soils, 6th Edition, 1966.

28. Rexworks, Inc. LO GO 5 Transit Mix Batch Plant, Bulletin No. 1017-283

29. U.S. Environmental Protection Agency. Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10 (Revised): Procedures for Evaluating Air Quality Impact of New Stationary Sources, EPA-450/4-77-001, October 1977.

30. U.S. Environmental Protection Agency. Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines, Code of Federal Regulations, Title 40, Part 85, as amended, July, 1987.

31. State of Hawaii. Air Pollution Control Implementation Plan, January 21, 1972.

TABLES

TABLE 1

SUMMARY OF STATE OF HAWAII AND FEDERAL
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS PRIMARY	FEDERAL STANDARDS SECONDARY	STATE STANDARDS
1. Total Suspended Particulate Matter (TSP)	Annual Geometric Mean	75	60	60
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	260	150	150
2. PM-10	Annual	50	50	--
(micrograms per cubic meter	Maximum Average in Any 24 Hours	150	150	--
3. Sulfur Dioxide (SO2)	Annual Arithmetic Mean	80	--	80
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	--	365
	Maximum Average in Any 3 Hours		1,300	1,300
4. Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	100		70
(micrograms per cubic meter)				
5. Carbon Monoxide (CO)	Maximum Average in Any 8 Hours	10		5
(milligrams per cubic meter)	Maximum Average in Any 1 Hour	40		10
6. Photochemical Oxidants (as O3)	Maximum Average in Any 1 Hour	240		100
(micrograms per cubic meter)				
7. Lead (Pb)	Maximum Average in Any Calendar Quarter	1.5		1.5
(micrograms per cubic meter)				

TABLE 2

TSP and PM-10 MONITORING DATA
PEARL CITY, OAHU
1986

MONTH	Particulate Matter-10u (PM-10) 24-Hour Concentrations (ug/m3)				Total Suspended Particulates (TSP) 24-Hour Concentrations (ug/m3)			
	SAMPLES	MIN.	MAX.	MEAN	SAMPLES	MIN.	MAX.	MEAN
Jan 86	5	22	46	32	5	10	22	14
Feb 86	5	30	65	43	5	12	32	20
Mar 86	5	19	46	30	5	10	22	15
Apr 86	5	23	41	30	5	14	23	18
May 86	5	27	38	33	5	16	22	18
Jun 86	5	23	30	26	5	12	18	15
Jul 86	5	17	28	22	5	9	15	12
Aug 86	5	22	31	26	5	11	19	15
Sep 86	5	22	44	34	5	13	22	17
Oct 86	5	24	32	27	5	10	17	13
Nov 86	5	23	35	27	5	12	20	17
Dec 86	5	18	35	27	5	10	20	15
ANNUAL	60	17	65	30	60	9	32	16

SOURCE: Department of Health

TABLE 3

SO2 MONITORING DATA
PEARL CITY, OAHU
1984

MONTH	SAMPLES	MIN.	MAX.	MEAN
Jan 84	<5	<5	<5	<5
Feb 84	<5	<5	<5	<5
Mar 84	<5	<5	<5	<5
Apr 84	<5	<5	<5	<5
May 84	<5	<5	<5	<5
Jun 84	<5	<5	<5	<5
Jul 84	<5	<5	<5	<5
Aug 84	3	<5	<5	<5
Sep 84	<5	<5	<5	<5
Oct 84	<5	<5	<5	<5
Nov 84	<5	<5	<5	<5
Dec 84	<5	<5	<5	<5
ANNUAL	<5	<5	<5	<5

SOURCE: Department of Health

TABLE 4

7:00 A.M. WIND ROSE
WHEELER AFB, OAHU
1975

Direction	Wind Speed (kts) 0 - 3	4 - 7	8 - 12	>12	Total
N	0.0083	0.0028	0.0000	0.0000	0.0111
NNE	0.0250	0.0250	0.0000	0.0000	0.0500
NE	0.0250	0.0194	0.0083	0.0000	0.0527
ENE	0.0056	0.0361	0.0194	0.0000	0.0611
E	0.0139	0.0278	0.0056	0.0000	0.0473
ESE	0.0000	0.0083	0.0000	0.0000	0.0083
SE	0.0000	0.0056	0.0028	0.0000	0.0084
SSE	0.0000	0.0056	0.0056	0.0000	0.0112
S	0.0000	0.0000	0.0000	0.0000	0.0000
SSW	0.0028	0.0028	0.0000	0.0000	0.0056
SW	0.0083	0.0028	0.0000	0.0000	0.0111
WSW	0.0028	0.0000	0.0000	0.0000	0.0028
W	0.0111	0.0056	0.0028	0.0000	0.0195
WNW	0.0250	0.0139	0.0000	0.0000	0.0389
NW	0.0667	0.0639	0.0000	0.0000	0.1306
NNW	0.0167	0.0194	0.0000	0.0000	0.0361
Total:	0.2112	0.2390	0.0445	0.0000	0.4947
	Calms: 0.5053				1.0000

TABLE 5

4:00 P.M. WIND ROSE
WHEELER AFB, OAHU
1975

Direction	Wind Speed (kts) 0 - 3	4 - 7	8 - 12	>12	Total
N	0.0028	0.0223	0.0084	0.0000	0.0335
NNE	0.0028	0.0279	0.0195	0.0000	0.0502
NE	0.0167	0.1309	0.1281	0.0195	0.2952
ENE	0.0000	0.0919	0.1727	0.0195	0.2841
E	0.0000	0.0362	0.0696	0.0056	0.1114
ESE	0.0028	0.0167	0.0139	0.0000	0.0334
SE	0.0028	0.0195	0.0084	0.0000	0.0307
SSE	0.0028	0.0279	0.0111	0.0028	0.0446
S	0.0028	0.0056	0.0028	0.0000	0.0112
SSW	0.0000	0.0111	0.0000	0.0000	0.0111
SW	0.0000	0.0028	0.0000	0.0000	0.0028
WSW	0.0000	0.0000	0.0000	0.0000	0.0000
W	0.0000	0.0028	0.0028	0.0000	0.0056
WNW	0.0028	0.0028	0.0000	0.0000	0.0056
NW	0.0000	0.0139	0.0084	0.0000	0.0223
NNW	0.0084	0.0279	0.0028	0.0000	0.0391
Total:	0.0447	0.4402	0.4485	0.0474	0.9808
	Calms: 0.0192				1.0000

TABLE 6

Estimates of Annual Emissions Due to
Electrical Generation and Solid Waste Disposal
Wahiawa Mixed Use Project

Pollutant	Emissions (T/Yr) Electrical Generation	Solid Waste Disposal
Sulfur dioxide	1.8	0.1
Nitrogen oxides	2.3	0.6
Particulate Matter	0.2	0.1
Carbon monoxide	0.1	0.5
Hydrocarbons	<0.1	<0.1

TABLE 7

1980 EMISSIONS INVENTORY

CITY & COUNTY OF HONOLULU

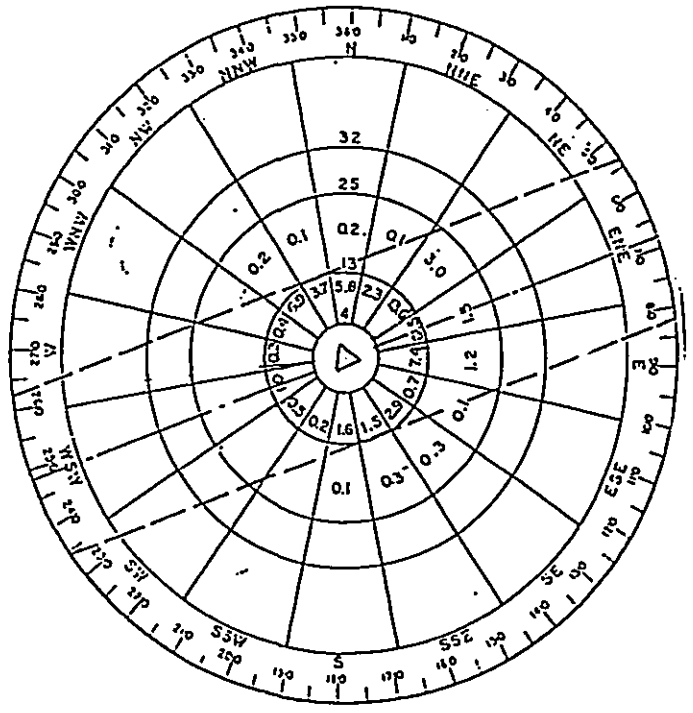
SOURCE CATEGORY	EMISSIONS (Tons/Year) PM	SOx	NOx	CO	HC
Steam Electric Power Plants	2092	36,736	12,455	1,065	184
Gas Utilities	14	0	199	0	0
Fuel Combustion in Agricultural Industry	1088	579	358	0	31
Refinery Industry	622	7,096	2,149	266	2,584
Petroleum Storage	0	0	0	0	1,261
Metallurgical Industries	28	96	40	0	0
Mineral Products Industry	6,884	1,883	597	0	31
Municipal Incineration	42	145	2,029	0	184
Motor Vehicles	1,413	1,014	17,270	239,198	22,853
Construction, Farm and Industrial Vehicles	184	193	2,507	3,729	338
Aircraft	382	145	1,751	5,594	1,476
Vessels	42	386	438	533	123
Agricultural Field Burning	1,399	0	0	15,982	1,692
TOTAL:	14,191	48,274	39,792	266,367	30,756

SOURCE: State Department of Health

FIGURES

FIGURE 1

ANNUAL WINDROSE



SOURCE: National Weather Service

SITE: Kipapa Army Airfield

PERIOD: June, 1942 - June, 1943

FIGURE 2
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

KOPENA STREET AT CALIFORNIA AVENUE
P.M. PEAK HOUR (1988)

345 deg

azimuth

California Avenue

8.0	8.0	8.0	7.6
5.6	5.5	5.1	4.8
4.2	4.0	3.6	3.3

Kopena Street

NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 45 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 1.0 ppm
Diffusion model: CALINE-4
Emissions model: MOBILE-3

FIGURE 3
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

KOPENA STREET AT CALIFORNIA AVENUE
P.M. PEAK HOUR (1989 WITHOUT PROJECT)

345 deg

azimuth

California Avenue

7.5	7.4	7.4	7.3
5.2	5.1	4.9	4.5
4.0	3.7	3.5	3.2

Kopena Street

NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 45 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 1.0 ppm
Diffusion model: CALINE-4
Emissions model: MOBILE-3

FIGURE 4
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

KOPENA STREET AT CALIFORNIA AVENUE
P.M. PEAK HOUR (1989 WITH PROJECT)

345 deg
|
azimuth

California Avenue

8.7	8.9	9.1	9.6	Kopena
6.3	6.4	6.3	6.0	Street
4.9	4.7	4.4	3.9	

NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 45 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 1.0 ppm
Diffusion model: CALINE-4
Emissions model: MOBILE-3

APPENDIX D

SOCIAL IMPACTS STUDY

SOCIAL IMPACT STUDY

FOR WAHIAWA MIX USE PROJECT

Prepared for
Pacific Planning and Engineering, Inc.

By
Earthplan

May 1988

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1. BACKGROUND AND PURPOSE

The State Housing Finance and Development Corporation (HFDC) is proposing a mixed use project in Wahiawa, which is situated in the Central Oahu region on the island of Oahu. Identified as Tax Map Keys 7-4-12:12 and 7-4-12:10, the project site encompasses 17.2 acres.

Approximately 7.8 acres will be developed at the present time. Plans call for 40 single-family fee-simple lots and 60 units for the elderly to be located in mid-rise structures.

Conducted as part of the Environmental Assessment for this project, this report examines some of the potential social impacts of the proposed project. The scope of this study includes population, displacement and public services.

2. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

2.1 Population

2.1.1 Existing Characteristics

This section discusses population impacts of the proposed project on the region and the Wahiawa study area. The regional area is hereby defined as Central Oahu, which is based on the boundaries of the Central Oahu Development Plan. The Wahiawa study area is hereby defined as the Census Designated Places (CDP) of Wahiawa, Whitmore and Schofield.

Table 1 presents the population growth of Oahu, Central Oahu region and the Waipahu Study Area. This table shows that population growth in the Wahiawa Study Area is inconsistent with the islandwide and regional growth between 1970 and 1985.

In that 15-year period, Oahu's population grew by six percent; Central Oahu, by 13 percent.

The Wahiawa Study Area population grew by only two percent, and one of its CDPs (Schofield) experienced a 0.4 percent decrease.

The project site is situated in Census Tract 93, which is part of the Wahiawa CDP. This Census Tract also experienced an overall decrease in population -- from 4,875 people in 1970 to 4,425 people in 1985 (State of Hawaii Department of Business and Economic Development, 1987).

Another source of population information is the Neighborhood Statistics Program of the U. S. Bureau of the Census. This program produced demographic and economic information on the officially recognized neighborhoods, generally based on the boundaries of the Neighborhood Boards. It is noted that these boundaries differ from the aforementioned CDP boundaries, and such data is provided for informational, rather than comparison, purposes. According to this information, 41,562 persons lived in Wahiawa on April 1, 1980. They comprised 5.5 percent of the islandwide population of 762,534 (Bureau of the Census, 1983).

2.1.2 Potential Population Impact

Table 2 indicates average 1980 average household sizes for Oahu, Central Oahu and the Wahiawa Study Area. Wahiawa's household sizes were generally larger than the Oahu's, but smaller than those in Central Oahu. Census Tract 93, in which the project site is situated had a 1980 average household size of 3.11 persons, which is similar to that of Oahu.

TABLE 1

Population Growth on Oahu, Central Oahu and Wahiawa Study Area, 1970, 1980, and 1985

Area	Population 1970	Population 1980	Population 1985	Percent Change 1980 - 1985
City and County of Honolulu	630,528	762,565	811,096	+ 6%
Central Oahu Development Plan Area 1/	67,586	100,953	114,008	+ 13%
Wahiawa Study Area				
Wahiawa CDP 2/	17,560	16,911	17,090	+ 1%
Whitmore CDP 3/	3,410	3,339	3,943	+ 18%
Schofield CDP 4/	13,582	18,899	18,814	- 0.4%
Total Study Area	34,552	39,149	39,847	+ 2%

1/ The Central Oahu Development Plan Area includes the following census tracts: 82, 87.01, 87.02, 87.03, 88, 89.01, 89.02, 89.03, 90, 91, 92, 93, 94, 95.05, 95.02, 95.03, 95.04 and 95.05.

2/ The Wahiawa CDP includes Census Tracts 92, 93, and 94.

3/ The Whitmore CDP is Census Tract 91.

4/ The Schofield CDP includes the following Census Tracts: 95.01, 95.02, 95.03, 95.04 and 95.05.

Source: Hawaii State Department of Business and Economic Development, The State of Hawaii Data Book -- 1987: A Statistical Abstract.

TABLE 2

Household Size on Oahu, Central Oahu and Wahiawa Study Area, 1980

Area	1980 Population	1980 Households	Average Household Size
City and County of Honolulu	762,565	230,214	3.31
Central Oahu Development Plan Area 1/	94,877	26,101	3.62
Wahiawa Study Area			
Wahiawa CDP	16,911	5,367	3.15
Whitmore CDP	3,339	798	4.18
Schofield CDP 1/	12,823	3,433	3.74
Total Study Area	33,073	9,598	3.45

1/ Does not include Census Tract 95.03, which is part of the Schofield CDP and lists only 1 household in 1980.

Source: Hawaii State Department of Business and Economic Development, The State of Hawaii Data Book -- 1987: A Statistical Abstract.

It is estimated that the proposed single-family component of 40 lots will house approximately 138 people, based on the Wahiawa's 1980 average household size of 3.45 persons. This average was selected as a basis to reflect the tendency for Central Oahu to have larger households than the overall island, as well as Wahiawa's tendency of having smaller households than the Central Oahu region.

In addition, the 60 elderly units are estimate to house between 90 and 120 senior citizens, based on studio and one-bedroom housing types and household sizes of 1.5 to 2.0 persons.

The total population resulting from the project is therefore estimated between 198 to 258 persons.

Note, however, that as indicated in the previous section, the Wahiawa Study Area has been experiencing very little growth over the last 15 years, as compared to the Central Oahu region and Oahu. Because of a fairly stable population, a population increase due to the proposed project is not expected to cause excessive stress on public services or facilities, nor will it change the complexion of an-already residential neighborhood.

Further, the project site already contains 21 residential units. The net increase of residences is therefore 79 units, including the elderly units. The net population increase of the proposed project will therefore depend on where the existing on-site residents are relocated and the origin of the new residents.

The on-site 21 existing units house approximately 87 people. If all of these tenants are relocated to other Wahiawa sites, and if the new residents originate from outside of Wahiawa, then the aforementioned population estimate resulting from the project will be a net increase over the total Wahiawa population.

2.2 Character of the Neighborhood

The project site is adjacent to the intersection of California Avenue and Kopena Street and the surrounding neighborhood offers a variety of uses, services and facilities. Along California Avenue, commercial and retail establishments are available for residents of nearby in single- and multi-family housing units. Public recreation areas are situated nearby, as well as schools and a hospital. Police and fire stations are also in proximity of the project site.

The proposed project is consistent with the mixed use character of the area, and is not expected to change current social patterns or existing levels of services.

2.3 Displacement Impacts

2.3.1 Existing On-Site Uses

Currently, 21 households live on the project site. Further, four commercial activities operate on-site.

Current residents have lived on the property for an average of 6.6. years. The longest length of stay is 20 years; the shortest, one year. The average household size of the 21 units is 4.14 persons. Annual household incomes were generally low, with only four families having annual incomes exceeding $20,000 (State of Hawaii Housing Finance and Development Corporation, November 1987 and December 2, 1987).

The residential tenants currently pay an average monthly rent of $220, based on a range from $160 to $325.

The commercial uses include two auto body repair shops, one barber shop and one farming business. Current business rent ranges from $90 per year for a 144-square foot space (for the barber shop) to $150 per year for 1 acre (farm) to $550 per month for 5,000 square feet (one of the auto body repair shops)(State of Hawaii Housing Finance and Development Corporation, December 2, 1987).

2.3.2 Relocation

The project will cause the displacement of all existing tenants, except the farming operation. As the displacing agency, the Housing Finance and Development Corporation (HFDC) is required to provide relocation assistance to all eligible persons, families and businesses occupying the site. Such assistance is to comply with Chapter 111, Hawaii Revised Statutes, and Chapter 17-503, Rules and Regulations Governing Assistance to Persons, Families, Businesses and Non-Profit Organizations Displaced by Programs for Public Purposes (State of Hawaii Housing Finance and Development Corporation, November 1987).

All of the current residents will be displaced and are therefore entitled to relocation assistance under the aforementioned statutes and rules. Except for the farm operation, the on-site businesses will also be displaced.

The HFDC has already (1) surveyed the on-site tenants to assess their needs and preferences, (2) prepared a relocation plan, and (3) initiated specific relocation processes for individual families and businesses.

It was found that, except for one household, all of the residential tenants requested some form of relocation assistance. Of these, 12 qualified for low rent housing or rental assistance; two were ineligible because of higher income. Three households were interested in sales, and if they qualify,

they will be given first priority in the proposed development. The remaining households are expected to seek rentals. Except for one household, the tenants preferred relocation in the Wahiawa area (State of Hawaii Housing Finance and Development Corporation, November 1987).

In assisting these families, HFDC is guided by a number of criteria: availability of existing public and private housing, tenant preference on location, required standard quality in the replacement housing, tenant's own financial means, and proximity of the replacement housing to public transportation, commercial shopping areas and to employment sites.

Housing options for these displacees include:

- Low Rent Housing -- Displacees will be given priority on the waiting list when they present their certificates of displacement.

- State Rent Supplement Program -- If the displaced family qualifies, they may receive monthly rent supplement payments ranging from $70 (family) to $90 (elderly).

- Section 8 Program -- Seven displacees have preliminarily qualified for Section 8 assistance.

- Private Rentals.

Displaced businesses will also receive HFDC assistance, including necessary advice for the owner to plan his relocation, relocation payments up to the eligible amounts, and referrals to other agencies that may be of assistance financially or in an advisory capacity.

Potential problems may arise in relocating the on-site tenants:

- Lack of Housing -- HFDC anticipates that, if this problem does occur, it would be in the non-elderly, low-rent category, because it would be difficult to place displacees whose affordable rent levels are below $300 a month.

- Location Preference -- Accommodating the tenants' location preference may be difficult for the larger household require 4- and 5-bedroom units because of lack of supply.

- Standard Housing -- Displacees accustomed to their current low rents may anticipate difficulty in adjusting to market rents normally associated with standard housing. The relocation payments are intended

to absorb the additional financial burden. Displacees with fixed incomes, however, may not want to move into market units because of higher rental rates.

2.4 Public Services and Facilities

2.4.1 Police

Wahiawa is located in District II which is managed by the Wahiawa Police Station, located less than a mile from the project site. The Wahiawa Station operates three shifts, providing constant protection for the area. Each shift operates with 12 to 13 police officers.

District II encompasses communities from Mililani to Mokuleia, and the North Shore to Waimea Bay. The Wahiawa District had the lowest overall number of major crimes reported during 1986, which seven percent of the total islandwide number reported.

The project is not expected to cause significant stress on the delivery of police protection services, since the regional population is fairly stable in number and the project population increase will not occur at an excessive rate.

2.4.2 Fire

The project site is located within a mile of Wahiawa's one fire station which is located on California Avenue and is equipped with one pumper and one tanker. A normal 24-hour watch has six firefighters on duty at one time. The closest stations in nearby communities are located in Mililani and Waialua.

Fire protection services are not expected to be significantly impacted because the project population increase will not occur at an excessive rate.

2.4.3 Schools and Parks

The Wahiawa area has a total of ten public schools and six private schools, as follows:

Name of School

Public Schools

Hale Kula
Helemano Elementary
Iliahi Elementary
Kaala Elementary
Sgt. Samuel K. Solomon Elementary
Wahiawa Elementary

Major Sheldon Wheeler Elementary
Wahiawa Intermediate
Major Sheldon Wheeler Intermediate
Leilehua High

Private Schools

King's Schools
Leeward Adventist Mission School
Our Lady of Sorrows School
Pacific-Islands Christian School
Ponomauloa School
Trinity Lutheran School

Source: State of Hawaii Department of Education, Office of the Superintendent. 1985 -- 1986 Directory. Honolulu, Hawaii: August 1985

The public schools nearest the project site are the Wahiawa Elementary School, Wahiawa Intermediate and Leilehua High School. Although the net population increase is not expected to strain the existing educational facilities, the Department of Education will further evaluate the impacts of this project when it receives the Environmental Assessment for review.

The City and County of Honolulu has seven parks in the Wahiawa region as follows:

Name of Park	Type of Park	Number of Acres
Iliahi Playground	Neighborhood	3.12
Kaala Playground	Neighborhood	2.16
Melemanu Park	Neighborhood	4.04
Whitmore Playground	Neighborhood	2.29
Whitmore Community Center	Community District	0.92
Wahiawa Botanic Garden		26.92
Wahiawa Recreation Center	District	10.00

In addition, the State of Hawaii has the 66-acre Wahiawa Freshwater Park located adjacent to the town.

Residents of the proposed project will be within walking distance of the Wahiawa Botanic Garden, the Wahiawa Recreation Center (including Wright Field).

2.4.4 Medical and Other Services

The 270-bed Wahiawa General Hospital, a full service hospital located approximately three blocks from the project site, offers a variety of private physician and dental offices, and opthomologists.

The project site is also located within a few blocks of the Wahiawa Shopping Center and various other commercial and retail establishment located on or near California Avenue.

REFERENCES

City and County of Honolulu Department of Parks and Recreation. Index of Oahu's Parks and Facilities -- 1985. Honolulu, Hawaii: January 1985

City and County of Honolulu Police Department, Research and Development Division. Annual Statistical Report -- 1984. Honolulu, Hawaii July 1985

State of Hawaii Department of Education, Office of the Superintendent. 1985 -- 1986 Directory. Honolulu, Hawaii: August 1985

State of Hawaii Department of Business and Economic Development. The State of Hawaii Data Book -- 1987: A Statistical Abstract. Honolulu, Hawaii: November 1987

State of Hawaii Housing Finance and Development Corporation. Relocation Assistance Plan for Wahiawa Mix Use Project. Prepared by Development Branch. Honolulu, Hawaii. November 1987.

State of Hawaii Housing Finance and Development Corporation. Relocation Assistance Plan for Wahiawa Mix Use Project: Addendum. Prepared by Development Branch. Honolulu, Hawaii. December 2, 1987.

U. S. Bureau of the Census, Neighborhood Statistics Program. Narrative Profiles of Neighborhoods in Honolulu, Hawaii. 1983

APPENDIX E

TRAFFIC IMPACTS STUDY

TRAFFIC IMPACT ASSESSMENT REPORT

ADDITIONAL UNITS
FOR THE
WAHIAWA ELDERLY HOUSING PROJECT

Wahiawa, Oahu, Hawaii
TMK 7-4-12: 10 & 12

March 1990

Prepared for:

State of Hawaii
Department of Business and Economic Development
Housing Finance and Development Corporation

Prepared by:

Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

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INTRODUCTION

Pacific Planning & Engineering, Inc. (PPE) was engaged to undertake a study identifying and assessing future traffic impacts caused by the development of the "Additional Units for the Wahiawa Elderly Housing Project". This report focuses on the impacts at the intersection of California Avenue with a proposed new roadway.

Project Description

The Housing Finance and Development Corporation (HFDC) of the State of Hawaii is planning to construct 54 elderly rental apartments in Wahiawa, Oahu, Hawaii. The project is located in Wahiawa, Oahu, Hawaii, on 1.5 acres on land adjacent to California Avenue. Figure 1 shows the project location and the roadway network in the vicinity.

The proposed project will be constructed as part of the larger Wahiawa Mix Use project, which includes the "Leileihua Village Residential Subdivision" and the Wahiawa Elderly Housing" projects as shown in Figure 2. The Mix Use project is expected to be completed by 1991.

The project will consist of one 6 story mid-rise structure, hereafter refered to as "Building B". Vehicular access to the project will be from a new road that connects with California Avenue. Presently, there is a dirt road providing access to the project site. The project is expected to be completed by 1991. Figure 3 shows the project site plan.

The project site is bounded by California Avenue to the North, residential subdivisions along Rose and Plum Streets to the West and East, respectively, and Wahiawa Intermediate School to the South. The project is located East of Wahiawa Commercial Center, a short walking distance from Wahiawa Civic Center, Wahiawa General Hospital, and recreational areas, including the Wahiawa Botanic Garden and Recreation Center, which are located across the proposed development site.

Wahiawa Mix Use Project

The Wahiawa Mix Use project consists of 43 single family residential units and 54 elderly rental apartments located in Building "A", which are refered to as the Leileihua Village Subdivision and Wahiawa Elderly Housing projects, respectively. The mix use project is located on a parcel of 7.8 acres of land adjacent to California Avenue. The 7.8 acres includes the 1.5 acres for the Wahiawa Elderly Housing. Figure 2 shows the Wahiawa Mix Use project and Figure 3 shows "Building A" of the Wahiawa Elderly Housing Project.

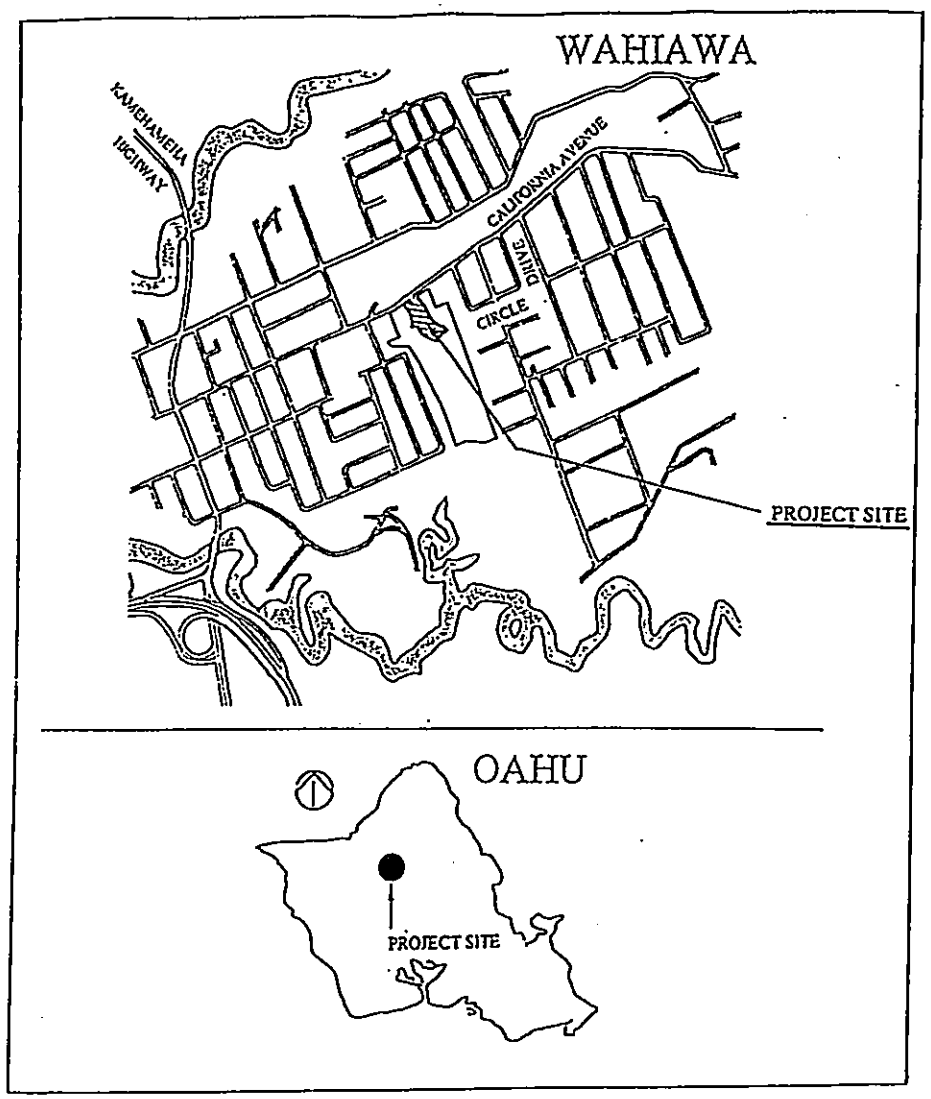

Figure 1. Project Location Map

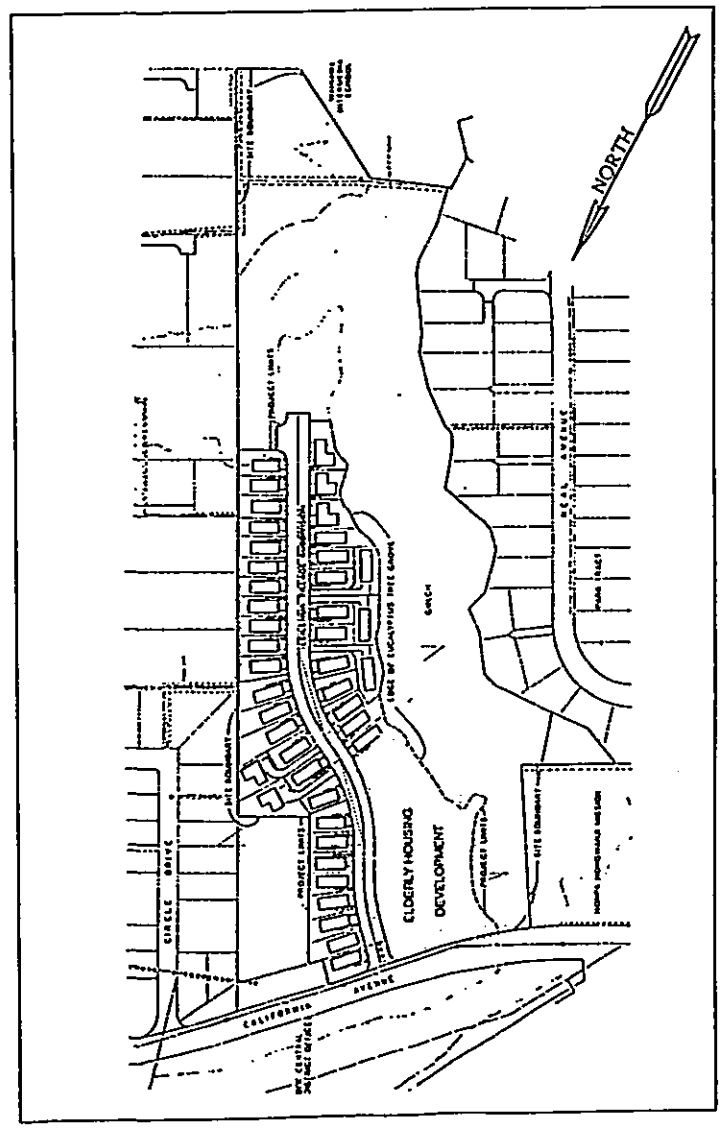

Figure 2. Wahiawa Mix Use Site Plan

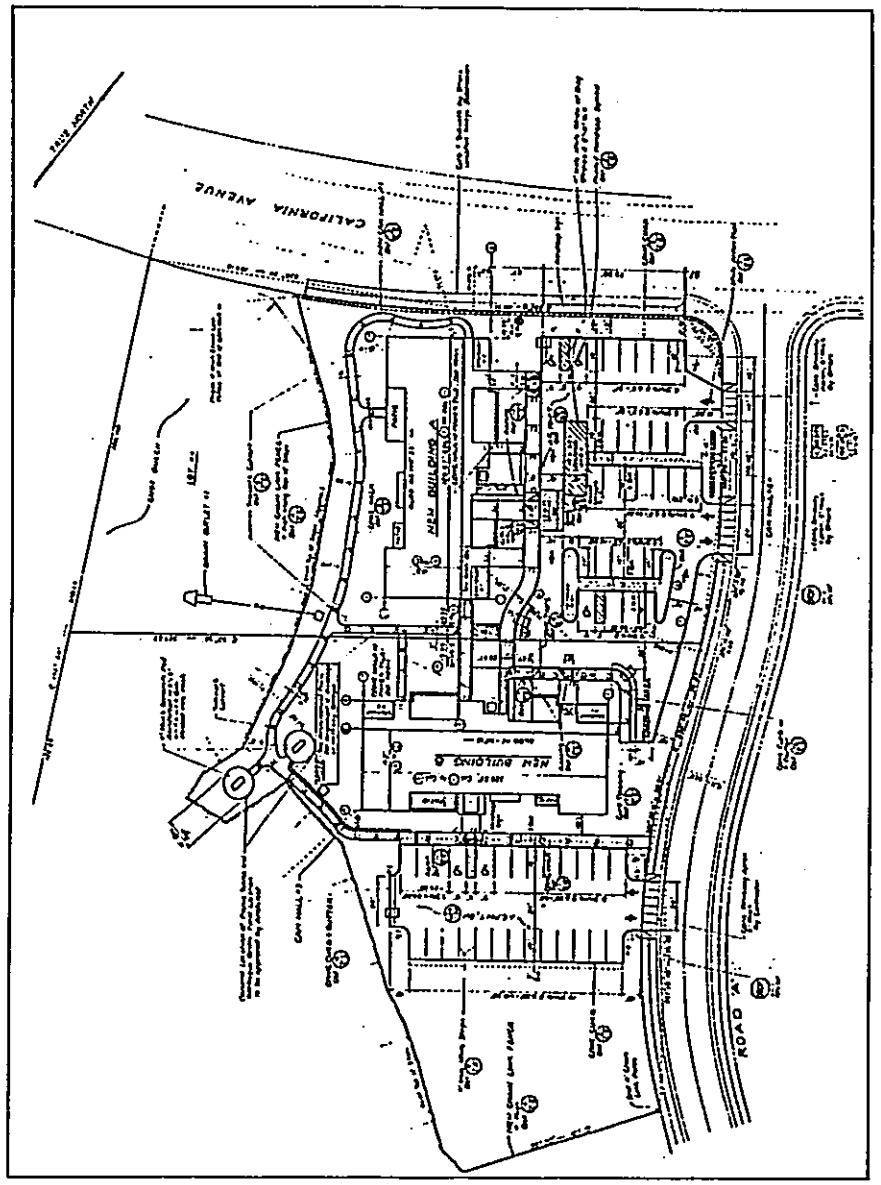

Figure 3. Project Site Plan

AREA CONDITIONS

A review of data of existing conditions was conducted to better understand the traffic impact from the proposed project. The review included the land use of the area, roadway facilities in the area and existing traffic conditions.

Existing Land Uses

The existing land uses for the project site consist of residential, commercial and agricultural activities. There are 15 houses, an automotive paint and body shop, barber shop, and a farming business located on the site. The homes are occupied by tenants on a month to month basis and will be demolished after the tenants are relocated to other suitable housing prior to beginning of construction. The existing road into the project site is currently a undeveloped dirt road which provides vehicular access to the tenants. Most of the site consists of a heavily vegetated gulch that is not suitable for development. The remainder of the site is generally level land which slopes gently towards the rear of the property.

Roadway Facilities

The primary vehicular access to the proposed additional elderly housing units will be from California Avenue. California Avenue serves as a collector / distributor road for Kamehameha Highway, which is one of the major roads carrying traffic in the north-south direction. The commercial section of California Avenue, which extends from Kamehameha Highway to Palm Street, is a four-lane undivided roadway with traffic signals located at the major intersections. From Palm Street towards the project site, California Avenue narrows to a two-lane undivided road.

California Avenue is a two-lane paved roadway in the vicinity of the project site with an extra wide pavement consisting of a 19 foot-wide inbound lane (towards Kamehameha

Highway), a 16 foot-wide outbound lane and a 10 foot-wide paved shoulder alongside the outbound lane. The general area is residential from the project site towards Wahiawa Heights. The posted speed limit is 25 miles per hour.

There are no sight distance or physical constraints which would result in unusual traffic safety concerns or conditions at the intersection of California Avenue with the project's proposed roadway. Sight distance for drivers exiting from the proposed project is excellent in both directions. A stopping sight distance of 200 feet is required when a design speed of 30 mph is exceeded by over twice the minimum distance.

The existing dirt road leading into the project site from California Avenue is currently undeveloped and used primarily by existing tenants. It will become the project's new access road providing vehicular access into the development.

Traffic Conditions

A review of State Department of Transportation (DOT) 1988 traffic counts for the intersection of Kamehameha Highway with California Avenue at Station 20-B indicated that the volume of traffic was higher during the afternoon peak hour, between 4:45 and 5:45 pm, than the morning peak hour, between 7:30 to 8:30 am. This report will therefore study the conditions of traffic during the afternoon peak hour period when the peak ambient traffic on California Avenue and traffic from the proposed project combine to produce the greatest impact.

Data of traffic counts taken at the intersection of California Avenue with the existing road on September 24, 1987, between 4:00 and 6:00 pm from a previous traffic study performed for the Wahiawa Mix Use Project was used. Additional data was also collected from a manual traffic count, conducted on August 3, 1989 between 4:00 and 6:00 pm, along California Avenue at the Wahiawa Recreation Center entrance located east of the California Avenue and Plum Street intersection.

This additional data taken from the August 3, 1989 traffic counts was used to update the previous traffic study's vehicular volume counts along California Avenue. The turning movements into the study intersection from the previous traffic counts taken on September

24, 1987 were also used since there were no significant land use changes within the project site.

Manual counts were taken of passenger car, truck, bus, motorcycle and pedestrian volumes. The survey was conducted to identify the average weekly peak traffic volumes in order to assess the existing conditions and establish a baseline for future traffic forecasts. A summary of the data collected from both traffic counts during the afternoon peak hour is shown in Appendix B. Figure 4 shows the layout of the study intersection and vehicle movements.

During the August 3, 1989 traffic counts, the weather was clear and the pavement dry. The park facility at the recreation center did have football practice for youngsters during this time period which created additional traffic into the recreation center parking lot due to parents watching and dropping off children.

Traffic signals at the intersection of California Avenue and North Cane Street was observed to cause vehicles headed eastbound along California Avenue to travel in platoons toward the project site, located approximately 1000 feet from the signalized intersection.

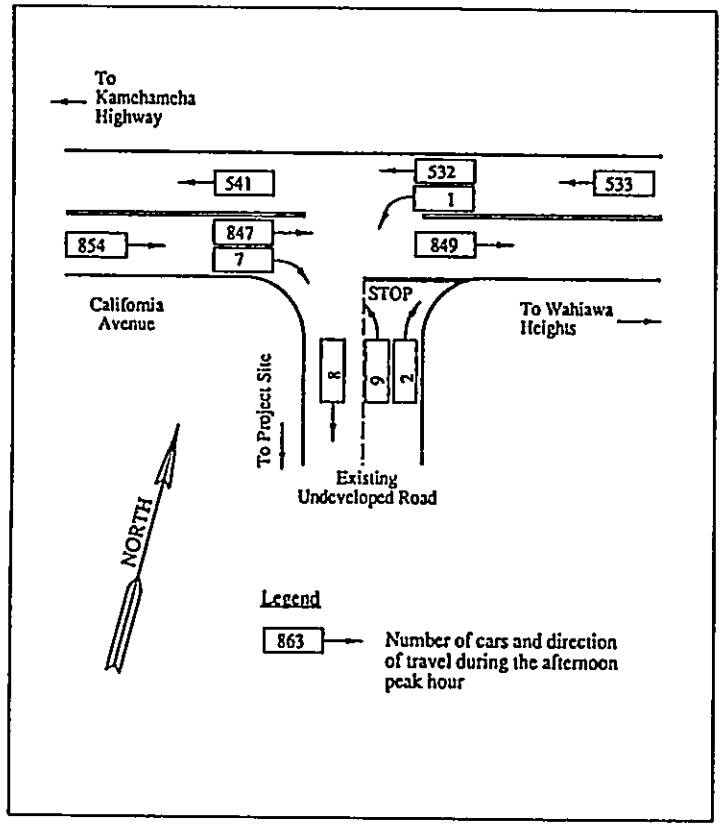

Figure 4. Existing Afternoon Peak Hour
California Avenue and Existing Dirt Road

Present Level-of-Service

During the afternoon peak hour, 1,398 vehicles entered the intersection of California Avenue with the existing road. Sixty percent of the vehicles along California Avenue approaching the intersection travelled eastbound toward primarily residential areas. Thirty nine percent of the vehicles along California Avenue travelled westbound toward the commercial area of Wahiawa and Kamehameha Highway. Eleven vehicles approached the intersection from the existing road and eight vehicles turned onto the existing road from California Avenue.

The intersection of California Avenue with the existing road was analyzed using Level-of-Service (LOS) analysis techniques according to the Highway Capacity Manual (HCM) (Special Report 209, 1985), and field data from the Wahiawa Mix Use traffic study and additional data collected from the August 3, 1989 traffic counts. The LOS for a given intersection or series of traffic movements is divided into six categories ranging from excellent traffic flow (A) to stop-and-go (F). Appendix A provides the definitions for each LOS category.

The results of the LOS analysis indicate little or no delay (LOS A) for vehicles turning left from California Avenue onto the existing road, short traffic delays (LOS B) for vehicles turning right from the existing road onto California Avenue and longer traffic delays (LOS D) for vehicles turning left from the existing road.

PROJECTED TRAFFIC CONDITIONS

Future traffic forecasts without and with the project were estimated for the year 1991. Traffic generated by ambient traffic growth in the area were used to forecasted future traffic with and without the project.

Future Ambient Traffic

Ambient traffic is traffic that would occur regardless of whether the proposed project were developed or not. Based on trend analysis of State Department of Transportation traffic count data at the intersection of Kamehameha Highway and California Avenue, Station 20-B, the number of vehicles entering the intersection was estimated to grow at a rate of 1.5% per year. For this study, ambient vehicular traffic along California Avenue was therefore forecasted to increase by one and one-half percent per year.

In addition, traffic generated by the Wahiawa Mix Use project was forecasted based upon the Institute of Transportation Engineers (ITE) Trip Generation Report (4th Edition) 1987. Trip generation calculates the number of trips that would be generated by a development during the morning and afternoon peak hours. Vehicle trips for 43 single-family detached housing units and 54 elderly apartment units were calculated and are shown on Table 1.

Table 1. Trip Generation for Wahiawa Mix Use Project

			Number of Trips Afternoon Peak Hour	
Land Use	Size	Units	Enter	Exit
Single-Family Residential	43	units	31	18
Elderly Apartments	54	units	15	10
Total Number of Trips			46	28

The traffic study performed for the Wahiawa Mix Use project utilized the ITE Trip Generation Report (3rd Edition), 1982 which tended to forecast a higher number of vehicle trips than the current Trip Generation Report (4th Edition). The vehicle trips generated by the current edition of the ITE Trip Generation Report was used because it reflects more current and detailed data.

Project Generated Traffic

The three-step procedure of trip generation, distribution and assignment were used to forecast traffic generated from the proposed additional 54 units to the Wahiawa Elderly Housing project.

Vehicle trips generated by the addtional units were calculated from the ITE Trip Generation Report (4th Edition) 1987 for 54 elderly apartment units. Table 2 shows the number of trips generated by the project during the afternoon peak hour.

Table 2. Trip Generation for Additional Units to the Wahiawa Elderly Housing

			Number of Trips Afternoon Peak Hour	
Land Use	Size	Units	Enter	Exit
Elderly Apartments	54	units	15	10

The distribution of trips generated by the proposed Wahiawa Mix Use Project is based on a split of 85% of the vehicles exiting from the project turning left onto California Avenue towards Kamehameha Highway, and 15% turning right towards Wahiawa Heights. The rational for the 85% / 15% split is based on the following:

1. Wahiawa Town Center, General Hospital, recreational parks, and major service oriented activities are accessed via California Avenue heading towards Kamehameha Highway.

2. Major job centers such as Schofield Barracks, Wheeler AFB, Wahiawa Commercial and civic centers, Dole pineapple field assembly areas and downtown Honolulu are accessed via California Avenue heading towards Kamehameha Highway.

3. Vehicles turning right onto California Avenue are those headed for Leilehua High School, Wahiawa Intermediate School, and other private schools are accessed via California Avenue heading towards Wahiawa Heights.

The ambient traffic volumes were added to the existing traffic volumes to obtain the total forecast volumes without the project during the afternoon peak hour in 1991. The project generated volumes were then added to the forecasted ambient volumes to determine the 1991 forecast volumes with the project. Table 3 shows the forecasted turning movement volumes with and without the project in 1991. Figure 5 displays the future traffic volumes with and without the project in 1991 on a diagram of the intersection.

Table 3. Afternoon Peak Hour Forecast Traffic

Intersection of California Avenue with New Project Access Road

Turning Movements		1989 Existing	1991 w/o project	1991 w/ project
California Avenue				
Westbound	LT	1	7	9
	TH	532	550	550
Eastbound	TH	847	870	870
	RT	7	39	52
New Project Access Road (Existing Road)				
Northbound	LT	9	24	32
	RT	2	4	6

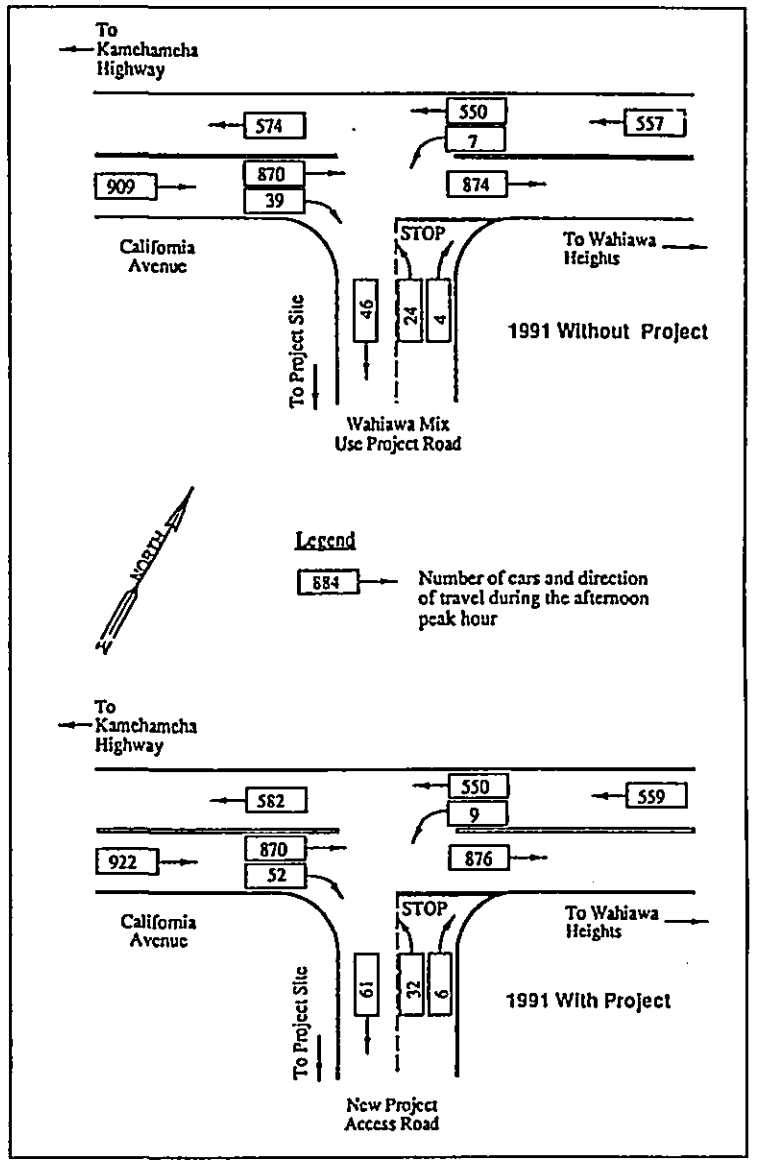

Figure 5. Future Traffic Volumes With and Without Project in 1991

TRAFFIC IMPACTS

Impacts on traffic resulting from the Additional Units for the Wahiawa Elderly Housing Project were measured by the change in Level-of-Service (LOS) for conflicting tuning movements at the intersection of California Avenue with the project's new roadway (existing road) with and without the project in the year 1991. The estimated future afternoon peak hour traffic with and without the project are shown on Table 4.

Table 4. Level-of-Service for Afternoon Peak Hour

Intersection of California Avenue with New Project Access Road

Turning Movements	1989 Existing	1991 w/o project	1991 w/ project
California Avenue			
Westbound LT	A	A	A
New Project Access Road (Existing Road)			
Northbound LT	D	E	E
RT	B	B	B

The results of the analysis indicate that there will be no change in the LOS for vehicles at the study intersection with the project in 1991. Drivers turning right exiting the project site or turning left from California Avenue into the project site will experience minimal traffic delays (LOS A or B), while drivers turning left onto California Avenue exiting the project will continue to experience long delays (LOS E).

With or without the project, the LOS for drivers will also remain the same as the existing conditions except for vehicles turning left from the project onto California Avenue which will experience a drop from LOS D to LOS E.

CONCLUSION AND RECOMMENDATIONS

The proposed "Addition Units for the Wahiawa Elderly Housing Project" will not significantly impact traffic flow along California Avenue when the project is completed in 1991.

The Level-of-Service analysis results also indicate that there will be minimal impact on existing traffic with both the Wahiawa Mix Use development and additional elderly housing project. Most (85%) of the traffic entering the proposed project is coming from Kamehameha Highway direction, turning right into the project roadway therefore avoiding any conflicts with the other project generated traffic.

The only movement which is expected to be operating at or near capacity level is the left turn movement out of the project (LOS E). At LOS E comfort and convenience levels are extremely poor and drivers are expected to experience long delays. The effects of upstream signals will cause traffic to arrive in platoons, providing left turning vehicles opportunities. The other turning movements, showing LOS A and B should not have any significant effects on traffic along California Avenue or the project's proposed roadway.

Some future considerations for improvements, should increase in ambient traffic further lower the level of service at the intersection, are as follows:

1. Provide a center left turn lane from Palm Street where California Avenue narrows to two lanes.
2. Provide bus turn-out along California Avenue that will not impair sight distance from the project roadway or other minor streets.

APPENDIX A

Definition of Level-of-Service

APPENDIX A
DEFINITION OF LEVEL-OF-SERVICE

For unsignalized intersections, the traffic most impacted will be the minor or cross-street with the stop or yield control. The major roadway will have the right-of-way. The level-of-service is the amount of delay expected for the average vehicle desiring to cross or enter the major road. The following gives a general description of the measure.

The concept of levels of service is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with level-of-service A representing the best operating conditions and level-of-service F the worst.

Level-of-Service definitions--In general, the various levels of service are defined as follows for uninterrupted flow facilities:

Level-of-service A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.

Level-of-service B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.

Level-of-service C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by

interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

Level-of-service D represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

Level-of-service E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuver. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

Level-of-service F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go wave, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level-of-service F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases operating conditions of the vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow which causes the queue to form, and level-of-service F is an appropriate designation for such points.

These definitions are general and conceptual in nature, and they apply primarily to uninterrupted flow. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them.

APPENDIX B

MANUAL TRAFFIC COUNT DATA

MANUAL TRAFFIC COUNT DATA

APPENDIX B

MANUAL TRAFFIC COUNT DATA

Location: California Avenue and Existing Road

Date: September 24, 1987

Time	California Ave Westbound		California Ave Eastbound		Existing Road Northbound		Total All Approaches
	LT	TH	RT	TH	LT	RT	
4:00-4:15	0	150	2	201	3	0	356
4:15-4:30	0	131	5	216	0	1	353
4:30-4:45	0	139	0	198	5	0	342
4:45-5:00	0	153	5	236	0	1	395
5:00-5:15	0	117	4	233	1	3	358
5:15-5:30	1	103	2	202	3	1	312
5:30-5:45	2	129	3	199	3	0	336
5:45-6:00	1	152	3	234	2	3	395
PM Peak Hour							
4:15-5:15	0	540	14	883	6	5	1448

APPENDIX B (Cont.)

MANUAL TRAFFIC COUNT DATA

Location: California Avenue and Wahiawa Recreation Center Entrance

Date: August 3, 1989

Time	California Ave Westbound	California Ave Eastbound	Total All Approaches
	TH	TH	
4:00-4:15	117	217	334
4:15-4:30	142	214	356
4:30-4:45	153	191	344
4:45-5:00	120	232	352
5:00-5:15	183	111	294
5:15-5:30	215	123	338
5:30-5:45	208	146	354
5:45-6:00	172	177	349
PM Peak Hour			
4:00-5:00	854	533	1387

APPENDIX F

RESPONSE LETTERS

FROM

AGENCIES CONSULTED IN MAKING ASSESSMENT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P.O. BOX 50167
HONOLULU, HAWAII 96850

APR 19 1988

Mr. Conrad Higashionna
Pacific Planning and Engineering
1144 10th Avenue
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

This follows up on our telephone conversation of earlier today regarding endangered or threatened species of plants and animals which may be present in the vicinity of, or may be affected by, the below described project:

Wahiawa Mix-Use Project
TMK: 7-4-12 Parcels 10 and 12
Wahiawa, Oahu, between Neal Avenue and Rose Street bounded on the north by California Avenue and on the south by TMK boundary 7-6 (and Wahiawa Intermediate School)

To the best of our knowledge, there are no listed species which would be found in this area, nor would any listed species be expected to be affected by this project.

Thank you for your interest in listed species.

Sincerely yours,

William R. Kramer
Acting Field Supervisor,
Environmental Services
Pacific Islands Office

cc: Chief, SE-FWE, FWS, Region 1, Portland, OR (Attn: Swanson)

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 • AREA CODE [illegible]

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE EN-LK

May 31, 1988

Mr. Conrad Higashionna, Engineer
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report for the Wahiawa Mix Use Project, Wahiawa, Oahu, Hawaii
Tax Map Key: 7-4-12: 10 & 12

We have reviewed the Environmental Impact Assessment Report for the proposed project and would like to offer the following comments.

Safety within the large parking structure that is not bordered by California Avenue is of particular concern. The report makes no mention of security measures that would ensure exclusive use by renters, and stalls near the eucalyptus grove are somewhat secluded and distant from the rental building.

While there are no objections to the project at this time, we would urge that consideration be given to environmental security (e.g. deadbolts, window locks, adequate lighting, parking lot security patrol, etc.) when both the residential units and the parking structures are designed.

Thank you for the opportunity to comment.

Sincerely,

DOUGLAS G. GIBB
Chief of Chief

U.S. Department of Housing and Urban Development
Honolulu Office, Region IX
300 Ala Moana Blvd., Room 3318, Box 50007
Honolulu, Hawaii 96850-4991

88-228

June 1, 1988

Mr. Conrad Higashionna, Engineer
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, HI 96816

Dear Mr. Higashionna:

SUBJECT: Environmental Impact Assessment Report for
the Wahiawa Mix Use Project
Wahiawa, Oahu

This responds to your request for comments on the Mix Use Project in Wahiawa that will provide 40 single family housing units and 60 elderly housing units on 17.2 acres of land. The single family housing units are on 3,500 square foot lots, while the elderly units are in a seven-story mid-rise building.

We have no comments to offer on other issues that should be considered in the assessment. We understand that no HUD assisted programs are involved with this project.

If you have any questions, you may call Frank Johnson at 541-1326.

Very sincerely yours,

Calvin Lew
Director
Community Planning and
Development Division

STATE OF HAWAII
COMMISSION ON THE HANDICAPPED
Old Federal Building • 335 Merchant Street • Room 353 • Honolulu, Hawaii 96813 • Phone 548-7606

June 1, 1988

Mr. Conrad Higashionna
Pacific Planning and Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, HI 96816

Dear Mr. Higashionna,

Re: Environmental impact assessment for the Wahiawa Mix Use Project,
Tax Map Key 7-4-12: 10 &2

Thank you for the opportunity to comment on the proposed Wahiawa Mix Use Housing Project proposed for Tax Map Key 7-4-12: 10 & 2. The project consists of 40 single family housing units and 60 elderly housing units to be built on approximately 7.8 acres. Our comments are limited to the project's impact on persons with disabilities.

While we are pleased to note that units for handicapped persons will be designed in accordance with The Uniform Federal Accessibility Standards we note that only three (3) of the sixty (60) units are so designated we note that none of the forty (40) single family housing units are designated to be sheelchair accessible. We would like to emphasize that persons with disabilities should not be limited in choice to only the apartment units in the elderly housing high-rise. Therefore we recommend that five (5) percent, or two single family units be designed so as to accommodate persons who are disabled.

Finally, we would like to note to the architect of this project that our office has a technical program specialist who is able to meet with the architect in the design phase to provide input to ensure that the proposed units do, in fact, meet the required U.F.A.S. standards. We are aware of previous units which, while designated on paper to be handicapped accessible, do not meet the minimum design standards under law, Therefore, we urge that our office be contacted in the design phase so as to avoid incorrect construction.

Sincerely,

Francine Wai Lee

FRANCINE WAI LEE
Executive Secretary

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

HIRAM K. KAMAKA
DIRECTOR

WALTER M. CLARK
DEPUTY DIRECTOR

June 8, 1988

Mr. Conrad Higashionna
Pacific Planning & Engineering, Inc.
114 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment
Wahiawa Mix Use Project
Tax Map Key 7-4-12: 10 and 12

We have reviewed the Environmental Impact Assessment for the Wahiawa Mix Use Project and offer the following comments.

We have determined that the plan for the mix use project is conceptually acceptable. Adequate recreational areas and facilities are being provided to serve the project. The development of meeting rooms, garden plots and a community center in the project are beneficial and will complement the recreational facilities and programs available at the Wahiawa Recreation Center.

Since adequate recreational facilities are being provided, we would not object to any request for a park dedication exemption under Chapter 359G, Hawaii Revised Statutes.

Thank you for the opportunity to comment on the report.

Sincerely,

HIRAH K. KAMAKA, Director

HKK:ei

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR
LESLIE S. MATSUBARA
DEPUTY DIRECTOR

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 TELECO [illegible]

Ref. No. P-8847

June 8, 1988

Mr. Conrad Higashionna, Engineer
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report for the
Wahiawa Mix Use Project, Wahiawa, Oahu, Hawaii,
Tax Map Key: 7-4-12: 10 & 12

We have reviewed the subject activity relative to Hawaii's Coastal Zone Management (CZM) objectives and policies and have no comments to offer at this time.

Thank you for the opportunity to comment on the proposed amendments.

Sincerely,

Roger A. Ulveling

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-149(449)

June 9, 1988

Mr. Conrad Higashionna
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report (EIAR)
for the Wahiawa Mix Use Project, Wahiawa, Hawaii
Tax Map Key: 7-4-12: 10 and 12

We have reviewed the subject EIAR and have the following comments:

1. Municipal sewers are adequate to serve the 40 single family and 60 elderly apartment units.

2. At an appropriate time, the following documents should be submitted to our Division of Engineering: drainage report, grading plan, and soils report.

Very truly yours,

ALFRED J. THIEDE
Director and Chief Engineer

United States Department of the Interior
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
P.O. Box 50166
Honolulu, Hawaii 96850

June 10, 1988

Mr. Conrad Higashionna
Pacific Planning & Engineering, Inc.
1144 Tenth Ave., Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report for the Wahiawa Mix Use Project Wahiawa, Oahu, Hawaii, Tax Map Key: 7-4-12: 10 & 12

The staff of the Hawaii District Office of the U.S. Geological Survey, Water Resources Division, has reviewed the subject Environmental Impact Statement, and has no comments to make.

Thank you for allowing us to review the subject statement and we are returning the report for your further use.

Sincerely,

William Meyer
District Chief

Enclosure

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

June 14, 1988

Mr. Conrad Higashionna
Pacific Planning and
Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Your Letters of May 24 and 26, 1988 on the Environmental Impact Assessment Report for the Wahiawa Mix Use Project, Wahiawa, Oahu, Hawaii, Tax Map Key: 7-4-12: 10 and 12

Thank you for the opportunity to review and comment on the environmental impact assessment report for the proposed residential housing project in Wahiawa.

We have the following comments:

1. A water master plan should be submitted for our review and approval.

2. Our water system cannot provide the fire protection required by the proposed project. The developer will, therefore, be required to upgrade the fire protection as indicated on Page 7, Potable Water, of the report.

3. The construction drawings for the waterline installation should be submitted for our review and approval.

4. The availability of additional water for the project will be determined when the building permit is submitted for our review and approval. If additional water is made available, the developer will be required to pay our Water System Facilities Charges for source-transmission and daily storage.

If you have any questions, please contact Lawrence Whang at 527-6138.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Pure Water . . . man's greatest need – use it wisely

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

June 17, 1988

Conrad Higashionna
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

SUBJECT: Review of Environmental Impact Assessment Report for the Wahiawa Mix Use Project
Wahiawa, Wahiawa District, O'ahu
TMK: 7-4-12: 10 and 12

Thank you for the opportunity to review this project. We have the following comments to offer.

There are no known State Park concerns. With respect to Historic Sites, staff archaeologists checked the site area and concluded that the project would have "no effect" on significant historic sites. The majority of the area is now urban and the gulch does not appear likely to have archaeological remains.

Sincerely yours,

RALSTON H. NAGATA
State Parks Administrator
and Deputy State Historic Preservation Officer

cc: Roger C. Evans

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

BENJAMIN B. LEE
DEPUTY DIRECTOR

88/EC-7(RF)
LU5/88-4183

June 17, 1988

Mr. Conrad Higashionna
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Environmental Assessment for "Wahiawa Mix Use Project"
Wahiawa, Central Oahu; Tax Map Key 7-4-12: 10 and 12

We have reviewed the subject Environmental Assessment and offer the following comments:

1. Figure 2, Site Plan, is unclear. Are the two buildings delineated by dashed lines the additional elderly housing and community center proposed for future (not immediate) development, as stated on page 7? Would the second elderly project be an identical seven-story tower?

2. Would the future community center be reserved for the use of elderly housing residents? The location of the Wahiawa Recreation Center should be shown relative to the proposed project. Since the project lacks a park or play area, we anticipate that children would congregate and play in the street and in and around the elderly housing and parking areas.

   Unless a play area is provided and the elderly housing buffered from the single-family subdivision, there could be conflict between the two different uses.

3. The EA lacks a zoning map and adequate discussion of immediately surrounding uses and structures. What occupies the California Avenue properties directly adjacent to the project? How would the project -- particularly the elderly housing towers -- relate to the existing built environment, to the botanical garden? The height of the elderly housing towers is out of scale and out of character with the existing neighborhood and the proposed single-family subdivision. We urge you to reevaluate the height and design of these structures.

4. We also suggest reevaluating the site plan for the single-family subdivision. Variety in building types and height and staggered setbacks could be used to create a more attractive neighborhood. Alternative design schemes using cluster or zero-lot-line approaches could also be used. Enclosed is a copy of our new publication, "Cluster/PD-H Guidebook," which contains a number of design suggestions.

5. How many mature trees will be removed to develop the project? What new plantings are proposed? The EA should include an open space/landscaping plan.

6. The discussion of visual impacts (p. 20) is inadequate and misleading. Removal of trees and vegetation could have a major negative visual impact, as might the seven-floor elderly housing structures. How would views along California Avenue and from the botanical garden be affected? A view assessment should be made by superimposing the building silhouettes on photographs showing existing views.

7. The EA should disclose all aspects of the project that do not meet county land use and construction regulations.

8. Does the Housing Finance and Development Corporation (HFDC) intend to seek waivers from county planning, zoning and construction regulations through HRS Section 359G-4.1? If, alternatively, the HFDC intends to employ new powers granted under Act 15 SLH 1988, when will the rules required under the act be promulgated?

In conclusion, we believe the project -- as currently designed -- will have a significant effect on this area of Wahiawa.

Thank you for the opportunity to comment. If you have any questions concerning the Guidebook and site design, please contact Greg Hee of our Urban Design Branch at 527-5369. For other questions, please contact Robin Foster of our Environmental Affairs Branch at 527-5027.

Very truly yours,

John P. Whalen

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
1900B

cc: DGP
DPR
DHCD

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

June 20, 1988

Mr. Conrad Higashionna, Engineer
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, HI 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report for the Wahiawa
Mix Use Project - Wahiawa, Oahu, Hawaii

We would like to offer the following comments in regards to the above-mentioned matter:

The proposed development is on Helemano silty clay and Leilehua silty clay. These soils have moderate shrink-swell potential. Helemano silty clay has an erosion hazard that is severe to very severe and is classified as MH in the Unified Classification System. This soil may be susceptible to sliding. Leilehua silty clay has an erosion hazard that is slight and is classified as MH-CH in the Unified Classification System.

Also, we would appreciate the opportunity to review the draft Environmental Impact Statement for the above-referenced matter.

Sincerely,

Larry J Babik

RICHARD N. DUNCAN
State Conservationist Acting

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
EXECUTIVE OFFICE ON AGING
OFFICE OF THE GOVERNOR
335 MERCHANT STREET, ROOM 241
HONOLULU, HAWAII 96813

JEANETTE TAKAMURA, PH.D.
DIRECTOR

TELEPHONE NO.

June 20, 1988

Mr. Conrad Higashionna
Engineer
Pacific Planning & Engineering Inc.
1144 Tenth Avenue
Honolulu, HI 96816

Dear Mr. Higashionna:

Based on our cursory review of your Environmental Impact Assessment Report for the Wahiawa Mix Use Project, the Executive Office on Aging would support the proposed mix use project which includes 60 elderly rental housing.

Although only 1% of Oahu's 60+ population (2,485) live in Wahiawa, 28% of our elders tend to be renters. We also note that the proposed project appears to have ready access to public transportation and to recreational altenatives. Moreover, the proposed $150 to $175 monthly rental is affordable for most of our elders.

One of our concerns at this juncture pertains to the interior design of the units for elders. We urge that your architectural plans be sensitive to physical disabilities which are common in old age. Please feel free to contact the Executive Office if we can assist you in assuring that you plan appropriately for our elders to age in place.

Sincerely,

Jeanette C. Takamura

Jeanette C. Takamura, Ph.D.
Director, Executive Office on Aging

JCT:ta

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

TE-3535
PL1.1151

June 22, 1988

Mr. Conrad Higashionna
Engineer
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue
Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Wahiawa Mix Use Project
Environmental Impact Assessment
TMK: 7-4-12: 10 & 12

This is in response to your letter dated May 24, 1988 requesting our review and comments on the assessment for the subject project.

We have the following traffic concerns:

1. Only one access point onto California Avenue should be provided for this proposed project.

2. The road serving this project should be constructed to all applicable City standards.

3. Off-street parking should be provided in accordance with the Land Use Ordinance.

4. Adequate sight distances should be provided at the Kopena Street/California Avenue intersection.

5. California Avenue has a 7-foot roadway setback and should be widened and improved along the project's frontage. Plans for these improvements should be submitted to our office as soon as they are available.

Should you have any questions, please contact Wayne Nakamoto of my staff at 523-4190.

Yours truly,

JOHN E. HIRTEN

cc: Department of Land Utilization

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

June 22, 1988

FM/DGP 5/88-1978

Mr. Conrad Higashionna, Engineer
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Environmental Impact Assessment for the
Wahiawa Mix Use Project, Wahiawa, Oahu

We believe that the environmental assessment prepared does not comply with the provisions of Section 11-200-7 of the EIS Rules. Section 11-200-7 states, in part, as follows:

> A group of actions proposed by an agency or an applicant shall be treated as a single action when:
>
> (1) The component actions are phases or increments of a larger total undertaking;

The Environmental Impact Assessment report prepared for the Housing Finance and Development Corporation described the anticipated impacts of the subject project which consists of 40 single-family affordable units for sale and 60 elderly housing units for rental located on 17.2 acres. The plan also includes an additional 60 elderly units and a community center which are proposed for later development. Although the plans for the later development are disclosed, their impacts are not assessed in the report that has been prepared.

Of the current tenants on the project site, only a farming operation will remain. The type of farming operation and its proximity to the proposed subdivision should be discussed in the environmental impact assessment report and any potential impacts due to the location of the subject project adjacent to the farming operation should be assessed.

The project site (TMK: 7-4-12: 10 and 12) includes designations of Commercial, Preservation and Residential on the Central Oahu Development Plan Land Use Map. Development of the elderly housing site and a portion of the single-family housing site along California Avenue will require an amendment from Commercial to Medium Density Apartment and Residential uses unless the proposing agency decides to utilize the applicable exemption provisions of Chapter 201E, Hawaii Revised Statutes, and Act 15, 1988. Mixed use is not sanctioned in this area by the Central Oahu Development Plan.

Thank you for providing us with the opportunity to comment. Please contact Faith Miyamoto at 527-6022 if you have any questions.

Sincerely,

Donald Clegg

DONALD A. CLEGG
Chief Planning Officer

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
EPHSO

June 23, 1988

Mr. Conrad Higashionna, Engineer
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report for the Wahiawa Mix Use Project, Wahiawa, Oahu, Hawaii, Tax Map Key 7-4-12: 10 & 12

Thank you for allowing us to review and comment on the subject project. We provide the following comments relating to noise:

1. Since the proposed development will utilize residential units in close proximity to each other, these homes should be designed so as to maximize the containment of noise.

2. In addition to requiring the contractor to comply with Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu, the following conditions should also be included:

   The contractor must comply with the conditional use of the permit as specified in the rules and conditions issued with the permit.

3. Should there be a baseyard or stockpile area located adjacent to residences, mitigative measures, such as barriers, must be developed in the event that noise complaints are received.

Sincerely,

BRUCE S. ANDERSON, Ph.D.
Deputy Director for
Environmental Health

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1455 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

FRANK K. KAHOOHANOHANO
FIRE CHIEF
LIONEL C. CAMARA
DEPUTY FIRE CHIEF

June 24, 1988

Mr. Conrad Higashionna
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

SUBJECT: EIA - Wahiawa Mix Use Project (TMK 7-4-12:10 & 12)

We have reviewed the subject EIA and recommend you incorporate a sprinkler system into the apartment building plans and other structures to enhance fire protection for elderly residents. The "mid-rise" building shall meet with provisions of the Fire Code. We expect an increased demand on our services due to calls for medical co-response when ambulance service will be delayed or is not available, however, present and planned fire protection services and facilities are considered adequate.

We apologize for the tardiness of our response. Should you have any questions, please contact Battalion Chief Kenneth Word of our Administrative Services Bureau at 943-3838.

Sincerely,

FRANK K. KAHOOHANOHANO
Fire Chief

FKK/DF:sb

JOHN WAIHEE
GOVERNOR

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

ROBERT Y. TSUYEMURA
ACTING DEPUTY
TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

June 27, 1988

Mr. Conrad Higashionna
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment (EIA) for the
Wahiawa Mix Use Project
Department of Business and Economic Development
Housing Finance and Development Corporation
TMK: 7-4-12: 10 & 12 Wahiawa, Oahu
Area: 7.8 acres

The Department of Agriculture has reviewed the subject EIA and has no comments to offer.

Thank you for the opportunity to comment.

Sincerely,

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: DBED - (HFDC)
OEQC

GTE Hawaiian Tel

P.O. Box 2200
Honolulu, Hawaii 96841
Telephone (808) 546-4511

June 28, 1988

Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

ATTENTION: Mr. Conrad Higashionna

Dear Sir:

Environmental Impact Assessment Report for the
Wahiawa Mix Use Project
Wahiawa, Oahu, Hawaii
Tax Map Key: 7-4-12: 10 & 12

We have reviewed the Environmental Impact Assessment Report for the Wahiawa Mix Use Project and find that the proposed project would not have any adverse environmental effects on our existing facilities, nor do we foresee any problems in providing temporary and permanent telecommunication services to the site.

There are existing aerial facilities along California Avenue to provide service to the subdivision. Provisions for installation of new underground/aerial facilities across California Avenue to the proposed site should be included in the plans.

Thank you for the opportunity to comment on the project. If you have any questions or comments, please call me at 546-3646.

Sincerely,

Walter M. Matsumoto
Oahu Engineering and
Construction Manager

MKT/tk (nmy2274.ltr)

Attachment

OFFICE OF HUMAN RESOURCES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING, 6TH FLOOR
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • PHONE 523-4341

FRANK F. FASI
MAYOR

MARIA VICTORIA R. BUNYE
DIRECTOR

VICTOR D. GUILLERMO, JR.
DEPUTY DIRECTOR

June 29, 1988

Mr. Conrad Higashionna, Engineer
Pacific Planning and Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report for the Wahiawa Mix Use Project

I read this report with great interest. Affordable housing for families and elderly residents is of prime importance and is a priority need for Oahu.

This mixed use housing project is an excellent use of the site and will expand the inventory of badly needed affordable housing. It is accessible to schools, Wahiawa Hospital, and Wahiawa Recreation Center where senior citizen and family programs are available.

In planning for the elderly housing project, we have several recommendations. First, low income elderly applicants, preferably those who are Section 8 eligible or are on the public housing wait list, should be given priority.

Secondly, careful consideration should be taken on the selection of a management company to manage the project. The management firm should have a successful track record working with elderly residents and have personnel that are trained and knowledgeable about the needs of older people and how to relate to them with understanding and dignity.

Furthermore, because of the rainy environment in Wahiawa, a covered pick up area should be planned as part of the project to protect tenants as they wait for van or car pick up. Safety and convenience features designed for older and handicapped residents should also be included in the plans of the project.

Thank you for the opportunity to comment on this report. If there are any questions, please contact us.

Very truly yours,

MARIA VICTORIA R. BUNYE, Director
Office of Human Resources

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-00

ENV 2-1
JA/G

July 5, 1988

Mr. Conrad Higashionna
Pacific Planning & Engineering, Inc.
1144 Tenth Avenue, Suite 202
Honolulu, Hawaii 96816

Dear Mr. Higashionna:

Subject: Environmental Impact Assessment Report for the Wahiawa Mix Use Project Wahiawa, Oahu, Hawaii

We have reviewed the subject document and have no comments.

Sincerely,

for William A. Bonnet
Manager, Environmental
Department

An HEI Company

1567

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT K. LANDGRAF
DEPUTY

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

DOC.: 3744E
FILE: 88-538

JUL 6 1988

Mr. Conrad Higashionna, Engineer
Pacific Planning and Engineering, Inc.
1144 Tenth Ave., Suite 202
Honolulu, Hawaii 96816

SUBJECT: Environmental Impact Assessment Report for the Wahiawa Mixed Use Project, Wahiawa, Oahu, Hawaii
TMK: 7-4-12: 10 & 12

Dear Mr. Higashionna:

Thank you for giving our Department the opportunity to comment on this matter.

We have reviewed the materials you submitted and have no comment.

Thank you again for your cooperation in this matter. Please feel free to call me or Jay Lembeck at our Office of Conservation and Environmental Affairs, at 548-7837, if you have any questions.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources