



DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
 COUNTY OF MAUI

RECEIVED

196
 LINDA CROCKETT LINGLE
 Mayor
 STEPHANIE AVEIRO
 Director
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 Deputy Director

200 SOUTH HIGH STREET, WAILUKU, HAWAII 96793

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August 8, 1994
 OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Brian J.J. Choy
 Office of Environmental
 Quality Control
 220 South King Street, 4th Floor
 Honolulu, Hawaii 96813

SUBJECT: Hale Mahaolu Elima
 TMK 3-8-7:por. 11
 Kahului, Maui, Hawaii

Dear Mr. Choy:

In accordance with the requirements of Chapter 343, Hawaii Revised Statutes, and Chapter 200 of Title 11, Administrative Rules, a Final Environmental Assessment has been prepared for the subject project.

Notice of availability of the Draft Environmental Assessment for the project was published in the June 23, 1994 OEQC Bulletin. No comment letters were received during the public review period.

As the approving agency, we are forwarding herewith one (1) copy of the OEQC Bulletin Publication Form, and four (4) copies of the Final Environmental Assessment. We have determined that there will be no significant impacts as a result of the project and, therefore, are filing the Final Environmental Assessment as a negative declaration. We respectfully request that the notice of Final Environmental Assessment be published in the OEQC Bulletin.

Very truly yours,

Stephanie Aveiro
 Stephanie Aveiro

SA:llt
 Enclosures
 cc: Roy Katsuda, Hale Mahaolu
 Vanessa Medeiros, Hale Mahaolu
 Milton Arakawa, Munekiyo & Arakawa, Inc.
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1994-08-23-MA-FEA-Hale Mahaolu
Elima Elderly Rental Housing

AUG 23 1994

**Final
Environmental Assessment**

Hale Mahaolu Elima

Prepared for

Hale Mahaolu Elima, Inc.

August 1994



***Final
Environmental Assessment***

Hale Mahaolu Elima

Prepared for

Hale Mahaolu Elima, Inc.

August 1994



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Preface

Hale Mahaolu Elima, Inc. proposes to construct the Hale Mahaolu Elima project, an elderly affordable rental project in Kahului, Maui, Hawaii (TMK 3-8-7:por.111). Adult day care and/or related services or uses may also be included within the project. Pursuant to Chapter 343, Hawaii Revised Statutes, and Chapter 200 of Title 11, Administrative Rules, Environmental Impact Statement Rules, this Final Environmental Assessment (EA) documents the project's technical characteristics and environmental impacts, and advances findings and conclusions relative to the significance of the project.

Summary

Applicant and Landowner

The Applicant for the proposed project is Hale Mahaolu Elima, Inc. The landowner of the property is the County of Maui.

Property Location and Description

South Kamehameha Avenue abuts the project site's western border. Located further west are vacant undeveloped lands. To the north of the project site is the Luana Gardens III multi-family development. To the east of the project site is the existing Luana Gardens I single family residential area. Vacant lands are located south of the project site.

The subject property is approximately 3.539 acres in size and is currently vacant. Existing vegetation on the site includes kiawe, false koa, common grasses and weeds.

Proposed Action

The proposed project includes up to 60 townhome units, 59 of which are one-bedroom units with one (1) two-bedroom manager's unit.

There are nine (9) single-level structures with a single three-story structure. There are six (6) townhome structures, each containing six (6) one-bedroom units. A single-level townhome structure containing four (4) units also includes the manager's unit and maintenance/storage space. A three-level townhome structure contains twenty (20) units with eight (8) units on each of the first two (2) floors and four (4) units on the third floor. An approximately 2,472 square foot community building containing a central laundry, office, kitchen, and social hall, is also proposed. The adult day care center and/or related services or uses is anticipated to be a single-level facility comprising approximately 6,000 square feet of similar design to the community center structure.

All units in the project would be designed to be accessible to persons with disabilities, including those persons in wheelchairs.

The use of Federal funds for construction of the project has been awarded to Hale Mahaolu Elima, Inc. for 40 units. Additional sources of Federal funding are being sought for 20 more units. The units within the project are proposed to be rented to elderly tenants who would pay a maximum of 30 percent of adjusted gross income toward their monthly payment. Federal Section 8 rental subsidies are intended to pay for a portion of the project's operating costs.

With regard to the provision of parking, there are up to 62 resident and guest parking stalls to service up to 60 townhome units and the community building. For the adult day care facility and/or related services or uses, an additional 24 parking stalls will be built.

Since Federal funds and County lands are involved, an Environmental Assessment (EA) is being prepared in compliance with the National Environmental Policy Act (NEPA) and Chapter 343, HRS.

In accordance with Chapter 201E-210, HRS, waivers or exemptions from certain planning, zoning, building and construction standards are being requested.

Findings and Conclusions

The Hale Mahaolu Elima Project would provide much needed elderly affordable housing in the Wailuku-Kahului region. The project would be developed by Hale Mahaolu Elima, Inc. There is a significant community need for affordable housing as evidenced by the extensive waiting list of people for units at existing Hale Mahaolu projects.

The proposed project will involve earthwork and building construction activities. In the short term, these activities may generate temporary nuisances normally associated with construction activities. However, dust control measures, such as regular watering and sprinkling, will be implemented, as needed, to minimize wind-blown emissions. All construction activities are anticipated to be limited to normal daylight working hours. Impacts generated from construction activities are not considered adverse.

From a long-term environmental perspective, the proposed project is not anticipated to result in adverse environmental impacts. The property has been subject to previous ground disturbing activities. Subsurface archaeological investigations on adjoining properties have not yielded any cultural materials. There are no surface indications that significant archaeological remains exist on the property. Should any unanticipated remains be uncovered during construction, work in the immediate area will be halted and the State Historic Preservation Office will be notified. In terms of visual resources, the proposed project would be aesthetically integrated with surrounding properties.

It is anticipated that the project will not have a significant impact on recreational and social services because of the relatively small number of units in the project. Moreover, elderly patrons may utilize programs offered by the County of Maui regardless of whether they live in the project or other places. Should the adult day care facility be included in the project, this will represent a significant addition to addressing social service needs in the Central Maui area.

The proposed project is not anticipated to generate a significant amount of vehicular trips. Project-generated trips are likely to be interspersed throughout the course of a normal day. Moreover, project traffic would have access to Hoomoku Street which connects with South Kamehameha Avenue as well as Papa Avenue. Connection to the County water system is proposed. The project is not anticipated to have a significant impact upon the County's water source, storage and transmission system. Runoff from the project is anticipated to be transported to an existing sump at Papa Avenue and Pomaikai Street. Projected cumulative flows would not exceed the design capacity of the sump. The project is also anticipated to connect with the County sewer system. An allocation of wastewater capacity will be coordinated with the Department of Public Works and Waste Management. The project should not have any significant adverse impacts to roadway, water, drainage, and wastewater systems.

In addition, the project is not anticipated to have adverse impacts upon medical, police and fire protection services as well as other infrastructure systems.

In light of the foregoing findings, it is concluded that the proposed action will not result in any significant impacts.

Chapter 1

Project Overview

PROJECT OVERVIEW

A. PROPERTY LOCATION, EXISTING USE AND LAND OWNERSHIP

The applicant, Hale Mahaolu Elima, Inc., proposes to construct the Hale Mahaolu Elima Project, an elderly low/moderate income housing project in Kahului, Maui, Hawaii (TMK: 3-8-7:por. 111). See Figure 1 and Figure 2. Hale Mahaolu Elima, Inc. is also pursuing the possibility of including an adult day care facility and/or related services or uses as part of the project.

To the north of the site is the Luana Gardens III multi-family development. To the east of the project site is the existing Luana Gardens Phase I single-family residential subdivision. Vacant lands are located to the south and west of the project site.

The subject property is approximately 3.539 acres in size and is currently vacant. Existing vegetation includes kiawe, false koa, common grasses and weeds.

The County of Maui is the owner of the subject property. The property is currently part of the larger Luana Gardens III tax map parcel. It is intended that a separate tax map parcel be created for the Hale Mahaolu Elima project site. Approval must be obtained from the Farmers Home Administration to release the 3.539-acre site from the existing mortgage for Luana Gardens III. Once a release is obtained, Hale Mahaolu Elima, Inc. intends to enter into a lease of the land from the County of Maui.

B. PROJECT NEED

The proposed project would provide much needed elderly affordable housing in the Central Maui region. Hale Mahaolu Elima, Inc. is a private, non-profit housing corporation formed to develop the project. Hale

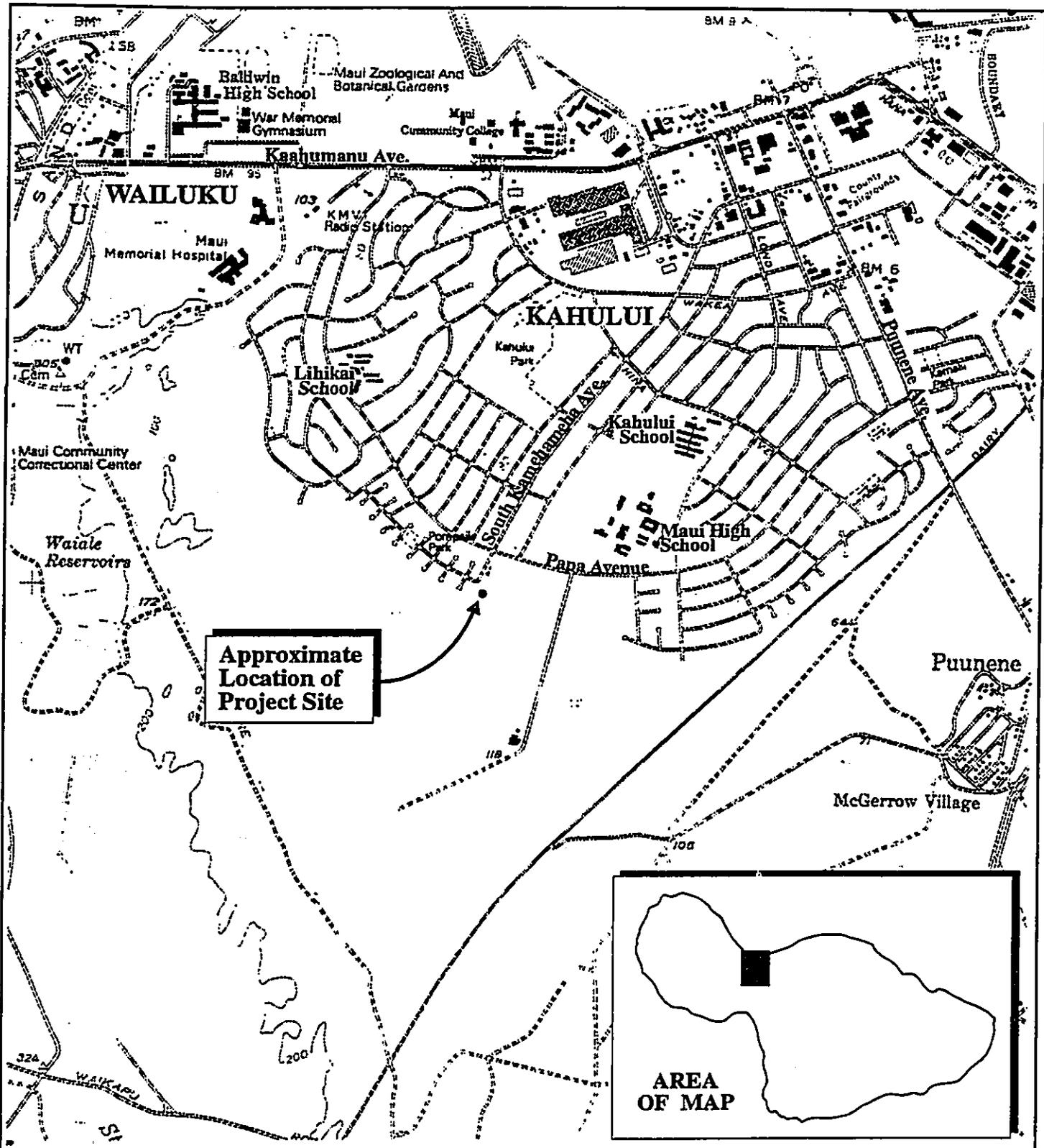
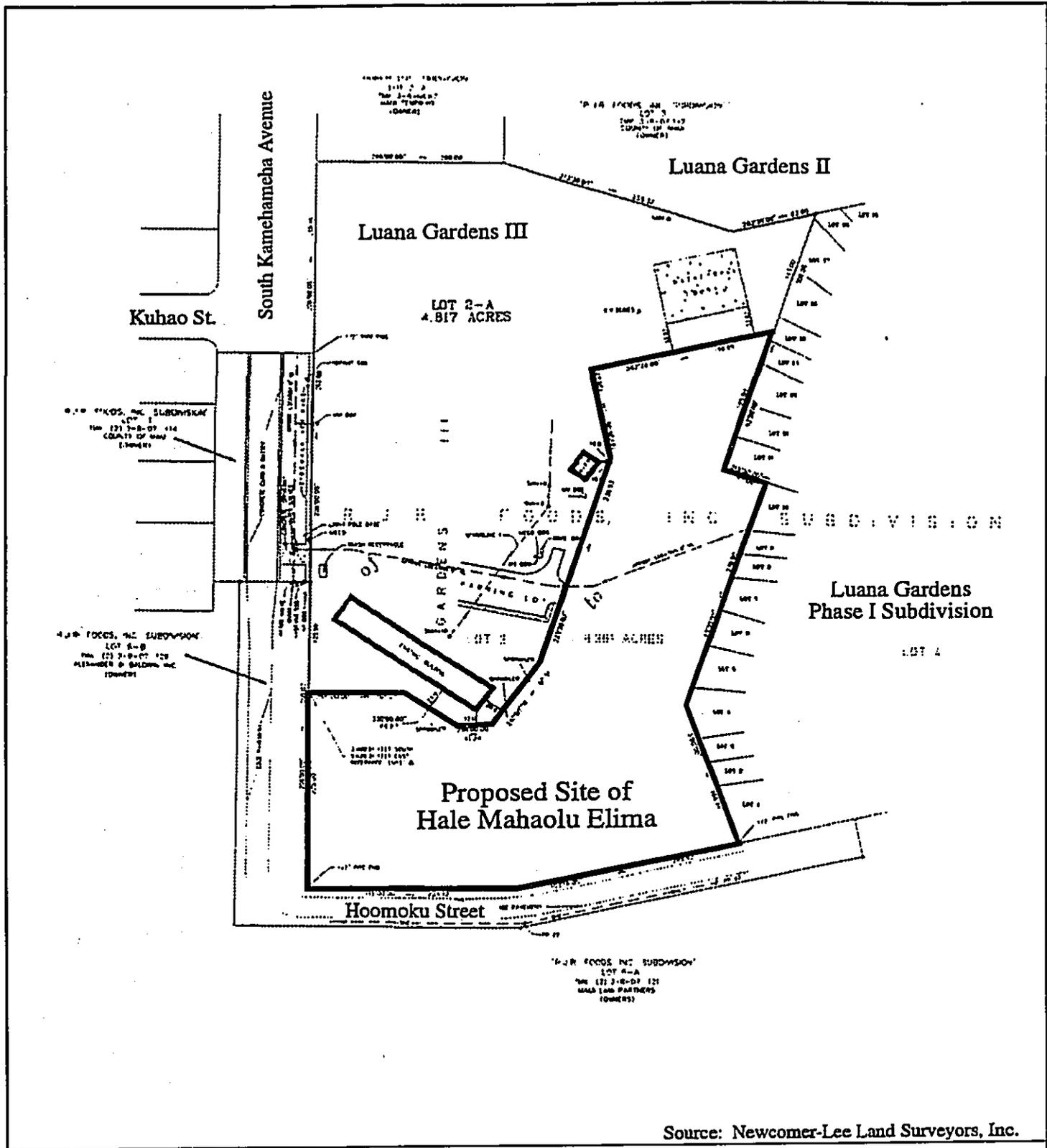


Figure 1 Hale Mahaolu Elima
Regional Location Map



Prepared for: Hale Mahaolu Elima, Inc.



Source: Newcomer-Lee Land Surveyors, Inc.

Figure 2 Hale Mahaolu Elima
Location Map



Prepared for: Hale Mahaolu Elima, Inc.

NOT TO SCALE

Mahaolu, a closely related but separate private non-profit housing corporation, would manage the affordable housing project. Hale Mahaolu Elima, Inc. was formed since Federal Department of Housing and Urban Development provisions require a separate development entity in order to utilize Federal funding.

There are three (3) existing Hale Mahaolu Projects in the Central Maui region. Two projects are in the Kahului area and the remaining project is in Waiehu. The Kahului projects, Hale Mahaolu Akahi and Elua, have maintained substantial waiting lists of prospective tenants desiring to live in the existing facilities. The Waiehu Ekolu project was completed in November 1992 and is fully rented with a growing waiting list as well.

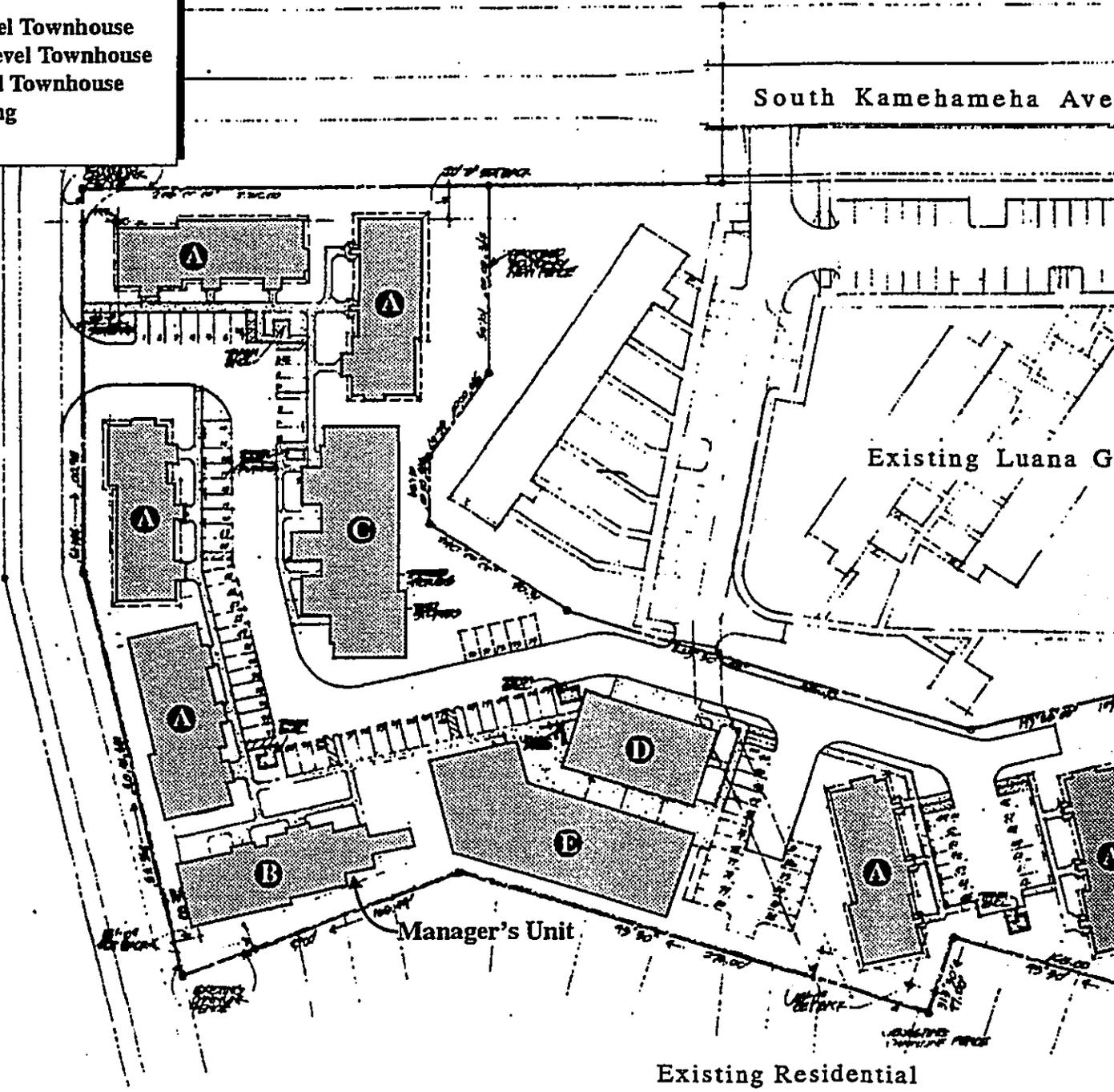
The possibility of including an adult day care facility and/or related services or uses is also being discussed with Maui Adult Day Care Centers in order to establish a permanent home for its facility (currently located in Puunene). Its current facility is located in substandard structures at the old Puunene School site.

C. PROPOSED IMPROVEMENTS

The proposed project includes up to 60 townhome units, 59 of which are one-bedroom units with one (1) two-bedroom manager's unit.

There are nine (9) single-level structures with a single three-story structure. See Figure 3. There are six (6) townhome structures, each containing six (6) one-bedroom units. See Figure 4 and Figure 5. A single-level townhome structure containing four (4) units also includes the manager's unit and maintenance/storage space. See Figure 6. A three-level townhome structure contains twenty (20) units with eight (8) units on

- KEY**
- Ⓐ Six Unit, Single-level Townhouse
 - Ⓑ Four Unit, Single-level Townhouse
 - Ⓒ 20 Unit, Three-level Townhouse
 - Ⓓ Community Building
 - Ⓔ Adult Day Care



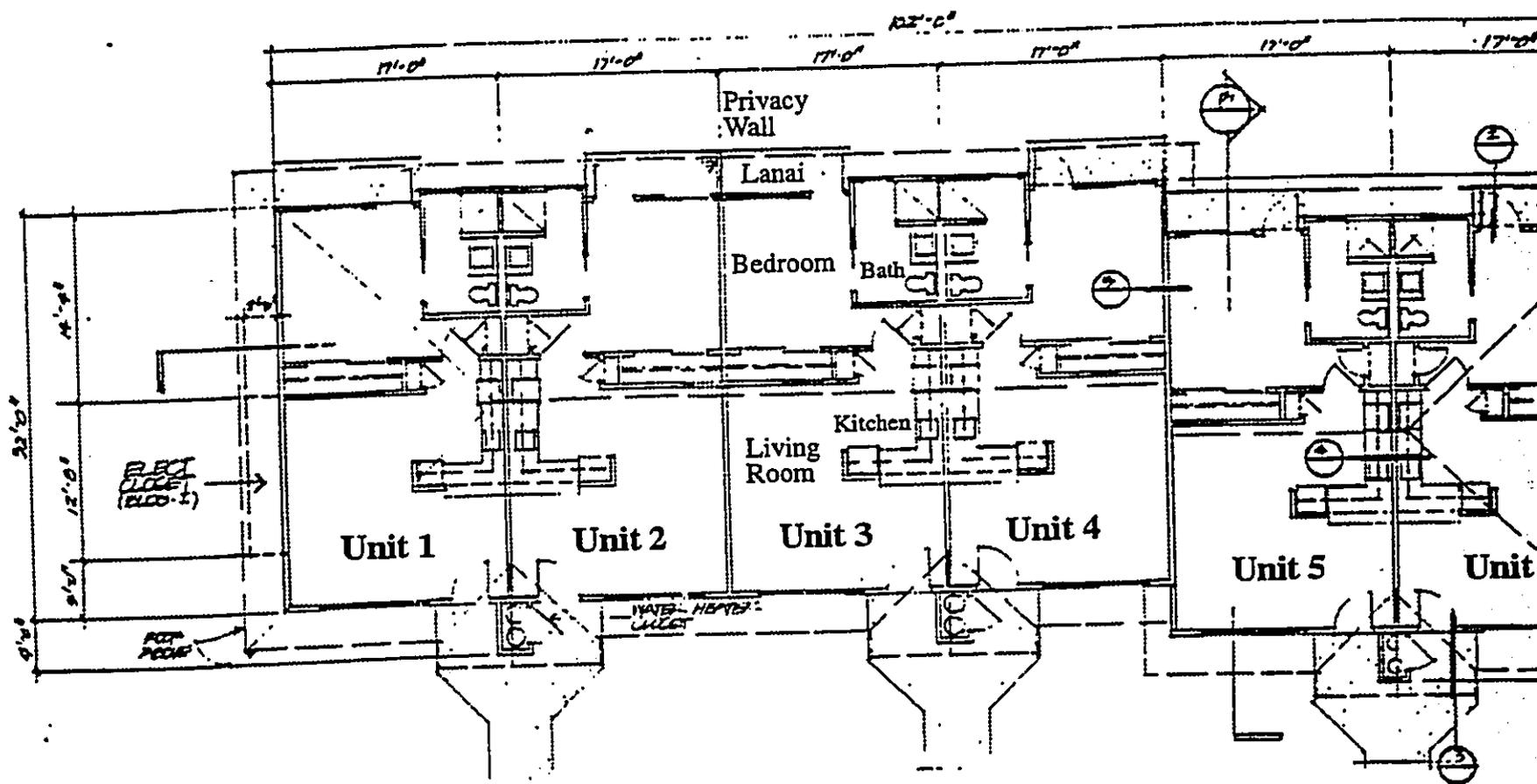
Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 3

Hale Mahaolu Elima
Site Plan



Prepared for: Hale Mahaolu Elima, Inc.

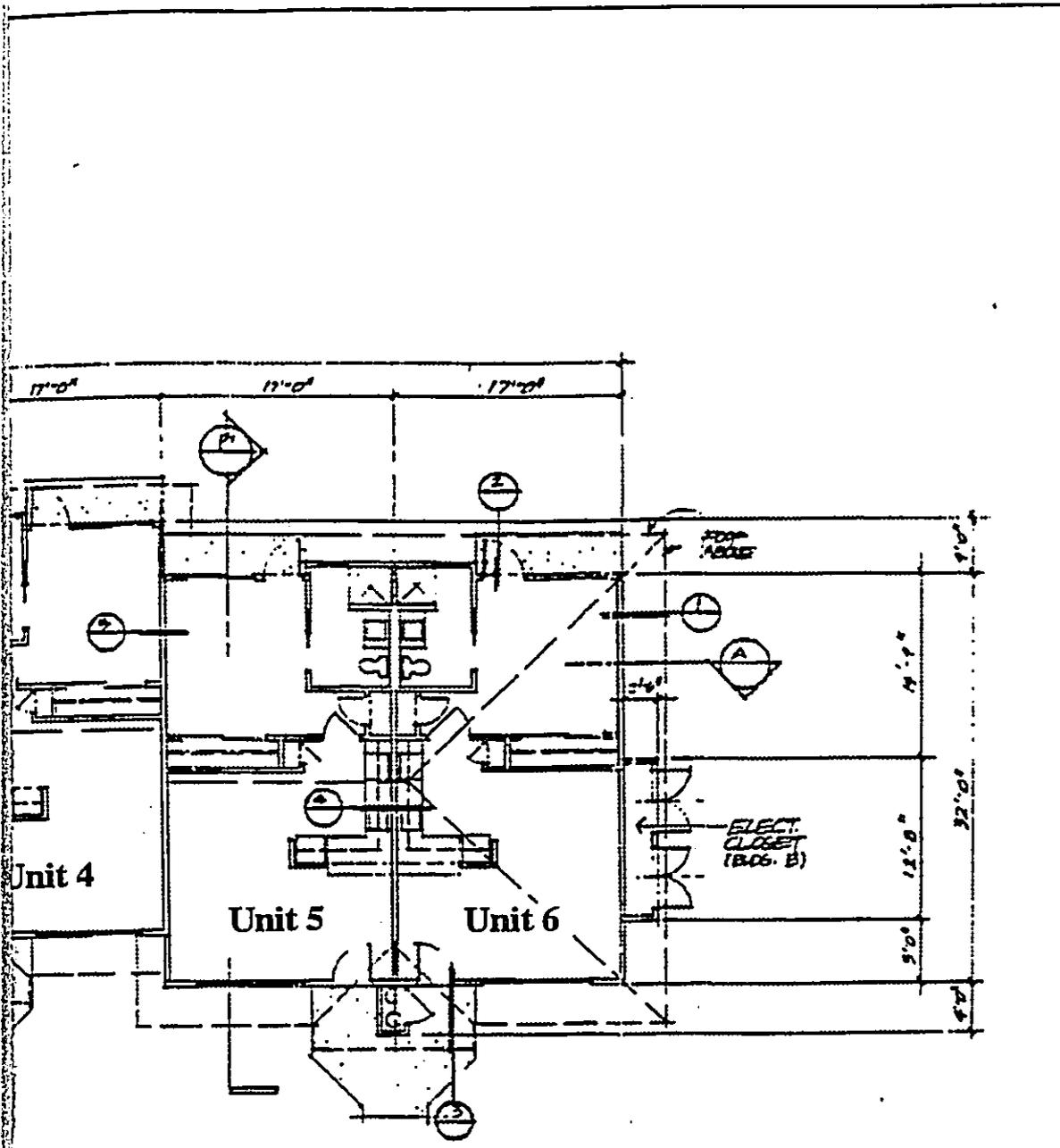


Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 4

Hale Mahaolu Elima
 Typical Six Unit Townhouse Floor Plan

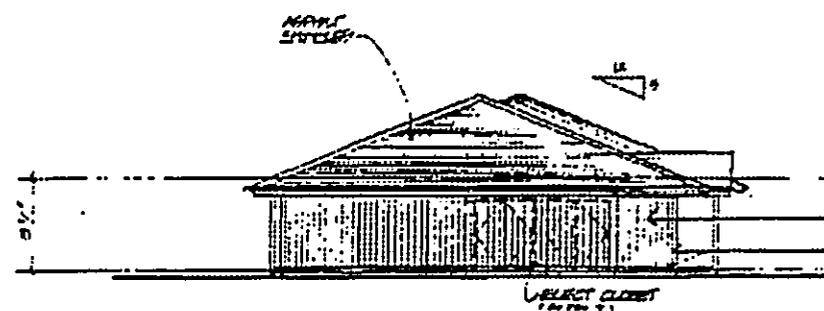
Prepared for: Hale Mahaolu Elima, Inc.



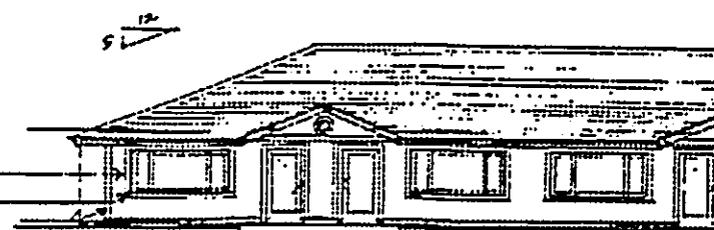
Maolu Elima
Townhouse Floor Plan



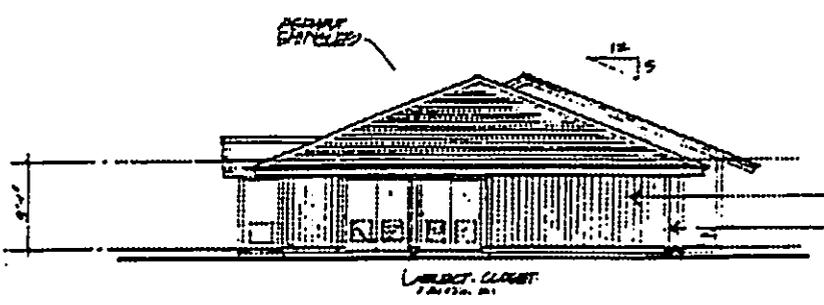
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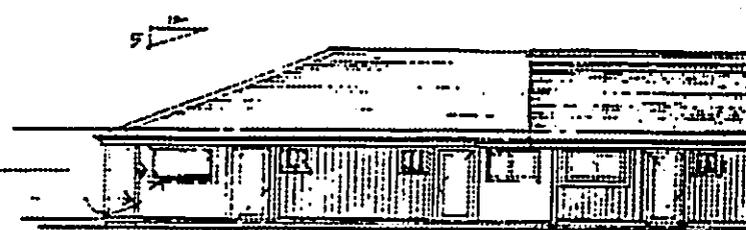
Left Side Elevation



Front Elevation



Right Side Elevation



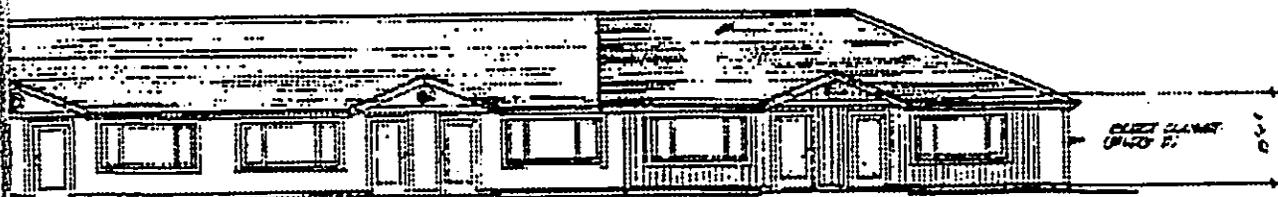
Rear Elevation

Source: Hiyakumoto & Higuchi Architects, Inc.

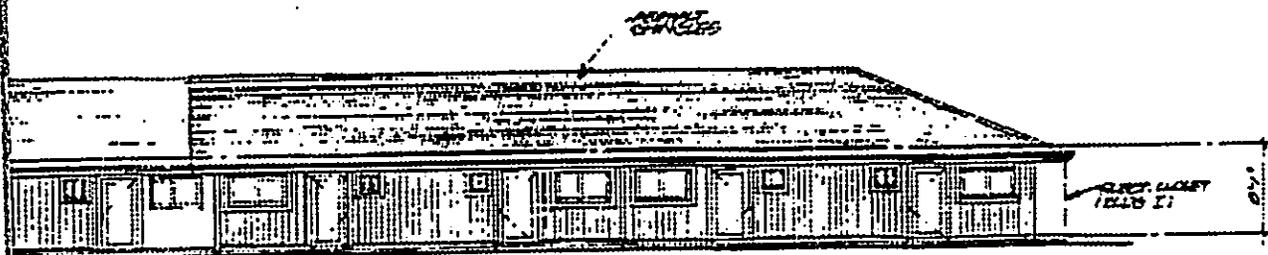
Figure 5

Hale Mahaolu Elima
Typical Six Unit Townhouse Elevation

Prepared for: Hale Mahaolu Elima, Inc.



Front Elevation

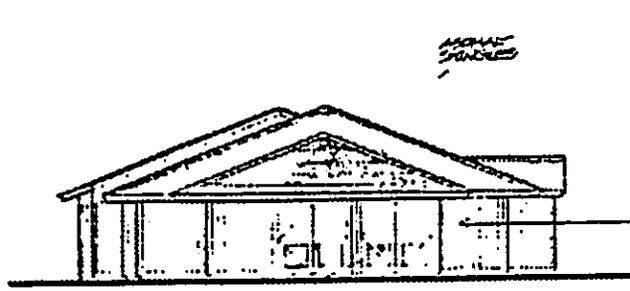


Rear Elevation

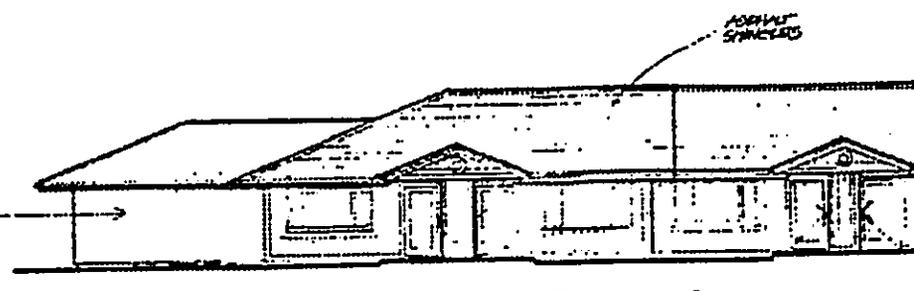
Maolu Elima
Townhouse Elevations



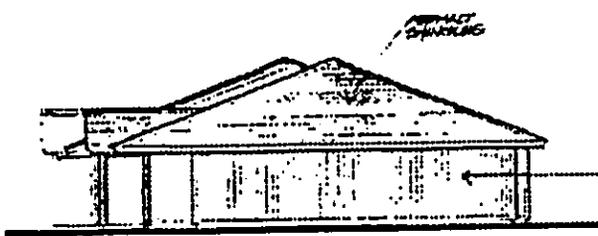
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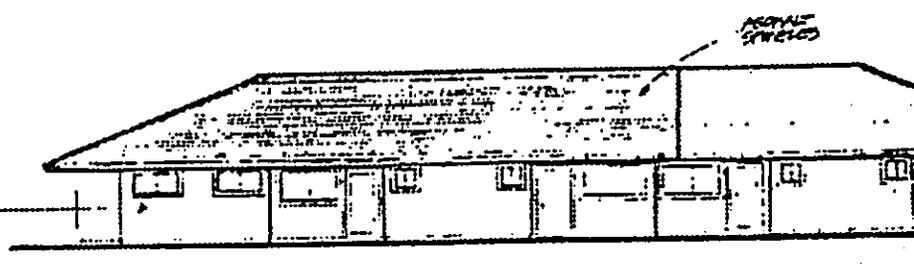
Left Side Elevation



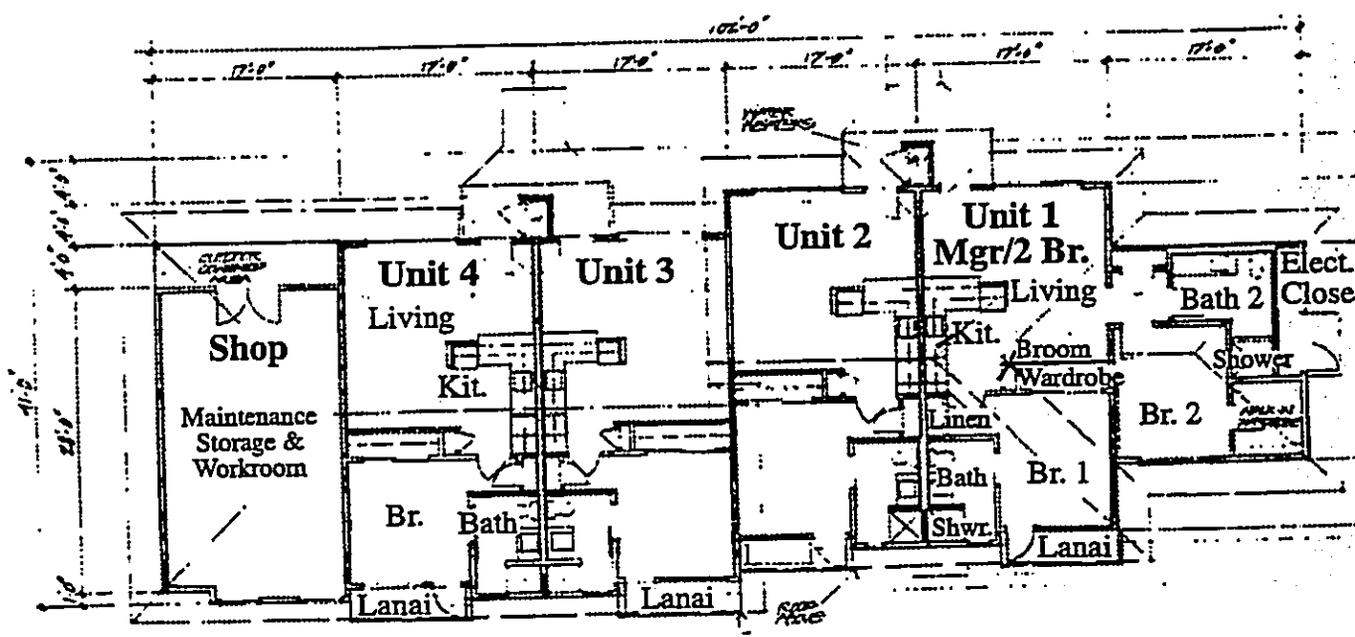
Front Elevation



Right Side Elevation



Rear Elevation

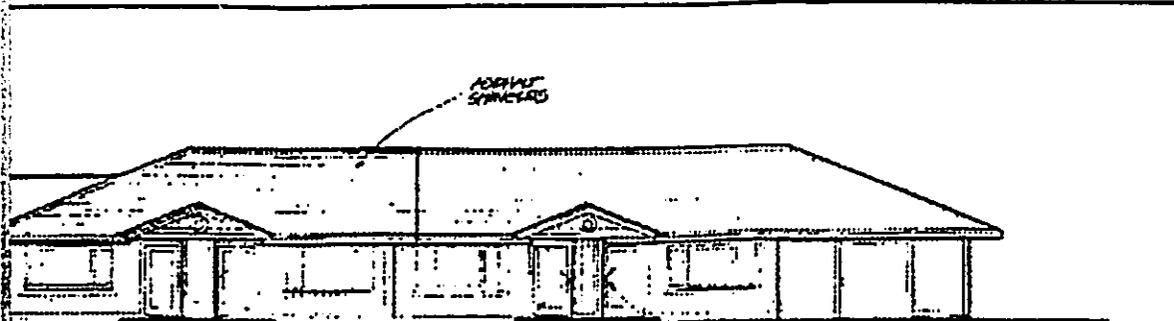


Source: Hiyakumoto & Higuchi Architects, Inc.

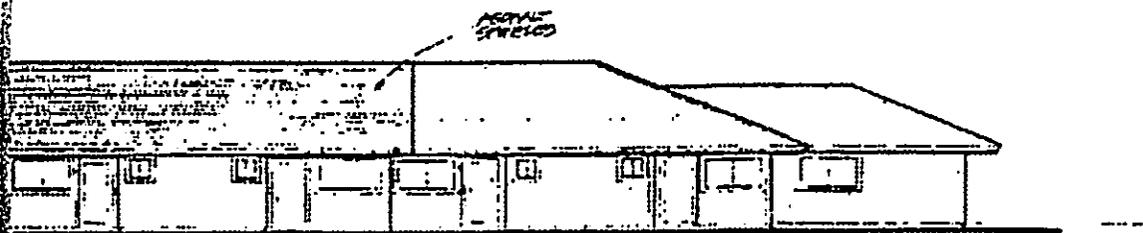
Figure 6

Hale Mahaolu Elima
 Four Unit Townhouse - Floor Plan and Elevations

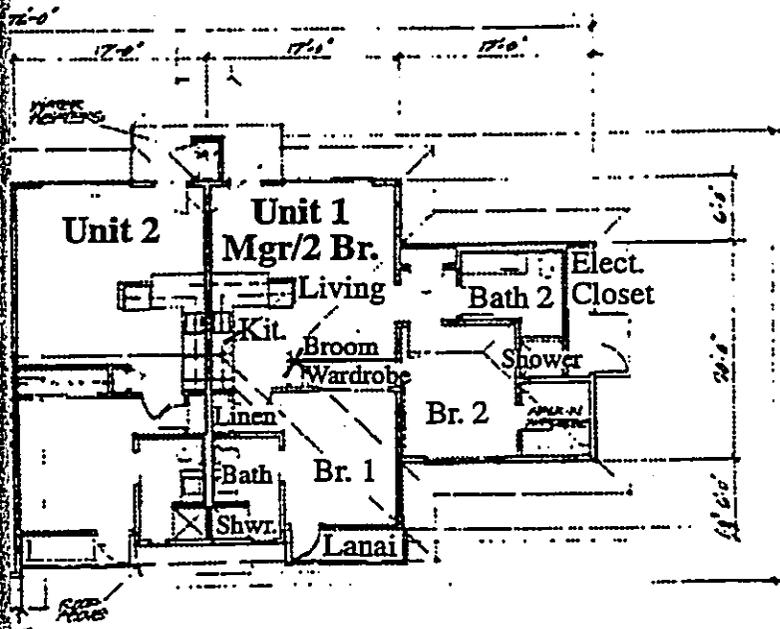
Prepared for: Hale Mahaolu Elima, Inc.



Front Elevation



Rear Elevation



haolu Elima
 Floor Plan and Elevations



NOT TO SCALE

each of the first two (2) floors and four (4) units on the third floor. See Figure 7 and Figure 8 and Figure 9. An approximately 2,472 square foot community building containing a central laundry, office, kitchen, and social hall, is also proposed. See Figure 10 and Figure 11. The adult day care center and/or related services or uses is anticipated to be a single-level facility comprising approximately 6,000 square feet of similar design to the community center structure.

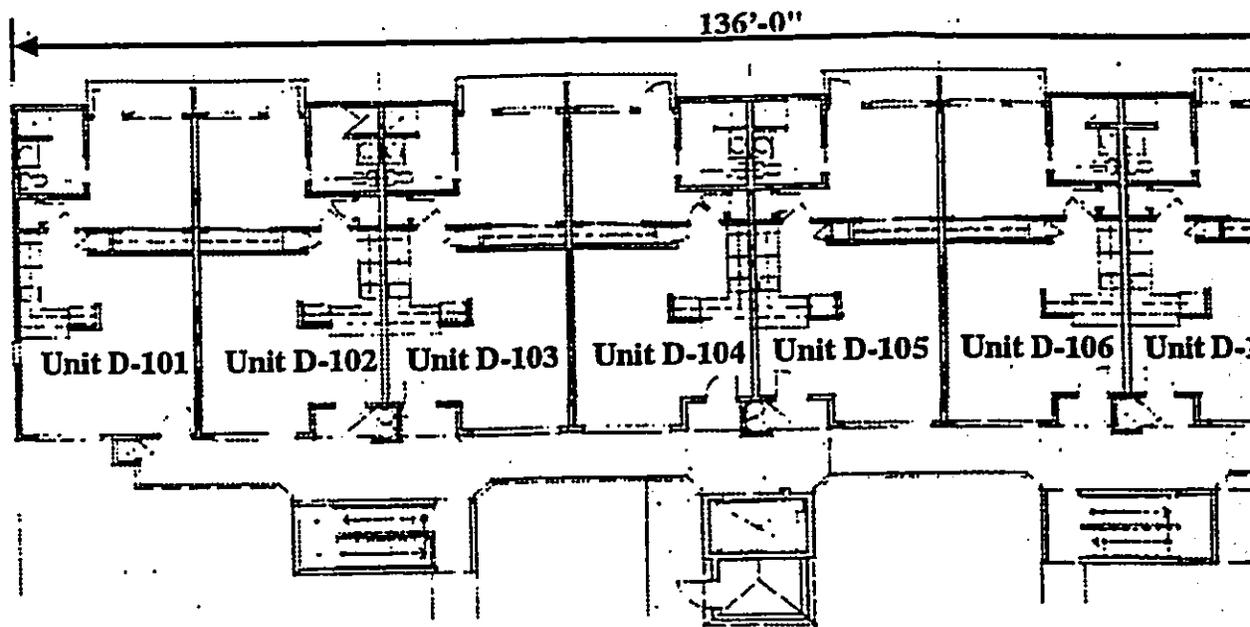
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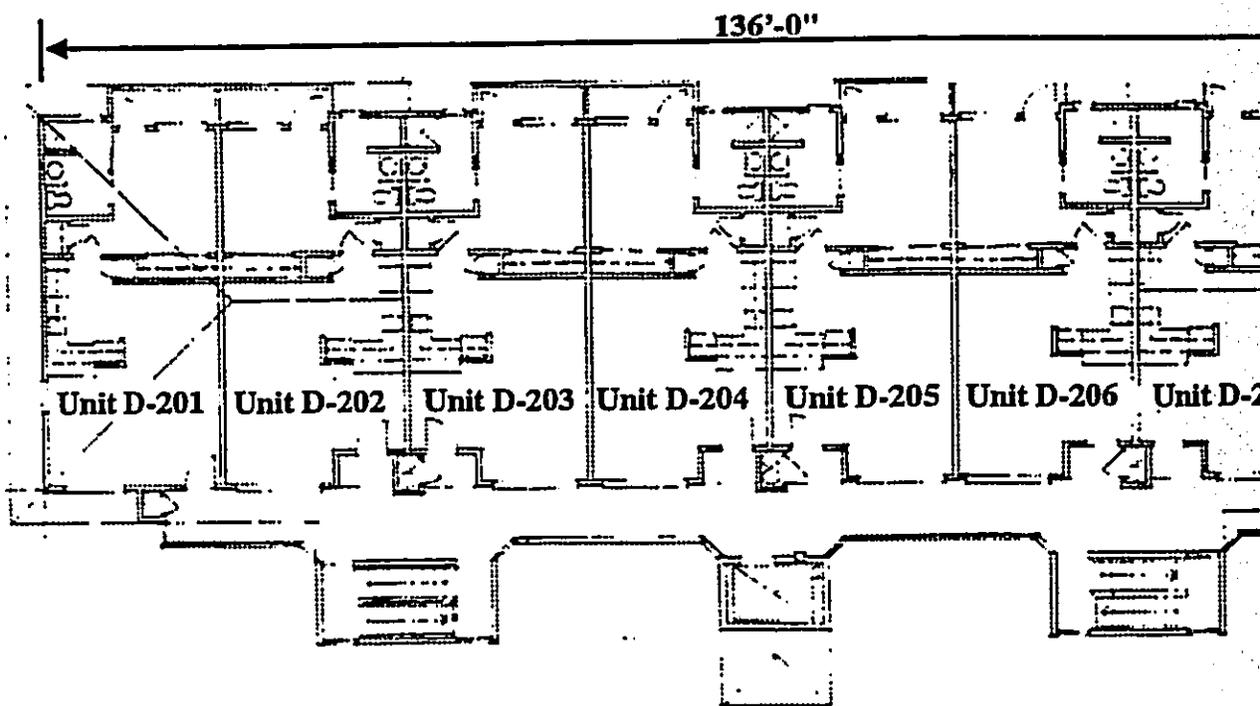
With regard to the provision of parking, there are up to 62 resident and guest parking stalls to service up to 60 townhome units and the community building. For the adult day care facility and/or related services or uses, an additional 24 parking stalls will be built.

Since Federal funds and County lands are involved, an Environmental Assessment (EA) is being prepared in compliance with the National Environmental Policy Act (NEPA) and Chapter 343, HRS.

First Floor Plan



Second Floor Plan



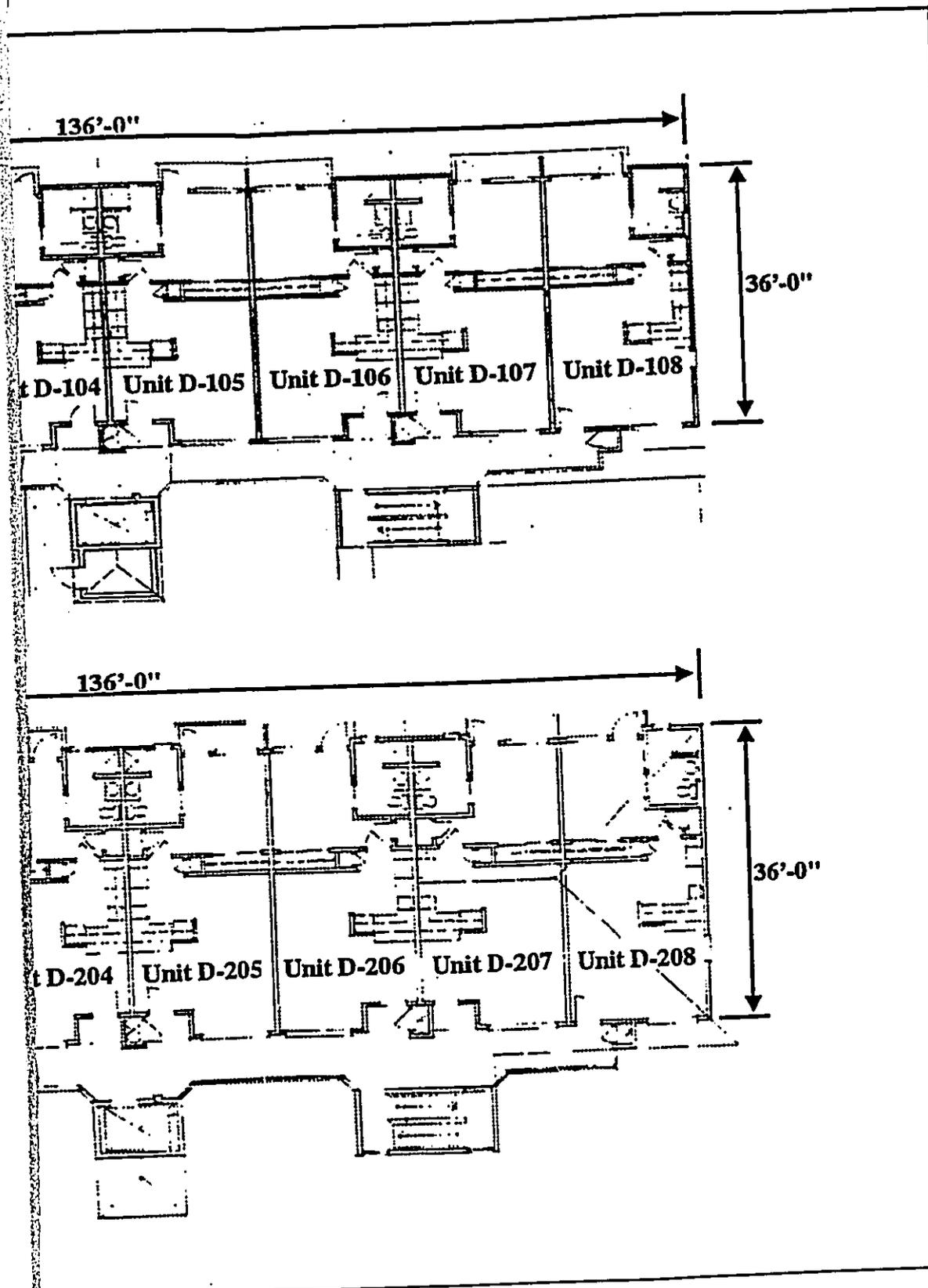
Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 7

Hale Mahaolu Elima

Twenty Unit Townhouse - First and Second Floor Plans

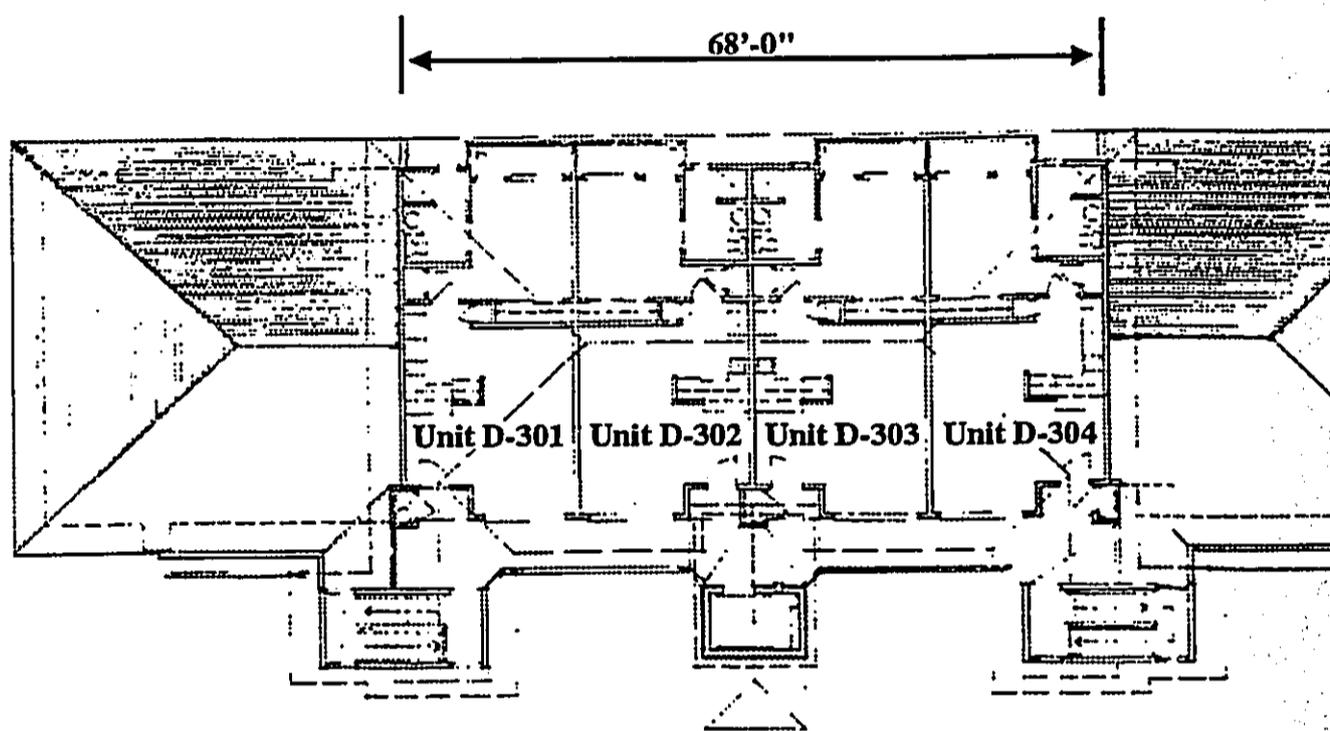
Prepared for: Hale Mahaolu Elima, Inc.



Maolu Elima
First and Second Floor Plans



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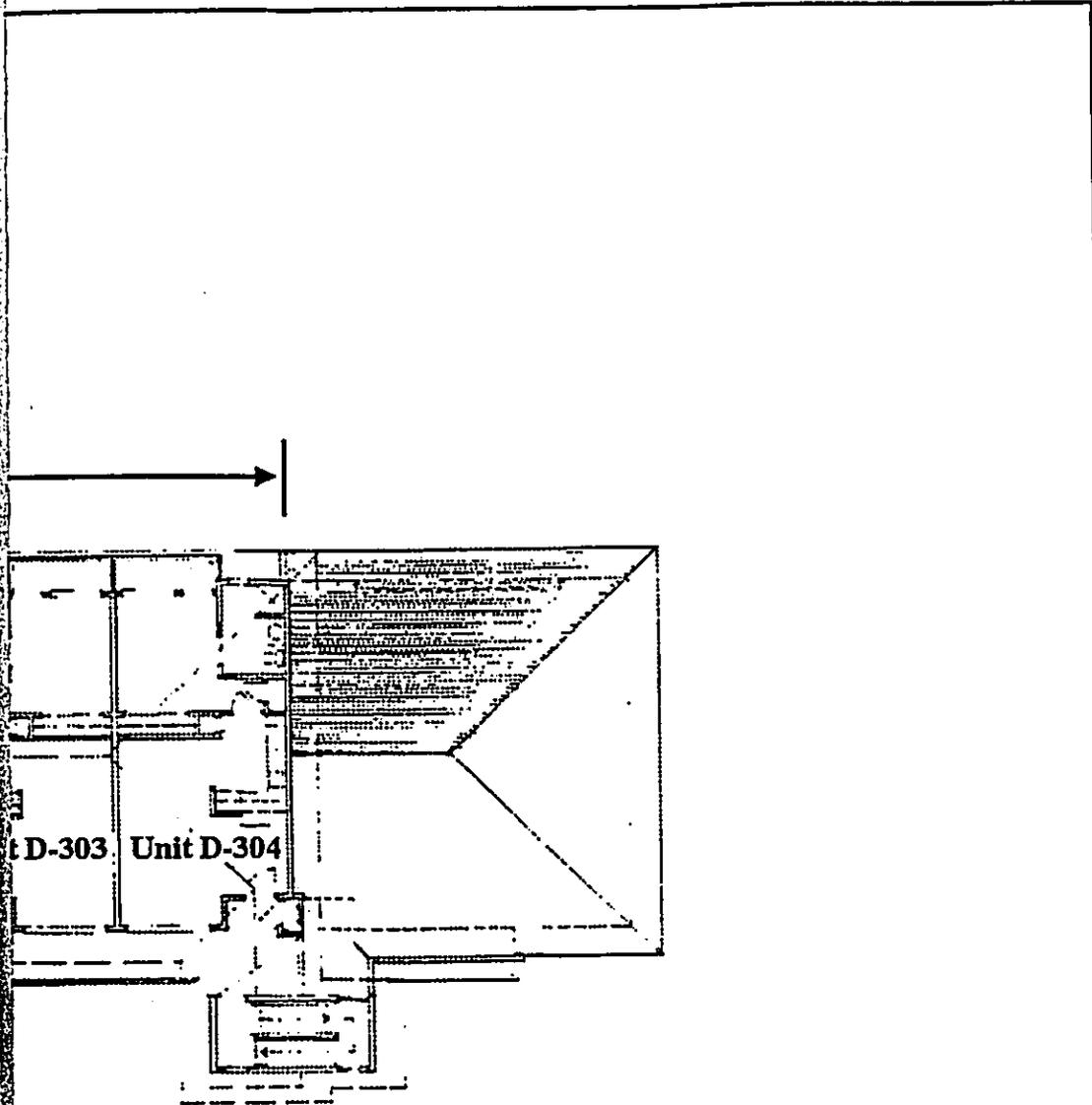
Third Floor Roof Plan

Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 8

Hale Mahaolu Elima
Twenty Unit Townhouse - Third Floor Plan

Prepared for: Hale Mahaolu Elima, Inc.

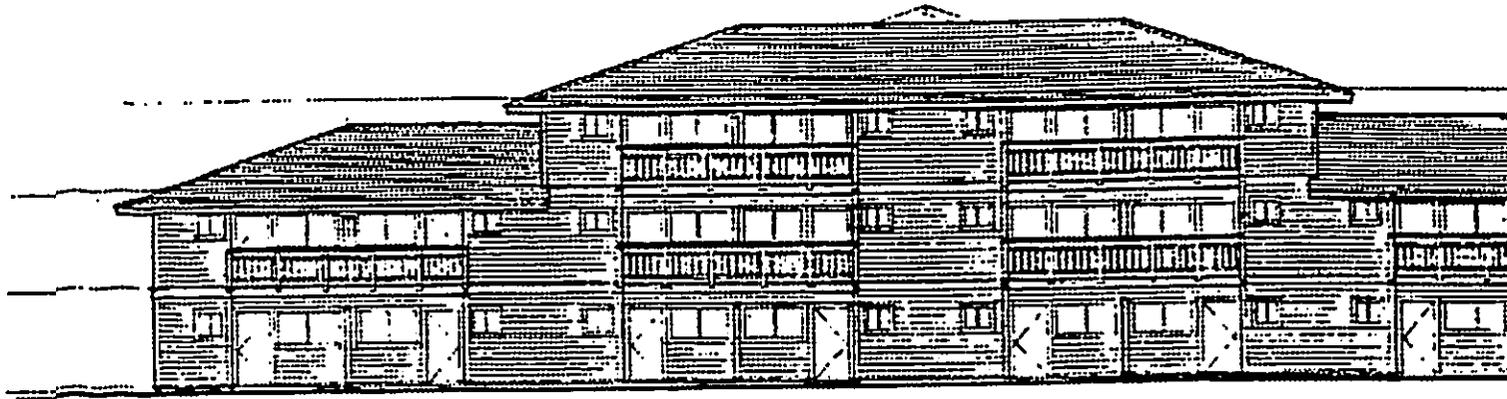


of Plan

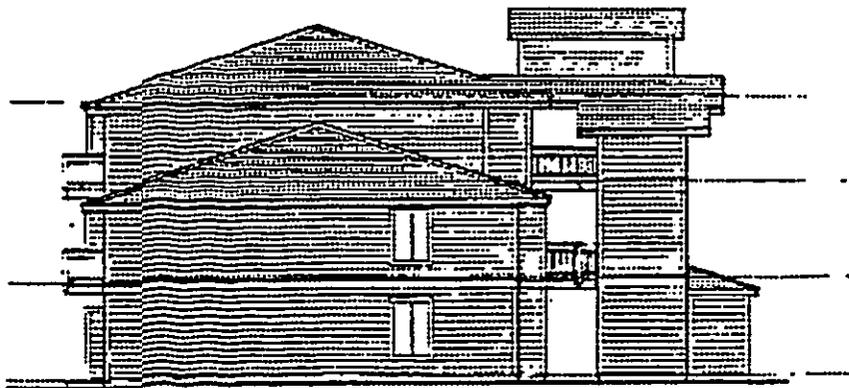
olu Elima
se - Third Floor Plan



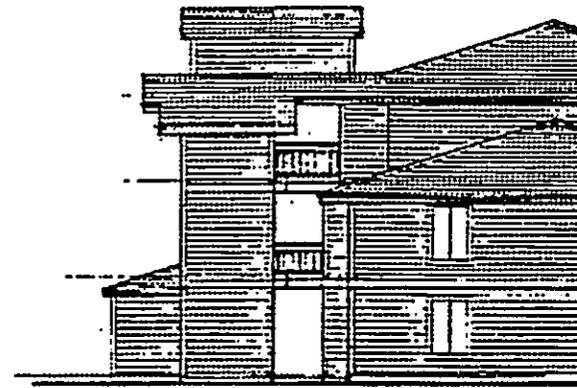
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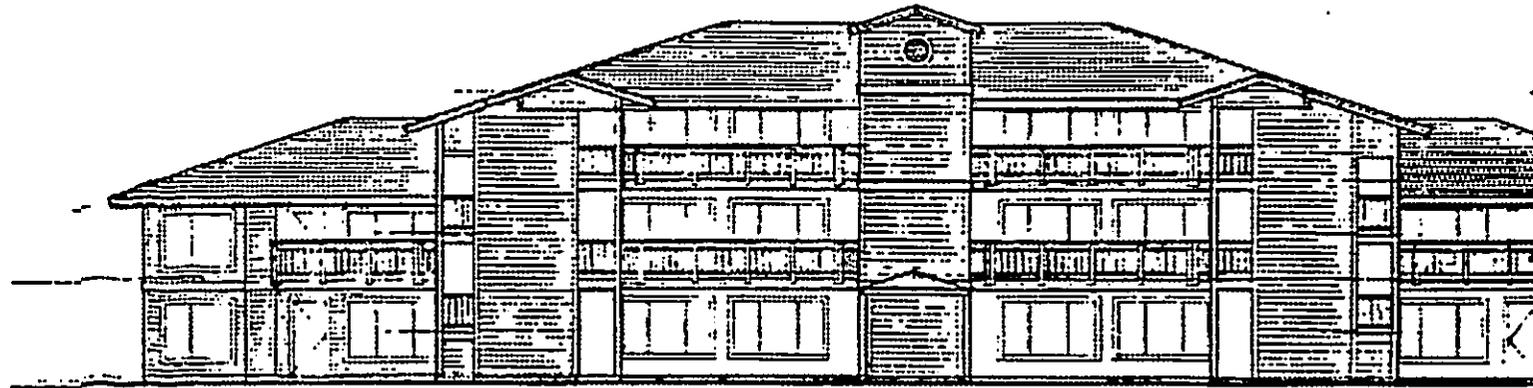
Front Elevation



Left Elevation



Right Elevation



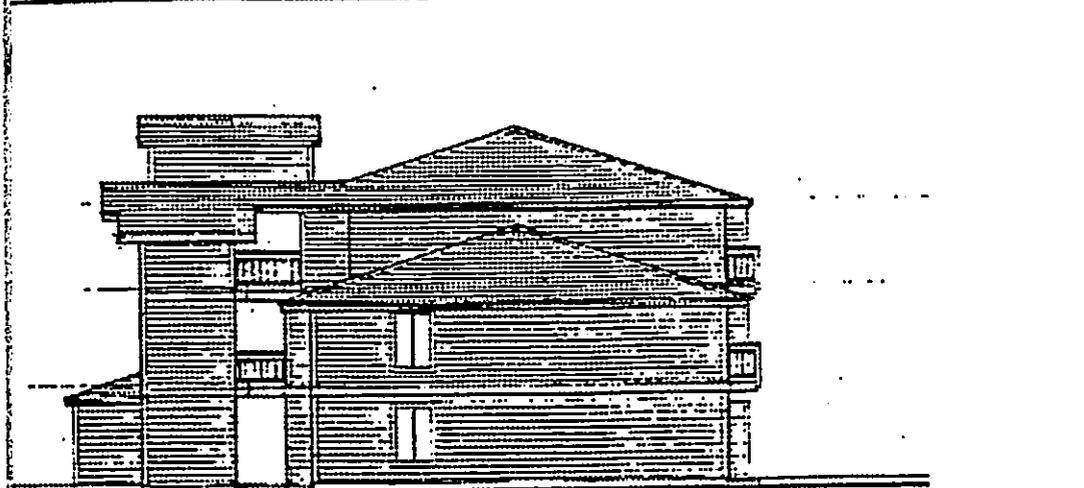
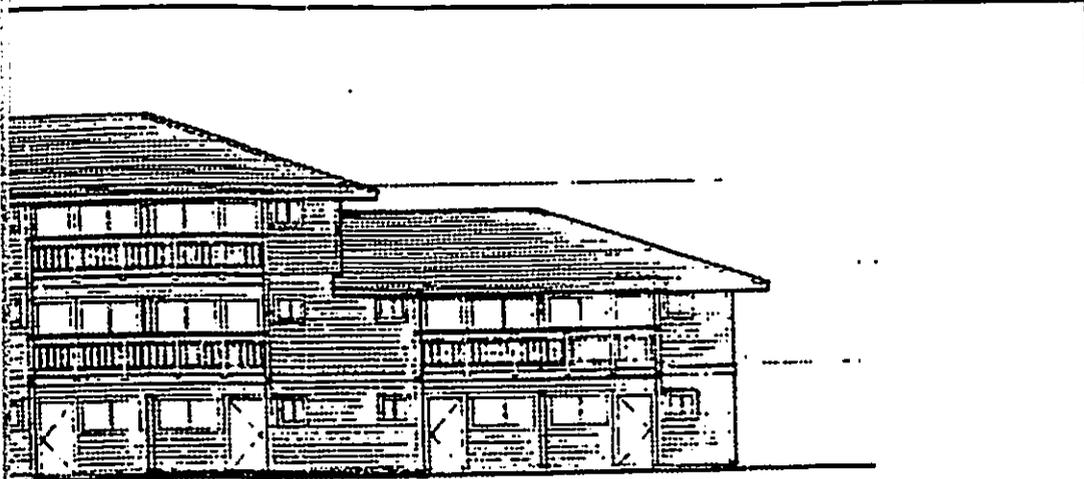
Rear Elevation

Source: Hiyakumoto & Higuchi Architects, Inc.

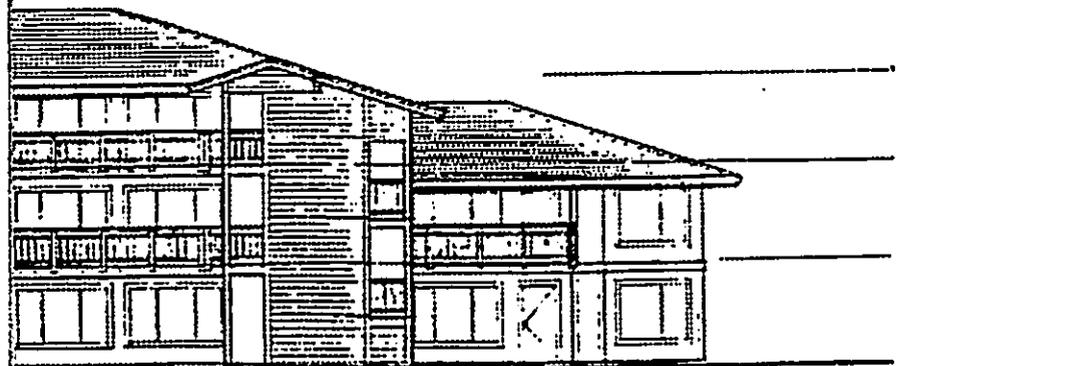
Figure 9

Hale Mahaolu Elima
Twenty Unit Townhouse - Elevations

Prepared for: Hale Mahaolu Elima, Inc.



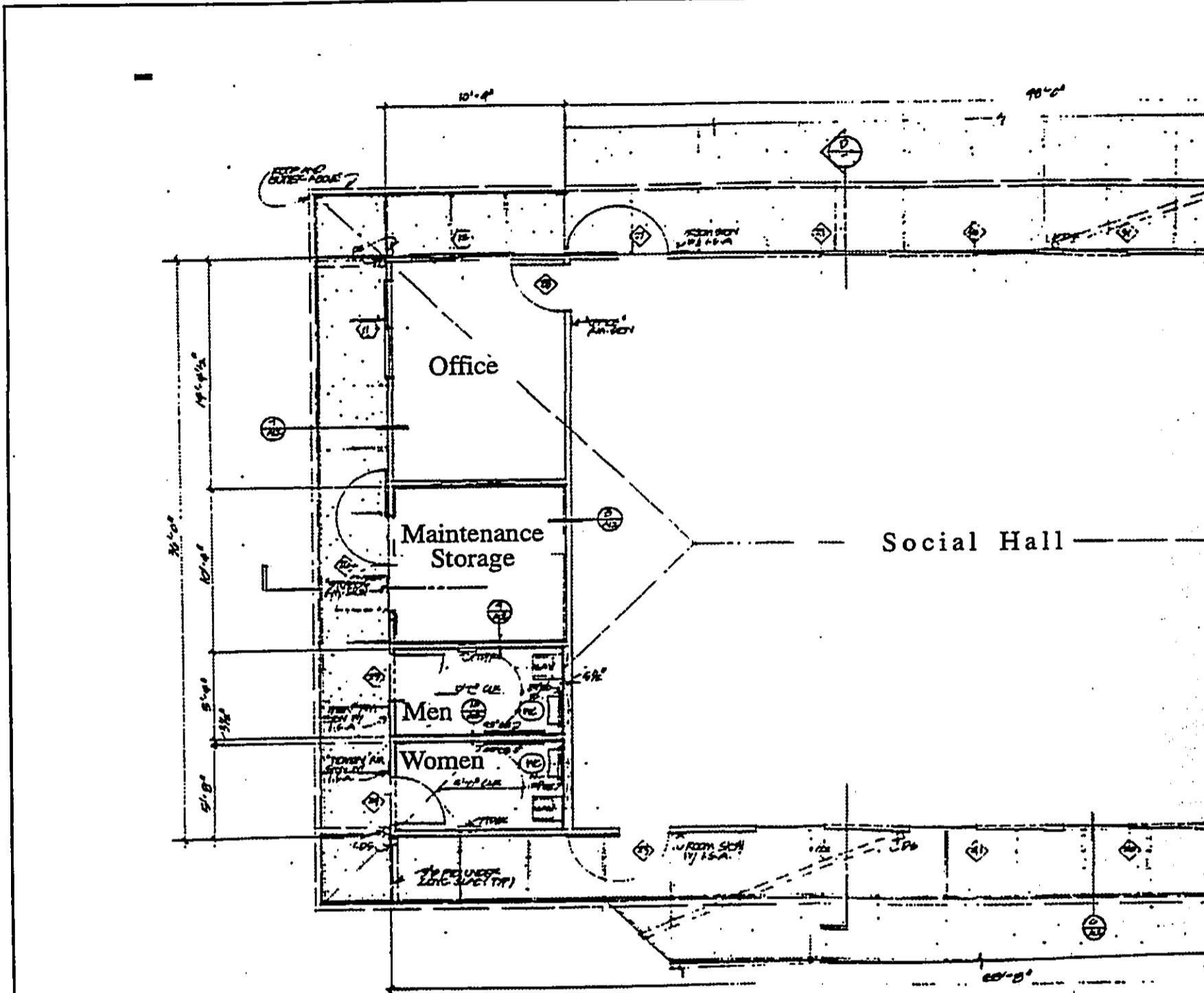
Right Elevation



Elima
House - Elevations



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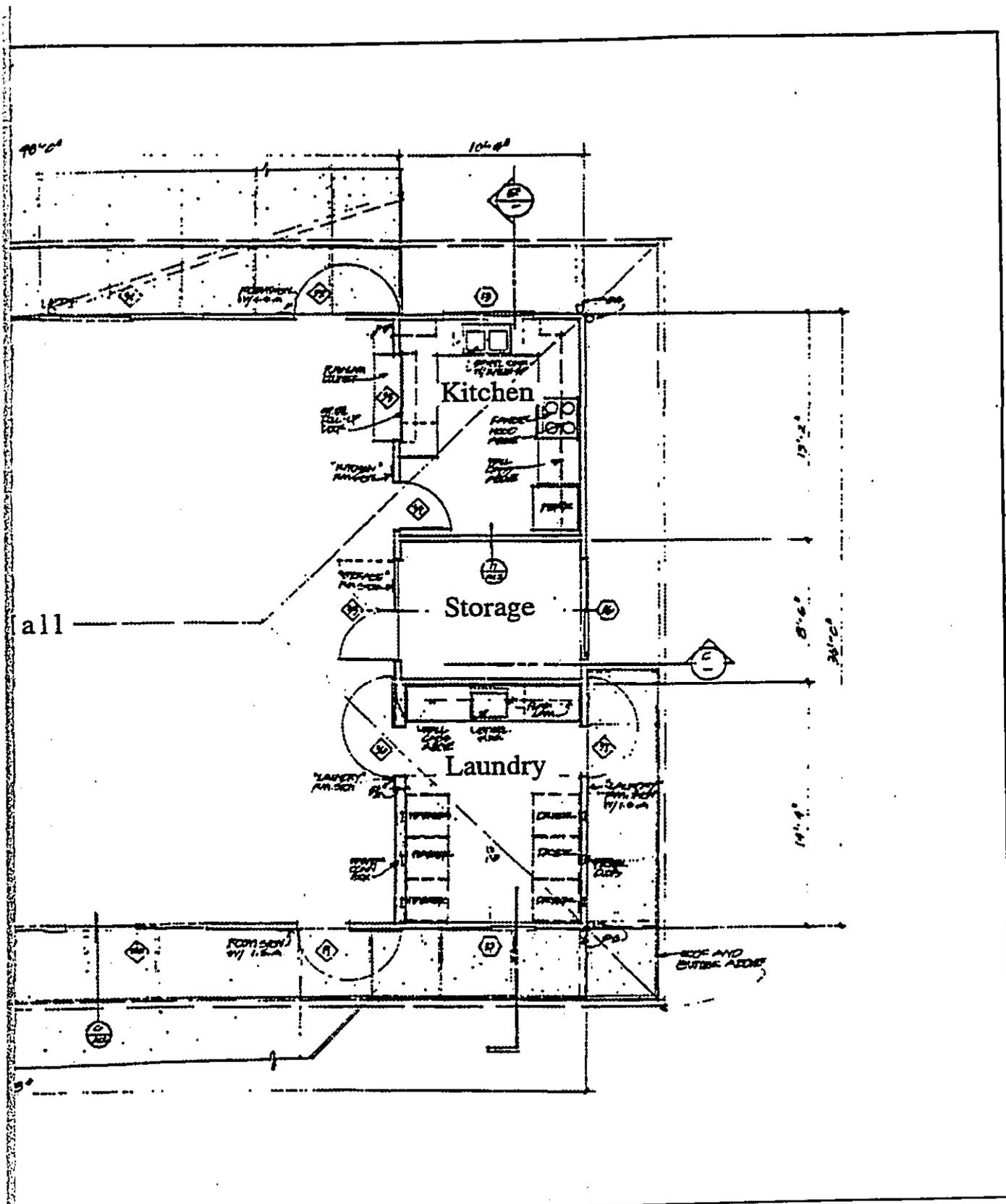


Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 10

Hale Mahaolu Elima
Community Building Floor Plan

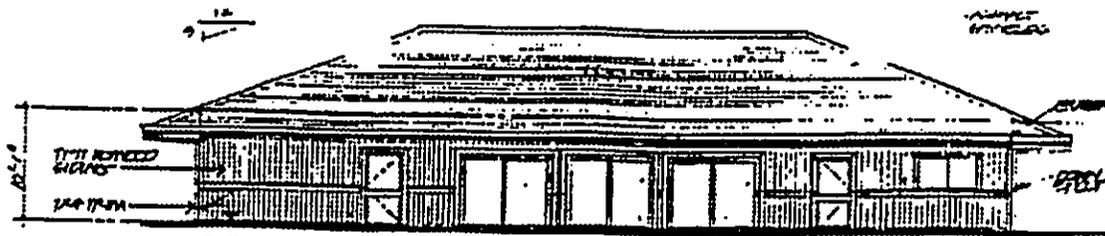
Prepared for: Hale Mahaolu Elima, Inc.



olu Elima
ding Floor Plan



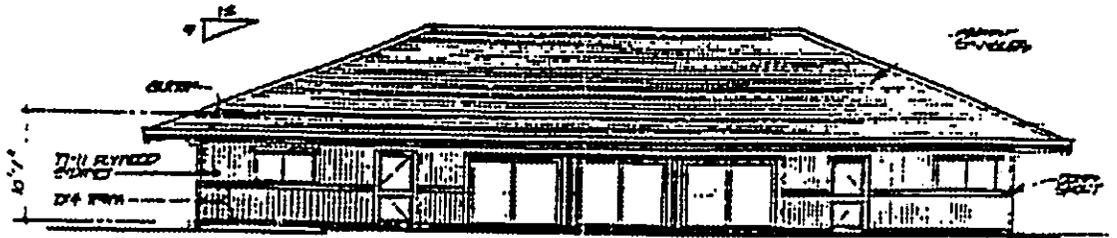
NOT TO SCALE



North Elevation



East Elevation



South Elevation



West Elevation

Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 11

**Hale Mahaolu Elima
Community Building Elevations**



Prepared for: Hale Mahaolu Elima, Inc.

NOT TO SCALE

The following waivers and exemptions are being requested under the Chapter 201E-210 process:

1. The existing zoning is R-2 Residential District (Chapter 19.08, Maui County Code). An exemption from the change in zoning requirement is being requested.
2. Within the R-2 Residential District, apartment houses are not a permitted use. An exemption to allow apartment houses on the subject property is being requested.
3. An exemption from R-2 Residential District provisions to allow establishment of accessory uses of central laundromat, manager's office, social hall, kitchen, and recreation storage necessary to facilitate the establishment of the requested permitted use is being requested.
4. An exemption from R-2 Residential District provisions to allow apartment houses with a maximum lot coverage of 29 percent is being requested.
5. Within the R-2 Residential District, building heights are limited to two (2) stories or 30 feet. An exemption to allow a three (3) story townhome structure not to exceed 35 feet in height is being requested.
6. An adult day care center and/or related services or uses within the R-2 Residential District would require a Special Use Permit. An exemption from the Special Use Permit requirement is being requested.
7. Two (2) parking spaces per apartment unit are required (Chapter 19.36.010(7), Maui County Code). For the community building, a parking requirement of one (1) stall per 100 square feet of serving and dining area and a minimum of three (3) additional parking spaces for employee parking are required (Chapter 19.36.010(24), Maui County Code). The community building is proposed to contain 1,728 square feet of serving and dining area. The Code requirement for an adult day care center would be considered under schools with students more than fifteen (15) years of age where the parking requirement is eight (8) stalls per classroom (Chapter 19.36.010(16)). The adult day care center is anticipated to have a maximum of three (3) classrooms. Based on a total of 60 apartment units, the community building, and adult day care center, a total of 164 stalls

would be required. An exemption from parking provisions is being requested to provide 86 stalls.

8. An exemption to allow landscape irrigation for the project to connect with and utilize water from the County water system is being requested.
9. A guarantee of an allocation of water, exemption from any water moratoria, and exemption from water source assessment, storage assessment fees and water system development fees established by the Board of Water Supply is being requested.
10. Should land be subdivided, the park assessment requirement is 245 square feet per unit, in excess of one (1), resulting from the subdivision (Chapter 18.16.320(B)(2), Maui County Code). Based on 60 units, the park assessment land requirement is 14,455 square feet. A subdivision of land and an exemption from the park assessment requirement are being requested.
11. Exemptions from all current and future sewer impact or assessment fees relating to treatment plant expansion, and collection system and wastewater pump station improvements, and sewer moratoria are being requested.
12. An exemption from any requirement for a traffic study is being requested.
13. A subdivider is required to grade, drain and surface all streets shown on his plat with streets being constructed to specifications noted in the Code and on file with the Department of Public Works and Waste Management (Chapter 18.20.030, Maui County Code). An exemption is being requested so that streets abutting the project may be retained in its existing condition.
14. Improvements to existing streets may be deferred for a subdivision of three (3) lots or less, provided the subdivider or applicant executes an agreement to pay a pro rata share of the cost of road improvements (Chapter 18.20.040, Maui County Code). An exemption is being requested on the execution of the agreement.
15. Concrete curbs and gutters are required to be constructed to standard specifications on file in the Department of Public Works and Waste Management (Chapter 18.20.080, Maui County Code). Exemptions from providing curbs and gutters are being requested.

-
16. Exemptions from real property taxes in accordance with Section 246-39, HRS are being requested.
 17. Exemptions from all current and future improvement assessments in accordance with Section 46-74-1, HRS are being requested.
 18. Exemptions from fees for building, electrical, plumbing, and driveway permits, grading permits and plan review are being requested.
 19. Exemptions from the following requirements for Uniform Building Code, Chapter 46, are being requested:
 - a. Road widening and curbing improvements;
 - b. Off-site utilities underground;
 - c. Off-site drainage improvements; and
 - d. Off-site sewer improvements.

In accordance with the provisions of Chapter 201E-210, HRS, the request would be submitted to the Maui County Council for review. The Council has 45 days to approve or disapprove the project. If, on the 46th day, the project is not disapproved, it shall be deemed approved.

The Chapter 201E-210 application is anticipated to be submitted to the Council in mid-1994. Construction is anticipated to start in early 1995 with completion targeted for late 1995. The estimated cost of the project is \$5.2 million for the 60 units and community building.

Chapter II

Description of the Existing Environment

II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

The proposed project site is located in Kahului Town. Kahului is home to Kahului Harbor, the island's only deep water port, and the Kahului Airport, the second busiest airport in the State. With its proximity to the Harbor and the Airport, the Kahului region has emerged as the focal point for heavy industrial, light industrial and *commercial activities and services such as warehousing, baseyard operations, automotive sales and maintenance, and retailing for equipment and materials suppliers.* The region is considered Central Maui's commercial retailing center with the Kaahumanu Center, the Maui Mall and the Kahului Shopping Center.

Surrounding this commercial core is an expansive residential area comprised principally of single-family residential units. Residential uses encompass the area extending from Maui Memorial Hospital to Puunene Avenue.

The project site is located near the southern boundary of Kahului Town. To the west of the project site is South Kamehameha Avenue. Located further west are vacant undeveloped lands. To the north of the project site is the Luana Gardens III multi-family development. Extending north across Papa Avenue are Maui High School and Kahului Elementary School. To the east of the project site is the existing Luana Gardens I single-family residential area. Vacant lands are located south of the project site.

2. Climate

Like most areas of Hawaii, Maui's climate is relatively uniform year-round. Characteristic of Hawaii's climate, the project site experiences mild and uniform temperatures year round, moderate humidity and a relatively consistent northeasterly tradewind. Variation in climate on the island is largely left to local terrain.

Average temperatures at the project site (based on temperatures recorded at Kahului Airport) range from lows in the 60's to highs in the 80's. August is historically the warmest month, while January and February are the coolest. Rainfall at the project site averages approximately 20 inches per year. Winds in the Kahului region are predominantly out of the north-northeast and northeast.

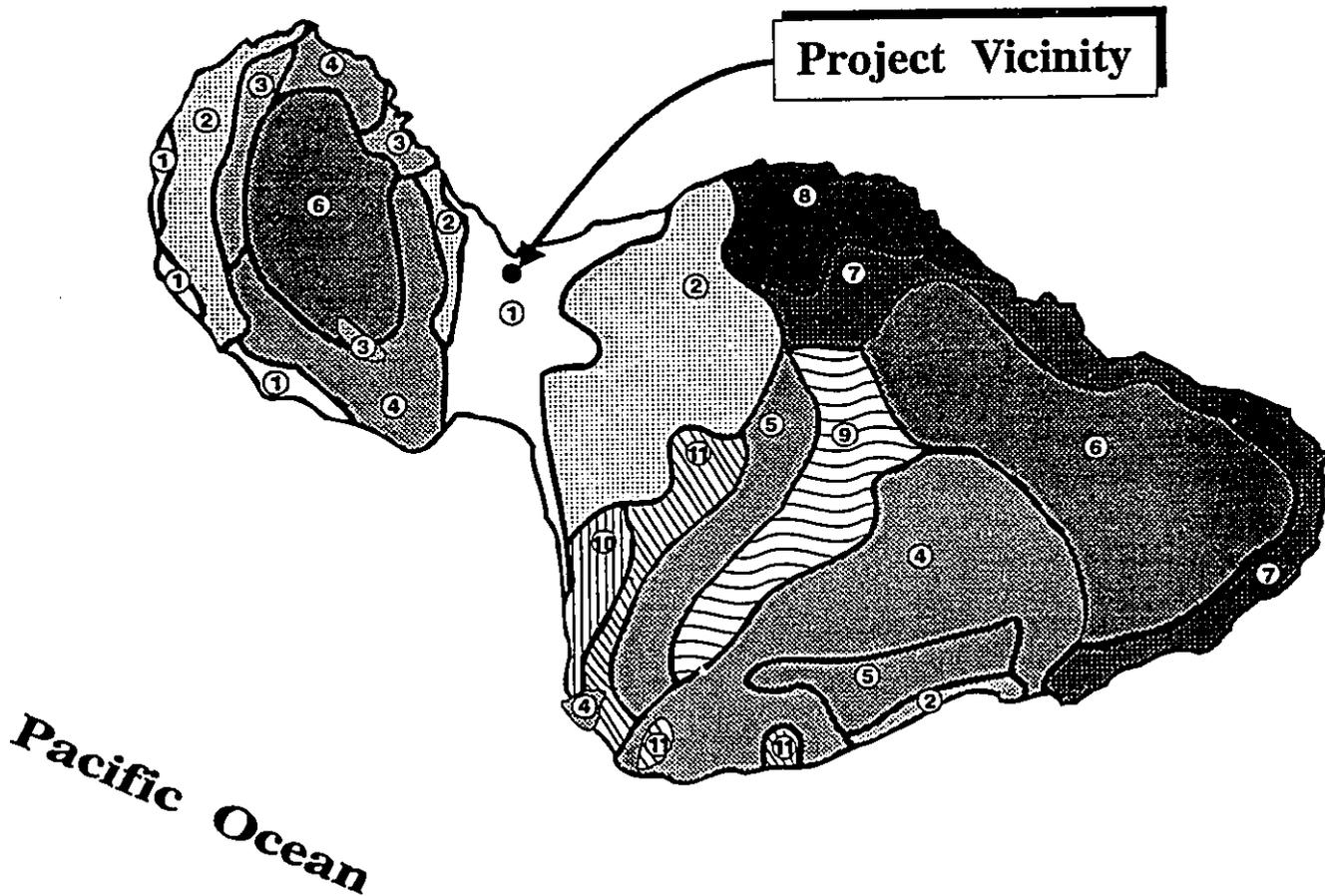
3. Topography and Soil Characteristics

The project site is located on Maui's flat central isthmus. The approximate elevation of the project site ranges from 86 to 108 feet above sea level. The high point is a gentle mound near the corner of South Kamehameha Avenue and Hoomoku Street. From this point, the site slopes gently lower toward the Luana Gardens development.

Underlying the proposed site and surrounding lands are soils belonging to the Pulehu-Ewa-Jaucas association. See Figure 12. The soil type specific to the project site is Puuone Sand, 7 to 30 percent slopes (PZUE). See Figure 13. PZUE soils predominate in the Kahului region and are typified by a sandy surface layer underlain by cemented sand. Naturally occurring vegetation in this series include bermuda grass, kiawe, and lantana.

LEGEND

- | | | | |
|---|--|---|-----------------------------------|
|  | Pulehu-Ewa-Jaucas association |  | Hana-Makaalae-Kailua association |
|  | Waiakoa-Keahua-Molokai association |  | Pauwela-Haiku association |
|  | Honolua-Olelo association |  | Laumaia-Kaipoi-Olinda association |
|  | Rock land-Rough mountainous land association |  | Keawakapu-Makena association |
|  | Puu Pa-Kula-Pane association |  | Kamaole-Oanapuka association |
|  | Hydrandepts-Tropaquods association | | |



Map Source: USDA Soil Conservation Service

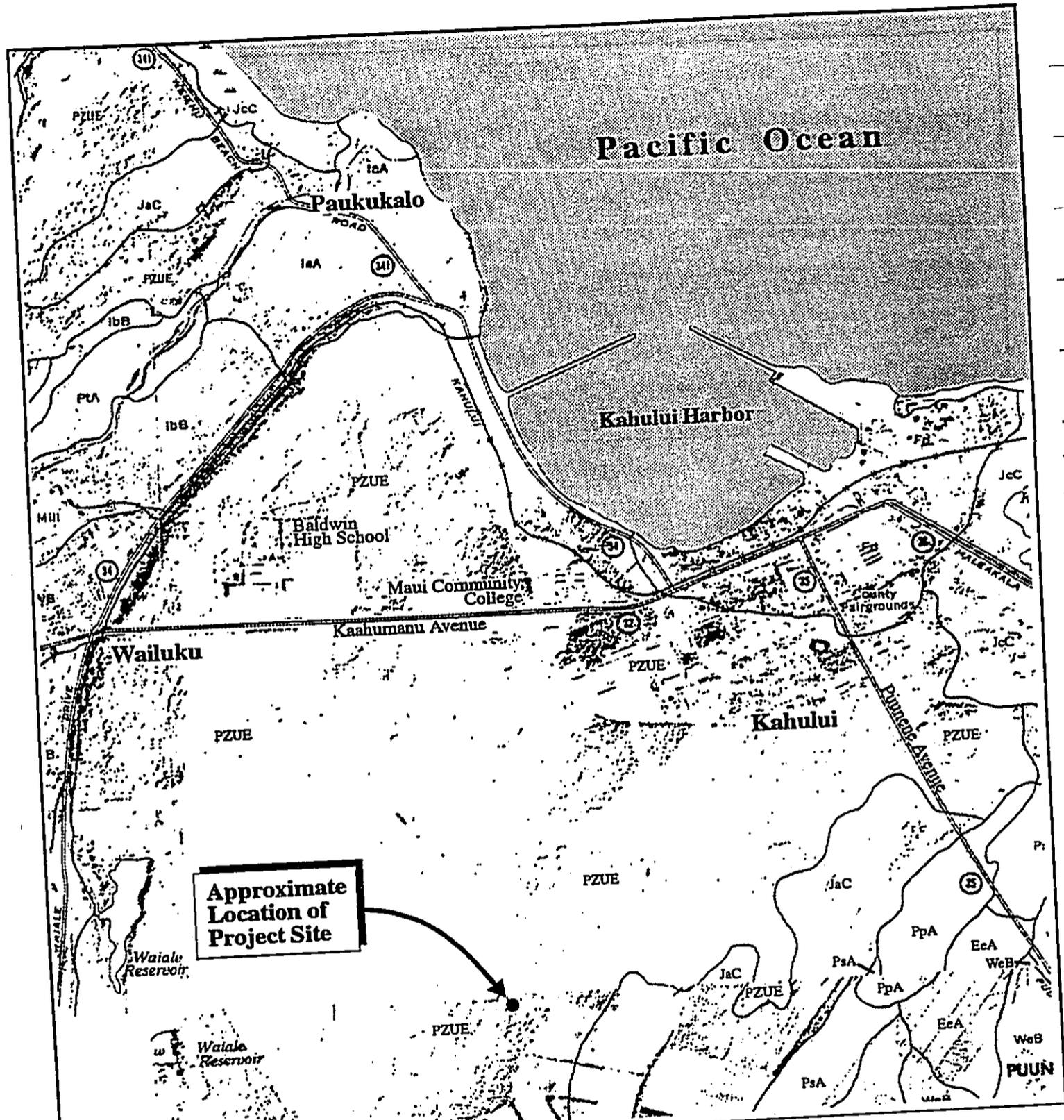
Figure 12

Hale Mahaolu Elima
Soil Association Map



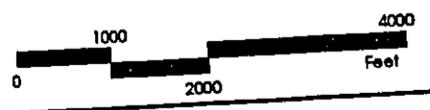
Prepared for: Hale Mahaolu Elima, Inc.

NOT TO SCALE



Source: U. S. Soil Conservation Service

Figure 13 Hale Mahaolu Elima
Soil Classifications



Prepared for: Hale Mahaolu Elima, Inc.

4. **Flood and Tsunami Hazard**

The project site is identified as Zone "C", an area of minimal flooding as determined by the Flood Insurance Rate Map for this region. See Figure 14. The site is located well beyond coastal inundation areas.

5. **Flora and Fauna**

The subject property is adjacent to the Luana Gardens development and Kahului residential area. Existing vegetation on the site includes kiawe, false koa, common grasses and weeds.

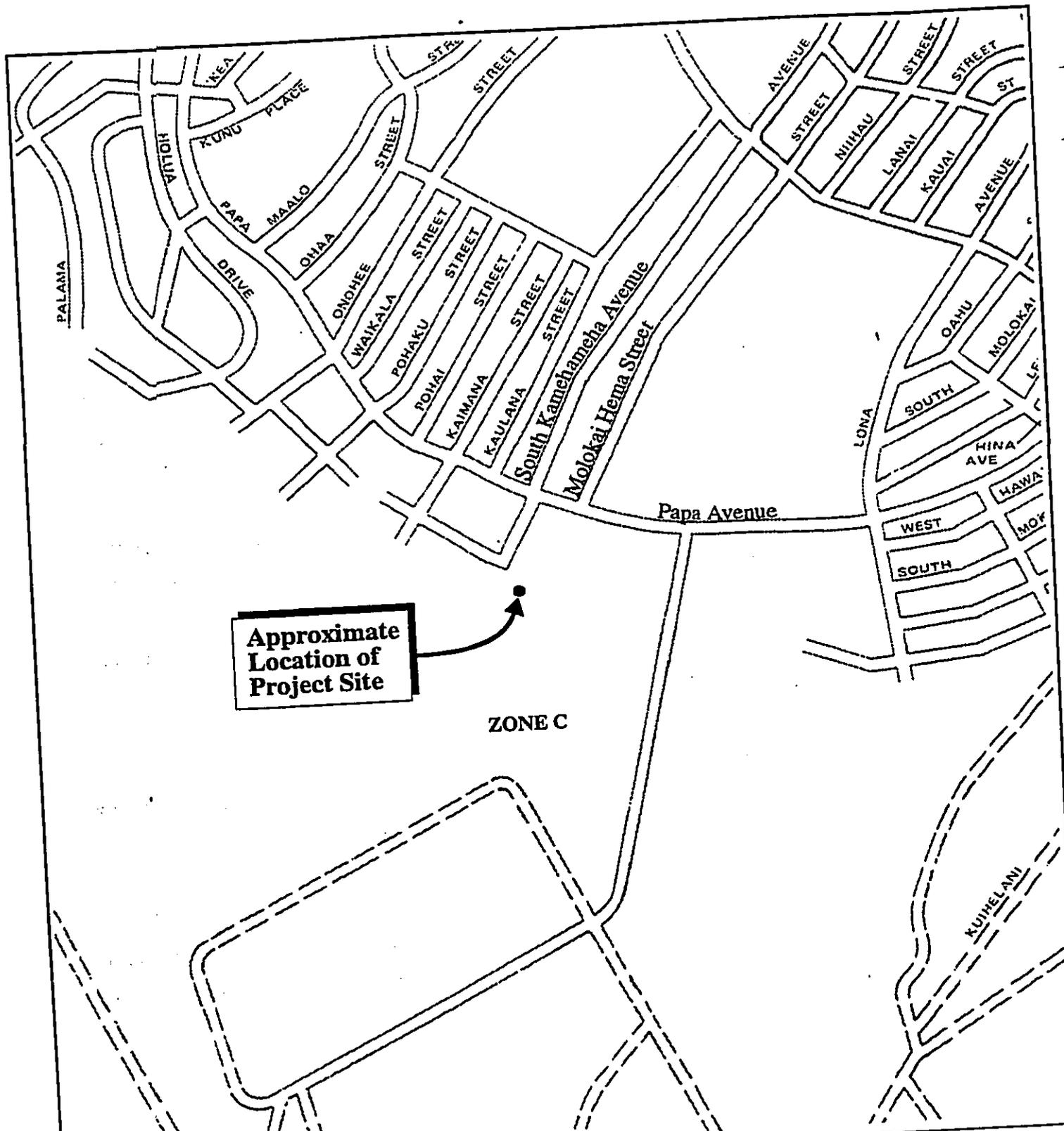
Fauna and avifauna are also characteristic of urban areas. Fauna typically found in the vicinity include mongoose, rats, dogs and cats. Avifauna typically include mynas, several types of doves, and house sparrows. There are no endangered species of fauna or avifauna at the project site.

6. **Archaeological Resources**

An archaeological inventory survey for the proposed project was conducted by Aki Sinoto Consulting. See Appendix A.

The study noted that extensive surface and subsurface alterations have already occurred within the project area. The site has been previously altered for modern agricultural use (1977), the construction of the neighboring Luana Gardens, and the later removal of vegetation to remove a fire hazard.

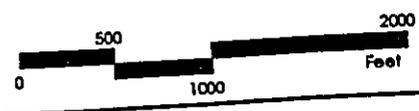
The study also involved a review of existing archaeological studies in the Wailuku-Kahului region. A majority of archaeological investigations in Wailuku ahupua'a have been conducted along the



Source: Flood Insurance Rate Map, Maui County, Hawaii

Figure 14

Hale Mahaolu Elima
Flood Insurance Rate Map



Prepared for: Hale Mahaolu Elima, Inc.

coastal and valley areas. These surveys revealed permanent habitation and religious sites at Kahului Bay, and irrigated taro pondfields in 'Iao Valley. Since most of the Wailuku Sand Dunes area where the current project is located has been disturbed by large scale agriculture, the possibility of identifying in-situ cultural remains is low. It is noteworthy that subsurface investigations in adjoining parcels did not disclose any human remains or other cultural material. The study notes that extensive ground disturbing activities in the project area and negative results from subsurface testing in adjacent areas minimize the potential for burials within the project area.

A surface survey was undertaken which concentrated on the inspection of exposed surface areas, cut banks, and a remnant stand of secondary vegetation. No surface prehistoric or historic archaeological remains were located within the project area.

7. **Air Quality**

Air quality in the Wailuku-Kahului region is considered good as point sources (e.g., Maui Electric Power Plant, HC&S Mill) and non-point sources (e.g. automobile emissions) of emission are not significant to generate high concentration of pollutants. The relatively high quality of air can also be attributed to the region's constant exposure to winds which quickly disperse concentrations of emissions. This rapid dispersion is evident during burning of sugar cane in fields located to the southeast of the Kahului residential core.

8. **Noise**

Traffic noise is the predominant source of background noise in the vicinity of the project. To the northeast of the property, use of the

Maui High School and Kahului School facilities could also add to background levels in the surrounding region on an occasional basis.

9. **Visual Resources**

Scenic resources to the west of the site include Iao Valley and the West Maui Mountain Range. To the southeast, Haleakala is visible from the site. To the north of the site lies the Kahului residential area and its commercial core. To the south of the site are vacant lands vegetated with kiawe, false koa, common grasses and weeds.

B. **SOCIO-ECONOMIC ENVIRONMENT**

1. **Population**

The population of the County of Maui has exhibited relatively strong growth over the past decade with the 1990 population estimated to be 100,374, a 41.7% increase over the 1980 population of 70,847. Growth in the County is expected to continue, with resident population projections to the years 2000 and 2010, estimated to be 123,900 and 145,200, respectively (DBED, 1990).

The estimated 1990 population of the Wailuku-Kahului Community Plan region is 32,816. A projection of the region's population shows an increase to 40,119 by the year 2000 and to 47,597 by the year 2010 (Community Resources, Inc., 1992).

2. **Economy**

The Kahului region is the Island's center of commerce. Combined with neighboring Wailuku, the region's economic character encompasses a broad range of commercial, service, and governmental activities. In addition, the region is surrounded by significant agricultural acreages which include sugar cane fields,

pineapple fields, and macadamia nut orchards. The vast expanse of agricultural land, managed by Hawaiian Commercial & Sugar (HC&S) and Wailuku Agribusiness Company, is considered a key component of the local economy.

C. PUBLIC SERVICES

1. Recreational and Social Services

The Wailuku-Kahului region encompasses a full range of recreational opportunities, including numerous County facilities such as Pomaikai Park, Kahului Park and Community Center, Kanaha Beach Park and the War Memorial Complex. Also located in close proximity to the project are the facilities and grounds of Maui High School and Kahului Elementary School.

2. Police and Fire Protection

Police protection for the Wailuku-Kahului region is provided by the County Police Department headquartered at the Wailuku Station, approximately 1.6 miles from the project site. The region is served by the Department's Central Maui patrol.

Fire prevention, suppression, and protection services for the Wailuku-Kahului region are provided by the County Department of Fire Control's Kahului and Wailuku Stations. The Kahului Station, located on Dairy Road, is approximately 1.7 miles from the project site. The Wailuku Station, located in Wailuku town near Wells Park, is approximately 2.3 miles from the site.

3. Solid Waste

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste

collected by County crews are disposed at the County's 55-acre Central Maui Landfill, located four miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies. Refuse collection for the project would be provided by a private collection company.

4. **Health Care**

Maui Memorial Hospital, the only major medical facility on the Island, services the Wailuku-Kahului region. Acute, general and emergency care services are provided by the 145-bed facility. The hospital is located approximately 1.8 miles from the project site. In addition, numerous privately operated medical/dental clinics and offices are located in the Wailuku-Kahului area to serve residents of the project as well as the region.

5. **Schools**

The Wailuku-Kahului region is served by the State Department of Education's public school system as well as several privately operated schools accommodating elementary, intermediate and high school students. Department of Education facilities in the Kahului area include Lihikai and Kahului Schools (Grades K-5), Maui Waena Intermediate School (Grades 6-8), and Maui High School (Grades 9-12). Existing facilities in the Wailuku area include Wailuku Elementary School (Grades K-5), Iao Intermediate School (Grades 6-8), and Baldwin High School (Grades 9-12).

Maui Community College, a branch of the University of Hawaii, serves as the Island's only Community College.

D. INFRASTRUCTURE

1. Roadways

The Wailuku-Kahului region is served by a roadway network which includes arterial, collector and local roads. Major roadways include Kaahumanu Avenue, the principal linkage between Wailuku and Kahului, Hana Highway and Puunene Avenue.

Access to the project site is from Hoomoku Street which links with South Kamehameha Avenue and Papa Avenue. These two roadways are key collector roads in the Kahului region which provide access to a number of other collector and local roads. South Kamehameha Avenue provides access to the north of the project site toward the Kahului commercial area. Papa Avenue extends to Kaahumanu Avenue and Puunene Avenue providing easy access to areas beyond Kahului Town.

2. Wastewater

Domestic wastewater generated in the Wailuku-Kahului region is conveyed to the County's Wailuku-Kahului Wastewater Reclamation Facility located one-half mile south of Kahului Harbor. The design capacity of the facility is 7.9 million gallons per day (MGD). Average daily flow currently processed through the plant is approximately 5.3 MGD.

An existing 6-inch line extends through the Luana Gardens III development providing service to that site.

3. Water

The Wailuku-Kahului region is served by the Board of Water Supply's (BWS) domestic water system. Water drawn from the Iao Aquifer

System is conveyed to this region for distribution and consumption. The Iao Aquifer, which serves the Central Maui region, has an estimated sustainable yield of 20 MGD. Recent estimates place the monthly average withdrawal from the aquifer at 18 MGD.

Water service is provided via an 8-inch waterline within South Kamehameha Avenue. The existing 8-inch line extends across the Luana Gardens III site and the subject property.

4. **Drainage**

The existing storm runoff for Luana Gardens flows into three (3) separate drain lines which connect to a 48-inch drainline on Papa Avenue. The 48-inch drainline transports the runoff into a sump located at the corner of Papa Avenue and Pomaikai Street. The sump was designed to receive runoff of 64.3 cubic feet per second from Luana Gardens. See Appendix B.

5. **Electric Power and Telephone Service**

Electrical and telephone services are provided by Maui Electric Company and GTE Hawaiian Telephone, respectively.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Surrounding Uses

The proposed project contains uses which are compatible with the largely low-rise residential neighborhood. Located at the existing southern boundary of Kahului Town, the project is adjacent to the Luana Gardens III townhome development and Luana Gardens I single-family residential subdivision. Further south are vacant lands which are part of the planned Maui Lani residential community.

2. Flora and Fauna

There are no known significant habitats or rare, endangered or threatened species of flora and fauna located within the project site. The proposed project is therefore not considered an adverse impact upon these environmental features.

3. Archaeological Resources

The project site has been subject to previous ground disturbing activities from agricultural use, construction of the neighboring Luana Gardens, and later bulldozing of vegetation to clear the site. Subsurface investigations of adjoining areas have not yielded any cultural materials. A surface survey also did not find any prehistoric or historic archaeological remains. In consultation with the State Historic Preservation Division of the Department of Land and Natural Resources, further archaeological investigations, primarily subsurface testing, prior to construction was deemed unnecessary. See Appendix A.

Full-time archaeological monitoring during construction is also not recommended. However, should any unanticipated remains be

exposed during construction, work in the immediate area will be halted and the Historic Preservation Division of the Department of Land and Natural Resources will be notified.

4. **Air Quality**

Air quality impacts attributed to the project will include dust generated by short-term, construction-related activities. Site work such as grading and utilities and parking lot construction, for example, will generate airborne particulates. Dust control measures such as regular watering and sprinkling will be implemented as needed to minimize wind-blown emissions.

The proposed development provides residential use and a possible adult day care facility which will result in a larger volume of traffic utilizing roadways in the vicinity. However, trip generation rates from elderly housing are relatively low in comparison to other residential developments. The project itself is a very small part of the urban fabric of the Wailuku-Kahului region. Project-related emissions are not expected to adversely impact local and regional ambient air quality conditions.

5. **Noise**

As with air quality, ambient noise conditions will be impacted by construction activities. Heavy construction equipment, such as bulldozers, front end loaders, and materials-carrying trucks and trailers, would be the dominant source of noise during the site construction period. Impact tools such as jack hammers and hand held pneumatic tools are also a major source of noise. To aid in the mitigation of construction noise impacts upon surrounding uses,

construction activities will be conducted during the daylight hours only.

The use of the property for elderly housing and an adult day care facility is compatible with surrounding uses. On a long-term basis, the project will not generate adverse noise conditions.

6. **Visual Resources**

The project will be fully landscaped to create a site visually and aesthetically integrated with the surrounding developed properties. The project would include a maximum of eight (8) single-level residential structures, all of which would not exceed 16 feet in height. A three-story townhouse structure would not exceed 35 feet in height. A community building for the residents of the development of approximately 18 feet in height is also proposed. Should the adult day center and/or related services be included, it is anticipated to be of similar height with the community building. The project complements the existing two-story Luana Gardens III multi-family development as well as the single-family residential character of the surrounding neighborhood.

B. **IMPACTS TO COMMUNITY SETTING**

1. **Population and Local Economy**

On a short-term basis, the project will support construction and construction-related employment. Over the long-term, the project will provide limited support to the service sector for project operations and maintenance. Direct on-site employment generated by the project will likely be limited to a resident manager and an additional person tending to the grounds and maintenance.

2. **Housing**

The project is expected to service a significant need in the community. Current elderly housing need can be evidenced by the waiting lists for housing at Hale Mahaolu projects. Each of the projects maintain separate waiting lists. At the 111-unit Hale Mahaolu-Akahi, for example, there are approximately 200 people on the waiting list. At the 180-unit Hale Mahaolu-Elua, approximately 300 people are on the waiting list. Both the Akahi and Elua Projects are located in Kahului.

The 42-unit Hale Mahaolu-Ekolu Project in Waiehu was recently completed in late 1992. There are already approximately 80 people on the waiting list for that project.

Based on past rates, it is anticipated that vacancies would occur in approximately 15 percent of the units per year. Although a number of prospective tenants on the waiting list can be expected to decline the opportunity to live in the project for a variety of medical, social, economic or other reasons, prospective tenants still can be expected to wait a number of years before the opportunity to live in an elderly project arises.

It should also be noted that elderly housing demand is expected to increase in the future since the elderly are a growing segment of the population. Statewide, the elderly population (age 60 and over) totalled 174,200 or approximately 15.3 percent of the population. By the year 2000, the elderly population is anticipated to increase to 206,200 or 16 percent of the population. By the year 2010, projections show an elderly population of 265,900 or 18.5 percent of the population (State of Hawaii, 1990).

3. Police, Fire and Medical Services

Police, fire and medical services are not expected to be adversely impacted by the proposed project. The project will not extend existing service area limits for emergency services.

4. Recreational and Social Services

The proposed project has a community building for use by residents of the development. This building contains a social hall, kitchen, laundry and office.

The occupants of the project also may utilize the services offered under the auspices of the County of Maui and Hale Mahaolu. It is anticipated that the project will not have a significant impact on existing recreational and social services because of the relatively small number of units in the project. Moreover, elderly patrons may utilize programs offered by the County of Maui and Hale Mahaolu regardless of whether they live in the project or other places.

A broad variety of services are offered to elderly patrons. There are Congregate Meal Services where seniors, age 60 and over, are offered meals as well as opportunities for socialization. Other programs include Chore Services and Volunteer Shoppers, for tenants who may have difficulty in performing these tasks.

Other services include Home Delivery of Meals to tenants who, because of illness or other temporary condition, are unable to cook for themselves. There is also an In-Home Respite Program which is designed to provide relief for caregivers for a recovering elderly tenant. Escort/Outreach Services are available to frail, isolated elderly who cannot utilize other means of transportation. Other

programs include the Helping Elderly Live Life's Opportunities (HELLO) program which involves volunteers visiting frail, homebound elderly and a Senior Companion program which involves volunteers helping their peers maintain their independence.

Tenants in the project would also be able to utilize the Kaunoa Senior Services Leisure Program which offers 71 regularly scheduled classes to Maui seniors (age 55 and over). These classes include arts and crafts, performing arts, cultural classes and lectures on a variety of topics.

If included in the project, the adult day care center provides a permanent home for a facility which provides a valuable social service to the community. The facility would provide a supervised daytime program for disabled adults and elderly in a supportive and protective environment. A facility would include a range of pursuits including, recreation, social and educational activities for its participants. The purpose of the facility is to maintain or improve the functional levels of its participants so that institutionalization is delayed or prevented.

5. Solid Waste

A solid waste management plan will be developed in coordination with the Solid Waste Division of the County Department of Public Works for the disposal of clearing and grubbing material from the site during construction.

Once completed, the proposed project will be served by a private refuse collection company. Solid waste generated from the project will be disposed at the County's Central Maui Landfill.

C. IMPACTS TO INFRASTRUCTURE

1. Roadways

Access to the subject property would be through the project driveway intersecting with Hoomoku Street. The driveway is set back from the Hoomoku Street-South Kamehameha Avenue intersection and will comply with applicable County sight distance provisions.

On-site sidewalks as well as off-site sidewalks abutting the Hoomoku Street and South Kamehameha Avenue frontages are being provided in order to ensure pedestrian safety. An exemption from providing additional Hoomoku Street and South Kamehameha Avenue frontage improvements is being requested through the Chapter 201E process primarily because of the added cost which affects the affordability of the units. Hoomoku Street and South Kamehameha Avenue, in the vicinity of the project site are presently without sidewalks, curbs, and gutters.

A secondary access to the project is through a Luana Gardens III interior driveway which links with South Kamehameha Avenue. This would primarily serve as an emergency fire truck access to the project.

Should the proposed Maui Lani Project be built, South Kamehameha Avenue would be extended as a major collector road from the Kahului region to the Maui Lani Project. While the Hale Mahaolu Elima Project would have access to South Kamehameha Avenue, its

impact to South Kamehameha Avenue would be minimized since Hoomoku Street also provides a connection to another collector roadway, Papa Avenue.

The project is anticipated to have an on-site resident manager and one person responsible for care of the grounds and maintenance.

Based on ratios for other elderly affordable projects, such as Hale Mahaolu Akahi and Elua, it is anticipated that residents in approximately 50 percent of the units would own automobiles. In the case of the 42-unit Hale Mahaolu Ekolu in Waiehu, approximately 12 residents (29 percent) own automobiles.

There also would be visitor traffic generated as a result of the project. Visitor traffic should occur intermittently throughout the day during non-peak hours. These may consist of visitors to the residents of the project, as well as other services needed by residents. Services may include chore services, Maui Economic Opportunity (MEO) transportation services, home delivery meal service, escort/outreach, and in-home respite. Based on ratios for other Hale Mahaolu projects, total vehicular trips for visitors and services would be a maximum of one (1) vehicular trip per unit. Visitor and service related vehicles on the project site at any one time would probably not exceed a factor equal to 20 percent of the units in the project.

For the development scenario of 60 units, it is estimated that a maximum of 30 residents would own cars. Since the project is for elderly tenants, vehicular trips are likely to occur intermittently throughout the day during non-peak hours. A maximum of one (1)

vehicle trip per day, or a total of 30 vehicular trips per day are anticipated.

For visitors and service related traffic, a maximum of 60 vehicles per day are anticipated. The maximum number of visitors and service vehicles that may be anticipated on the subject property at any one time are 12 vehicles.

Should the project include an adult day care facility, a total of 50 participants are anticipated. Drop off primarily occurs between 7:00 a.m. to 8:00 a.m., with pick up primarily between 3:30 p.m. to 5:00 p.m. MEO also provides transportation services for clients, which results in van pooling. A maximum of 0.6 vehicular trips per participant, or 30 vehicular trips per peak hour period is anticipated based on existing ratios at the Puunene facility. This would account for 60 peak hour trips per day. The maximum number of dropoffs or pickups that may be anticipated on the subject property at any one time are approximately six (6) vehicles. A staff of six (6) accounts for twelve (12) vehicular trips per day. There may be an additional two (2) vehicular trips during non-peak periods for service and delivery.

For this development scenario, a maximum of 164 vehicular trips are anticipated. However, only 36 vehicular trips occur during each AM and PM peak, with the remainder occurring during non-peak periods. At any one time, it is anticipated that there would be a maximum of 50 vehicles on the property. See Table 1 and Table 2.

It is noted that there are limited numbers of vehicles being generated by the proposed development. Moreover, most vehicular trips would

Table 1

GENERATION OF VEHICULAR TRIPS, BY FUNCTION AND TIME PERIOD				
	AM Peak	PM Peak	Non- Peak	Total
Adult Day Care Participants	30	30		60
Adult Day Care Staff	6	6		12
Adult Day Care Delivery and Service			2	2
60 Residential Units			30	30
Visitors and Services (for residential units)			60	60
TOTAL	36	36	92	164

Table 2

MAXIMUM NUMBER OF VEHICLES ON THE PROPERTY AT ANY TIME, BY FUNCTION AND TIME PERIOD			
	AM Peak	PM Peak	Non- Peak
Adult Day Care Participants	6	6	-
Adult Day Care Staff	6	6	6
Adult Day Care Delivery and Service			2
Residential Units	30	30	30
Visitors and Services (for residential units)			12
TOTAL	42	42	50

occur during non-peak periods. From a traffic impact standpoint, therefore, the proposed project is not anticipated to adversely affect existing intersection and roadway operating service levels.

With regard to parking and loading needs, it is noted that parking stalls are provided at a ratio of one (1) stall per two (2) units. Based on 60 units, 30 parking stalls are allocated for resident use. The project provides guest parking at a ratio of one (1) stall per five (5) units. Based on 60 units, twelve (12) parking stalls are for guest parking. The project complies with County requirements for number of parking stalls for the community building and the adult day care center. Based on 1,728 square feet of serving and dining area in the community building, 20 parking stalls are required. Based on three (3) classrooms in the adult care center, a total of 24 parking stalls are required.

The project proposes the provision of a total of 86 parking stalls. It is noted that the maximum number of vehicles on the property at any one time is estimated to be 50 vehicles. Thus, the number of parking stalls should be sufficient to service parking and loading needs of the proposed uses.

2. Water

With 60 units and adult day care, the project is anticipated to generate an average daily water demand of approximately 37,000 gallons per day (gpd). The project would incorporate Xeriscape principles including the use of low water demand plants which minimize the impact of water usage. The project is not anticipated to have a significant impact upon the water source, storage and transmission system.

3. Drainage

The volume of storm runoff was calculated for existing conditions at Luana Gardens and developed conditions at Hale Mahaolu Elimā.

Based on a 1-hour, 10-year storm, the project and Luana Gardens will produce runoff at a rate of 48.59 cubic feet per second (cfs).

Runoff from Luana Gardens and Hale Mahaolu Elima is proposed to be routed via a 48-inch drainline on Papa Avenue to the existing sump at the corner of Papa Avenue and Pomaikai Street. The design capacity of the existing sump is 64.3 cfs. Projected runoff from Luana Gardens and Hale Mahaolu Elima is not expected to exceed the design capacity of the sump.

Estimated soil loss was calculated using the universal soil loss equation in accordance with the County of Maui grading ordinance. Soil loss during construction is significantly below the County's allowable rate. Normal erosion control measures implemented during construction should be adequate to control soil loss from the project site.

Development of the proposed project is not expected to cause any adverse effects to adjacent or downstream developments.

4. **Wastewater**

The design capacity of the County's Kahului Wastewater Treatment Facility is 7.9 million gallons per day (MGD). The facility serves the Kahului, Wailuku, Paia, Kuau and Spreckelsville areas. Average daily flow currently processed through the plant is approximately 5.3 mgd.

With 60 residential units and an adult day care facility, the proposed project is anticipated to generate an average flow of approximately 11,600 gpd of wastewater. An allocation of capacity will be

coordinated with the Department of Public Works and Waste Management as part of the building permit process.

5. **Electrical and Telephone Systems**

Electrical power requirements associated with the proposed project will be supplied by Maui Electric Company, Ltd. Additional telephone system requirements generated by the project will be met by GTE Hawaiian Telephone Company.

Chapter IV

***Relationship to Governmental
Plans, Policies and Controls***

IV. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural" and "Conservation". The subject parcel is within the "Urban" District. See Figure 15. The proposed action involves the use of the property for an elderly affordable residential development and an adult day care facility which are compatible with the "Urban" designation.

B. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long range development of the County. As stated in the Maui County Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic and environmental effects of such development and set forth the desired sequence, patterns and characteristics of future development."

The proposed action is in keeping with the following General Plan objective and policy:

Objective:

Provide affordable housing to be fulfilled by a broad cross-section of housing types.

Policies:

Encourage the establishment of additional senior citizen housing in various locations.

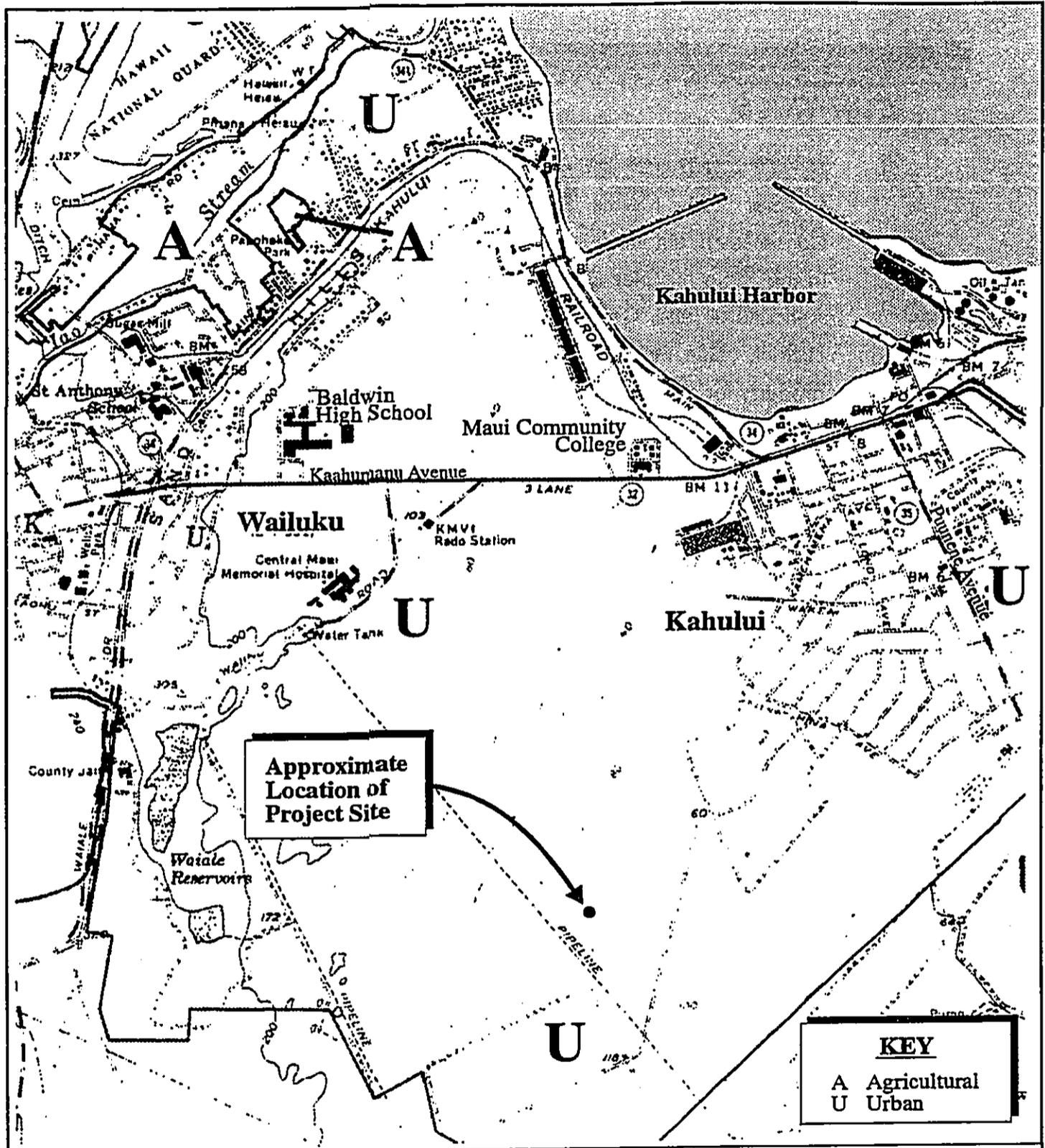


Figure 15

Hale Mahaolu Elima
State Land Use Classifications



Prepared for: Hale Mahaolu Elima, Inc.



C. WAILUKU-KAHULUI COMMUNITY PLAN

The subject parcel is located in the Wailuku-Kahului Community Plan region which is one of nine Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The proposed project site is designated "Multi-Family" by the Wailuku-Kahului Community Plan. See Figure 16.

It is noted that the project implements the following Wailuku-Kahului Community Plan objectives:

- Develop a comprehensive housing strategy for low and moderate income groups which will involve government and private industry cooperation. This approach would combine the resources of Federal, State, County, and private enterprise to improve the availability of rental and ownership housing targeted to various need groups. Anti-speculation and specification of a percentage of low and moderate income units in major projects are tools which should be considered as part of an overall housing program.
- Develop procedures and regulations to streamline government review and approval for housing projects. This should result in cost reductions by expediting the time required for implementation.

The proposed project conforms to the objectives of the Wailuku-Kahului Community Plan.

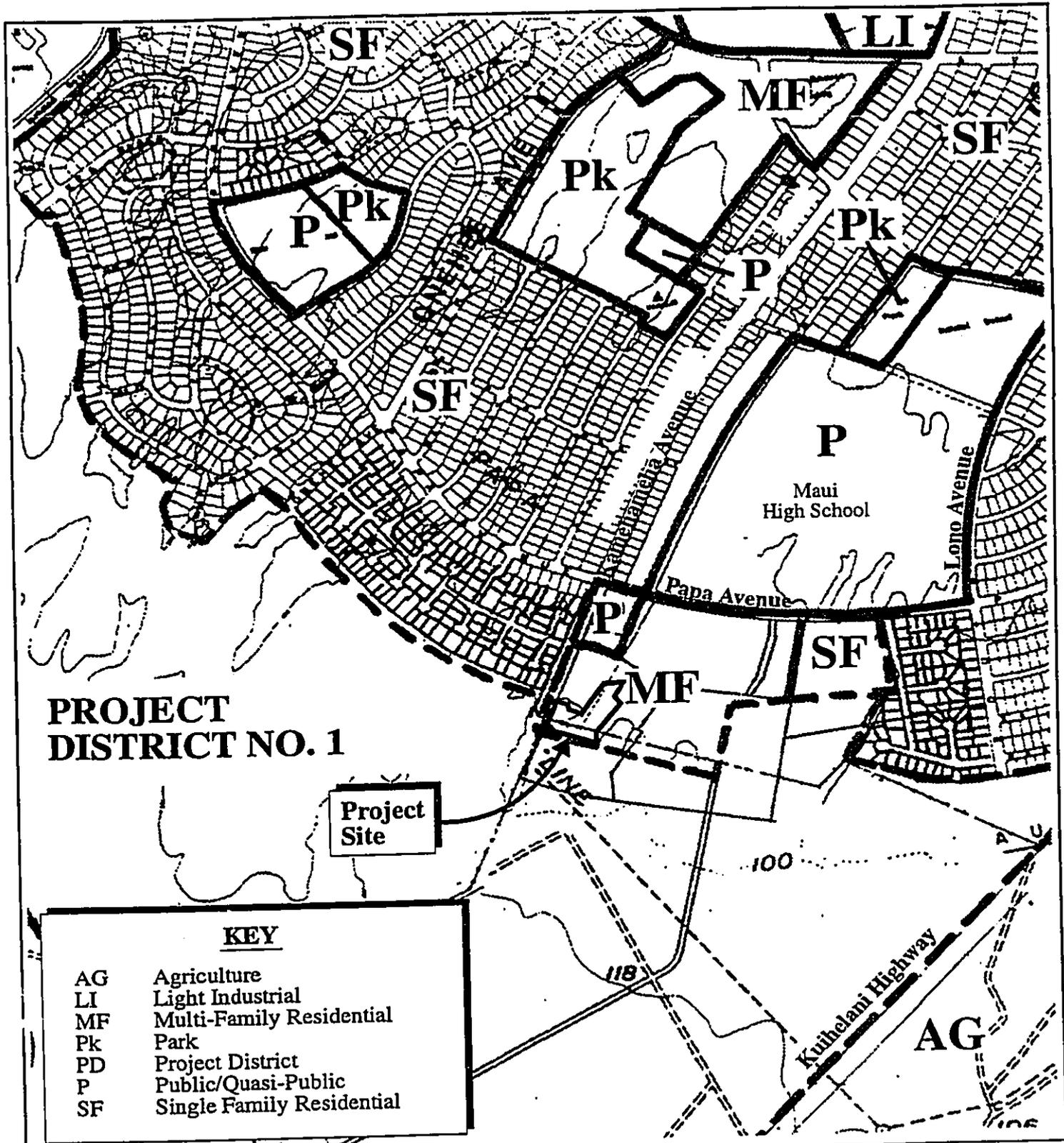
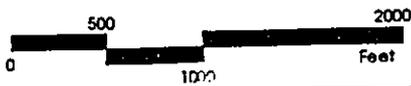


Figure 16 Hale Mahaolu Elima
Community Plan Designations



Prepared for: Hale Mahaolu Elima, Inc.

Chapter V

Findings and Conclusion

V. FINDINGS AND CONCLUSION

The Hale Mahaolu Elima Project would provide much needed elderly affordable housing in the Wailuku-Kahului region. The project would be developed by Hale Mahaolu Elima, Inc. There is a significant community need for affordable housing as evidenced by the extensive waiting list of people for units at existing Hale Mahaolu projects.

The proposed project will involve earthwork and building construction activities. In the short term, these activities may generate temporary nuisances normally associated with construction activities. However, dust control measures, such as regular watering and sprinkling, will be implemented, as needed, to minimize wind-blown emissions. All construction activities are anticipated to be limited to normal daylight working hours. Impacts generated from construction activities are not considered adverse.

From a long-term environmental perspective, the proposed project is not anticipated to result in adverse environmental impacts. The property has been subject to previous ground disturbing activities. Subsurface archaeological investigations on adjoining properties have not yielded any cultural materials. There are no surface indications that significant archaeological remains exist on the property. Should any unanticipated remains be uncovered during construction, work in the immediate area will be halted and the State Historic Preservation Office will be notified. In terms of visual resources, the proposed project would be aesthetically integrated with surrounding properties.

It is anticipated that the project will not have a significant impact on recreational and social services because of the relatively small number of units in the project. Moreover, elderly patrons may utilize programs offered by the County of Maui regardless of whether they live in the project or other places. Should the adult

day care facility be included in the project, this will represent a significant addition to addressing social service needs in the Central Maui area.

The proposed project is not anticipated to generate a significant amount of vehicular trips. Project-generated trips are likely to be interspersed throughout the course of a normal day. Moreover, project traffic would have access to Hoomoku Street which connects with South Kamehameha Avenue as well as Papa Avenue. Connection to the County water system is proposed. The project is not anticipated to have a significant impact upon the County's water source, storage and transmission system. Runoff from the project is anticipated to be transported to an existing sump at Papa Avenue and Pomaikai Street. Projected cumulative flows would not exceed the design capacity of the sump. The project is also anticipated to connect with the County sewer system. An allocation of wastewater capacity will be coordinated with the Department of Public Works and Waste Management. The project should not have any significant adverse impacts to roadway, water, drainage, and wastewater systems.

In addition, the project is not anticipated to have adverse impacts upon medical, police and fire protection services as well as other infrastructure systems.

In light of the foregoing findings, it is concluded that the proposed action will not result in any significant impacts.

Chapter VI

***Agencies Contacted in the
Preparation of the Environmental
Assessment and Responses Received***

VI. AGENCIES CONTACTED IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT AND RESPONSES RECEIVED

The following agencies were contacted during the preparation of the Environmental Assessment.

1. State Historic Preservation Division
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813
2. David Nakagawa, Chief Sanitarian
Department of Health
54 High Street
Wailuku, Hawaii 96793
3. Robert Siarot, Maui District Engineer
Department of Transportation
650 Palapala Drive
Kahului, Hawaii 96732
4. Stephanie Aveiro, Director
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawaii 96793
5. Brian Miskae, Director
Department of Planning
250 South High Street
Wailuku, Hawaii 96793
6. George Kaya, Director
Department of Public Works and Waste Management
200 South High Street
Wailuku, Hawaii 96793
7. David Craddick, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793
8. Charmaine Tavares, Director
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Kahului, Hawaii 96732
9. Travis Thompson, Director
Department of Finance
County of Maui
200 South High Street
Wailuku, Hawaii 96793
10. Department of Fire Control
County of Maui
200 Dairy Road
Kahului, Hawaii 96732
11. Mr. James Lawrence, President
Kahului Town Association
P. O. Box 156
Kahului, Hawaii 96732

LINDA CROCKETT LINGLE
Mayor



BRIAN W. MISKAE
Director

GWEN Y. OHASHI
Deputy Director

COUNTY OF MAUI
PLANNING DEPARTMENT
260 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

March 16, 1994

Mr. Roy Katsuda
Executive Director
Hale Mahaolu
200 Hina Avenue
Kahului, Maui, Hawaii 96732

Dear Mr. Katsuda,

RE: Hale Mahaolu - Elima (Kahului)
TMK 3-8-7: por 111

The Planning Department has reviewed the preliminary information provided for the Hale Mahaolu - Elima Project in Kahului and offers the following comments:

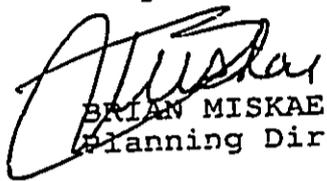
1. Consideration should be given to moving the location of the future adult day care center to a more central area of the site. This would facilitate use by the residents of the project as well as centralization of noise to mitigate impacts to the surrounding neighbors.
2. We have no objection to the proposed use in the R-2 Residential District as a Chapter 201E project. The Wailuku-Kahului Community Plan designates the subject site for Multi-family use.
3. We do not object to the number of parking stall being proposed for the adult care facility (81 stalls)
4. We are concerned about the applicant utilizing potable water for landscape irrigation. This has not been encouraged by the Department of Water Supply.
5. We are concerned about waiving all necessary road widening improvements including sidewalks, curbs, gutters etc. In the future when the Maui Lani project is developed and the subject roadway feeds into this project, who will be responsible to make the necessary improvements?

MAR 25 1994

Mr. Roy Katsuda
March 16, 1994
page 2

Thank you for the opportunity to comment. If further clarification is required, please contact this office.

Very truly yours,


BRIAN MISKAE
Planning Director

cc: Clayton Yoshida
Ann Cua
Project file

W. CROCKETT LINGLE
Mayor

GEORGE N. KAYA
Director

CHARLES JENCKS
Deputy Director

ANDREW SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT

LAND USE AND CODES ADMINISTRATION
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

April 17, 1994

Mr. Roy Katsuda
Hale Mahaolu
200 Hina Avenue
Kahului, HI 96793

SUBJECT: Hale Mahaolu - Elima Elderly Housing Project
TMK: 3-8-7:POR 111

Dear Mr. Katsuda:

Thank you for your letter of February 22, 1994. The following comments are relative to codes and ordinances under the jurisdiction of the Department of Public Works. Further comments should be solicited directly from other agencies having jurisdiction.

The comments are numbered in response to the requested waivers and exemptions as noted in your project summary:

1. The subject project site is currently being subdivided under LUCA No. 3.1596. The subdivision is required by the recently amended Section 18.04.030 of the Maui County Code (1994) to obtain zoning to conform to the community plan. However, this project may be exempted provided that the project is established as an affordable housing project in accordance to Section 18.08.050.h of the Maui County Code (MCC).

The R-2 Residential District zoning should be confirmed with the Planning Department. It appears that there is a gap in the current zoning maps on file with our office which would leave the property within a urban interim designation.

2. Provided that the zoning for the subject project is confirmed, comments relative to this waiver is deferred to the Planning Department.
3. Same as response no. 2.
4. Same as response no. 2.

APR 22 1994

5. Same as response no. 2.
6. The requested parking waiver to provide 81 stalls instead of maximum requirement of 142 should be justified further to include the specific users. Perhaps a minimum number of paved stalls could be based on 1 stall per unit, visitor parking based on 20 % of the total units and the normal code requirements for the day care and community buildings. Overflow grassed parking may be alternative to mitigate costs.
7. Comment deferred to agency having jurisdiction.
8. Same as response no. 7.
9. Same as response no. 7.
10. The county cannot ensure that wastewater system capacity will be available for the project. The applicant will be required to fund any necessary off-site improvements to the collection system and wastewater pump stations. The applicant may contact the Wastewater Reclamation Division at 243-7417 for further clarification.
11. No traffic study is required however a sight distance analysis is required for any proposed driveway onto a County road.
12. Section 18.20.030 of the MCC does not apply to the subject project's subdivision since no new streets will be created. However, Section 18.20.040.B.2 of the MCC requires road improvements provided that access is established over the privately owned TMK parcel 3-8-07:126. The improvements may be deferred if the agreement noted in waiver no. 13 is executed.
The TMK map indicates that an easement was granted over parcel 126 to provide an access from the Hale Laulea Subdivision to Kamehameha Avenue.
If access to the project site is obtained through the existing Luana Gardens III, a subdivision will be required to establish the access.
13. No comments.
14. See response no. 12. Road improvements are not required for two lot subdivisions. The improvements may be required under Section 16.26.4600 of the Maui County Code if the adjacent private parcel is established as a public street.
15. Comment is deferred to agency having jurisdiction.

Hale Mahaolu-Elima Elderly Housing Project
April 17, 1994
page 3

16. No comments.

17. No comments.

18. Section 16.26.4600 of the MCC only applies if the adjacent TMK parcel 3-8-7:126 is established as a public street. The required improvements provides for the general health, safety and welfare of the general public. In addition, it provides for the users o these proposed facilities. If the applicant is granted waivers from these conditions, then the County of Maui will be required to construct these improvements to provide safer road and drainage facilities.

If you have any questions regarding this letter, please call Francis Cerizo at 243-7373.

Very truly yours,



GEORGE N. KAYA
Director of Public Works and Waste
Management

FC
file/HALEMAHA.OLU
XC: WWRD
FINANCE DEPT.
PARKS DEPT.
ENGINEERING DIV.



**BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1108
WAILUKU, MAUI, HAWAII 96793-7108**

June 7, 1994

Mr. Roy Katsuda, Executive Director
Hale Mahaolu
200 Hina Avenue
Kahului, Maui 96731

Re: Hale Mahaolu Elima, Inc.; 201E review for 60 proposed elderly housing units, community hall and adult daycare center; TMK 3-8-7:por. 111; Kahului, Maui

Dear Mr. Katsuda,

The water system development fee is the only charge which would affect the project. This is also the only means of granting a water reservation for the project. If the applicant will be ready to receive service within a year of payment, reservation of water can be obtained through normal processing of the project. If reservation of water is desired for a longer period, the applicant is advised to request reservation of water from the Board.

There is no water moratorium at present in the area of the project.

Water system and fire protection improvements to meet Board standards should be provided. We would be happy to review and comment on the planned improvements when these are submitted to our Engineering Division for review.

We would have no objections if the landscape were irrigated from the county system. Please name the designated responsible party for billing purposes at the time of water service application.

We advise the use of drought-tolerant plantings, and other water-saving landscape features. Please refer to the attached guidance in xeriscape techniques, and to the Maui County Planting Plan for additional guidance.

Sincerely,

David Craddick
Director
elk

JUN 13 1994

"By Water All Things Find Life"

Printed on recycled paper



XERISCAPE
Water Conservation Through Creative Landscaping

Xeriscape Defined
Seven Water Conservation Fundamentals
Planning and Design
Soil Improvement
Efficient, Zoned Irrigation
Limited Turf Area
Use of Mulches
Use Of Low Water-Demand Plants
Appropriate Maintenance
Community Water Management

XERISCAPE

The Department of Water Supply is faced with increasingly more difficult demands regarding water--its supply, quality, distribution, purification, management, and associated costs. Potable water is becoming scarce and the costs of building delivery systems and water treatment plants prohibitive. Consequently, there is a need to conserve water, not only during droughts, but to reduce demands of peak loading on systems in an attempt to delay construction of larger, expensive facilities. Saving water saves energy while conserving other valuable resources.

Water conservation takes on two broad aspects. First, efficient manipulation of physical factors in the landscape - delivery and irrigation systems, soils, percent hardscape used in a design, plants, microclimates, mulch, etc. Secondly, the people factors, which are often more important.

The incorrect perception that water is "cheap" or "inexpensive" has led to the ideas that the water supply is not finite and that it flows towards money. This in turn has fostered a national consciousness that high water use landscapes are normal, desirable and acceptable. Little has been done to change this mind set, particularly as it relates to water conservation in the landscape.

With the increased, continuous demand for high quality water exceeding supply of both surface and below ground sources, a new philosophy for conservation must be engendered: billing must reflect the real costs of water and people must learn and practice the "whys" and "hows" of water conservation. This is why Xeriscape began.

Xeriscape Defined

XERISCAPE (zir' i scap) is an integrated approach to landscape water conservation. Xeriscape was coined from the Greek word "xero" for dry. Thus, Xeriscape means dryscape or low-water use landscaping. Xeriscapes are designed through wise planning, plant and construction materials selection, and proper installation to provide beautiful, water efficient, low maintenance landscapes.

In Hawaiian E' Malama Wai meaning "Cherish Our Water" is used to refer to Xeriscaping.

Many have misread the term as zeroscape, which would imply noscape or no landscape plantings. Others have equated xeriscape landscaping with "rockscapes," many of which are not aesthetically pleasing and may not always conserve water or energy. Rockscapes are harsh, produce glare, and do little to prevent noise and air pollution, making them a poor substitute for Xeriscape landscaping.

Seven Water Conservation Fundamentals

The Xeriscape motto, "Water conservation through creative landscaping," provides the umbrella under which a wide variety of landscape water conservation activities may be taught and employed in a community. And although there are many landscape and horticultural techniques that conserve water, Xeriscape programming has focused on seven broad, fundamental areas.

1. Planning and Design
2. Soil Improvement
3. Efficient, Zoned Irrigation
4. Limited Turf Areas
5. Use of Mulches
6. Use of Low Water Demand Plants
7. Appropriate Maintenance

Planning and Design

Architects, planners, and homeowners are encouraged and taught to incorporate standard design elements of function, circulation, topography, exposure, seasonal color, texture, safety, etc. into existing landscapes and new designs with emphasis on conserving, limiting and/or reusing water. 40% to 60% of the water homeowners use goes for yard watering. Appropriate design and planning can provide these very necessary aspects of urban life and conserve water at the same time. Xeriscapes can ameliorate the impact of a severe drought and avoid the costly clean-up resulting from a "boom and bust" water policy. Tree removal, replanting of landscapes and turfgrass fields are eliminated and real savings to Maui County.

Thayer and Richman (1984) suggest that designing water-conserving landscapes should be considered in two parts. First, the physical ecology of plants and plant communities must be integrated within the microclimates of the landscape. Logically, plants best adapted to the climate, temperatures, sun, wind, and physical nuances of the site thrive best and require the least expenditures for water, energy and maintenance. Secondly, landscape designers must accept that there is a "human ecology" of water use in landscapes. That is, the intensity of human

activity dictates landscape water use. This includes all uses, whether functional or aesthetic. Thayer and Richman coined the term "hydrozone" to describe the type and intensity of human activity in the landscape and identified four classes of hydrozones. These will be discussed under the heading "Efficient, Zoned Irrigation".

Soil Improvement

Residential soils can be difficult soils to manage because they have been badly disturbed by construction and urban activities. Normal soil horizons are mixed unevenly both vertically and horizontally. Often, hardpans exist and impede drainage, and most urban soils have been compacted by heavy equipment or traffic. Many of the physical and chemical soil properties plants require for growth are present at less than optimum levels in urban soils. Soil improvements must correct poor water infiltration, percolation, and drainage, while providing adequate water holding capacity and improving the nutritional status of the soil. Organic amendments meet most of these requirements and improve tilth, making it easier to till the soil and manage weeds. Adding 3-5 cubic yards of well composted organic matter per 1000 square feet and tilling it into the top 8-12 inches of soil is recommended.

Other amendments such as lime be added to adjust an undesirable acid soil condition. These adjustments should be made prior to planting.

Efficient, Zoned Irrigation

Matching the amount of water supplied to each plant with the plant's water requirement is the most efficient way to irrigate.

Until recently this was difficult to do and most landscapes were irrigated to meet the needs of the turfgrass or other plants with high water requirements. Sprinklers cover large areas without regard to the water needs of individual plants. To eliminate waste by overwatering and run-off, group plants according to their water requirements and use zoned irrigation systems to deliver water to individual plants or to plants with similar moisture requirements (Figure 10-2). Fewer plants will develop disease or die from overwatering.

Not only are irrigation zones established to meet the physical or ecological water needs of plants, but Xeriscape landscaping also recognizes that human activity will impact plant water needs. Thayer and Richman (1984) describe this irrigation zoning to match man's activity as hydrozone planning, and they define four irrigation regimes (Figure 10-3).

The Principal Hydrozone represents the area with the greatest human activity and consequently the greatest water and energy use: sites in yards, parks, and play fields where people frequently, play, sit, walk, gather, or relax; places where people regularly contact plants.

The Secondary Hydrozone is less physically impacted by humans, but is visually important: areas of passive activities space delineation or focal interest such as flower and shrub beds, entrances, prominent plantings, etc; areas of high visual impact, but seldom touched by humans.

Buffer zones, distant views, median strips, parkways, and embankments—these make up the third hydrozone, called the Minimal Hydrozone. In this case, plants are selected that need minimal supplemental water to survive the natural climatic conditions.

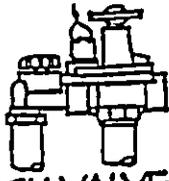
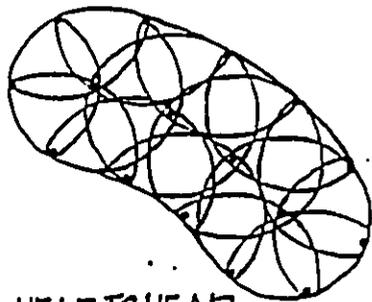
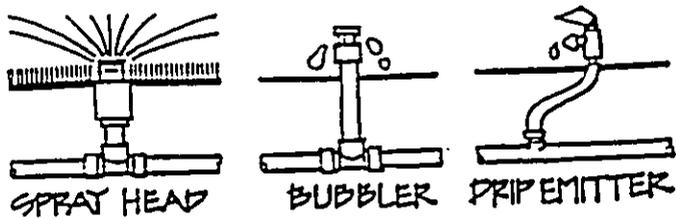
The Elemental hydrozone constitutes landscape plantings that require only natural precipitation to survive and seldom, if ever, incur human activity. Utility areas, mulched native plantings, and naturally sustainable, exotic vegetation belong to this hydrozone (Figure 10-4).

Flexible sprinkler heads and nozzles, adjustable delivery rates and coverage, modern valves, and automated controllers — these allow greater water conservation through zoned irrigation. On-off watering is easily programmed to match water infiltration rates into soils, thus avoiding surface runoff. Also, water is better applied to meet specific plant needs as impacted by seasonal human activity and changes in the weather.

Collection systems should be designed and constructed throughout the landscape to gather storm runoff from roofs, walks, drives, and slopes. By grouping high or moderate water requiring plants near swales and collection basins, much of their water needs can be met by natural moisture accumulations rather than irrigation. On the other hand, drought tolerant species may succumb to frequent accumulations of water and should be located on southern exposures or at the tops of slopes. Because they often only require supplemental irrigation during establishment or during a severe drought, a permanent irrigation system may not be needed.

Limited Turf Area

Turfgrass plays a primary role in most landscapes. Turfgrasses make excellent ground covers. They tolerate heavy foot traffic in the backyard, at the park, or on the athletic field. And mowed or unmowed, they stabilize slopes and prevent erosion. They serve to unify designs and instill a sense of pride in home and neighborhood when well kept. Moreover, turf helps keep homes and communities cleaner by reducing particulate and chemical air pollution. Unfortunately, a lawn consumes approximately half the landscape water and requires weekly care—As well, equipment, pest control and periodic cultural practice such as coring or dethatching contribute to the expense, both in time and money, of maintaining a lawn.



1. Separate irrigation lines into high, moderate and low water-use zones or areas and set an automatic valve at the head of each line. The same plant material on the north side of a structure or in a sheltered area will require less water than in a more severe exposure.
2. To help achieve uniform water distribution for turfgrass, overlap sprinkler spray patterns (100%) so that water from one head reaches out to the next nearest head (head-to-head coverage). Ask your irrigation supplier for low gallonage sprinkler heads that have "matched precipitation rates."
3. Wire each valve into an automatic timer to control how many minutes each valve applies water. Select a timer that allows recycling, that is, several cycles of on/off "runtime" during each irrigation day. Heavy soils, clays, require several hours between short on periods to allow water to move deeper into soils. Sandy soils require less time between on times and may require mulching to enhance water retention qualities.
4. Prepare and follow an irrigation schedule by contacting a local landscape architect or irrigation specialist. Determine the precipitation requirements for your particular trees, shrubs, lawn and flower beds and program the timer to meet their individual water requirements. Settings will have to be changed seasonally to meet the plants demand for water.
5. Prevent surface run-off by adjusting heads to eliminate over spray on hard surfaces; reduce misting by spraying larger water droplets; utilizing on/off cycling; reducing slopes; using low precipitation heads and applying mulch whenever possible.

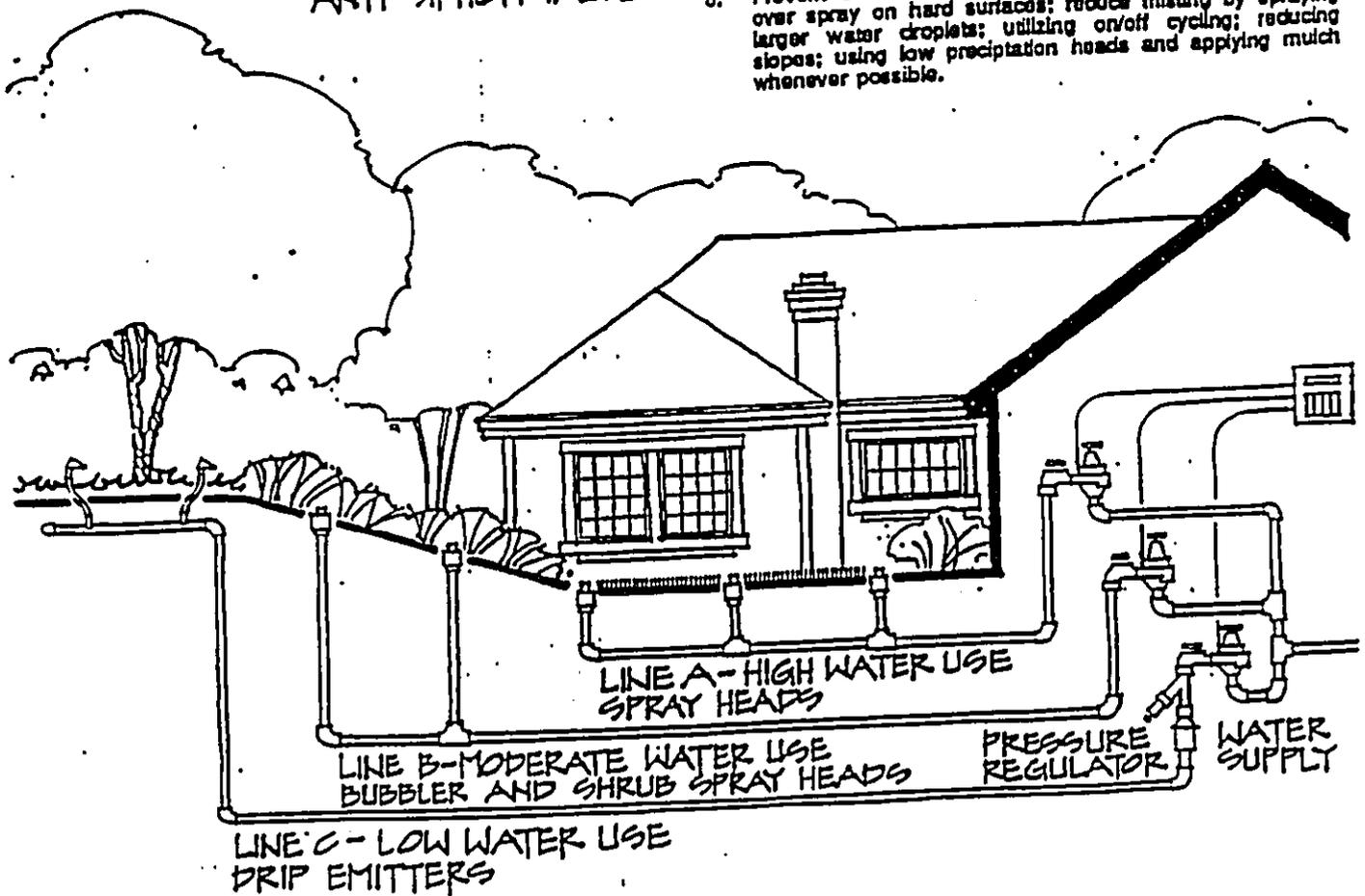


Figure 10-2. Five Steps to Efficient Irrigation

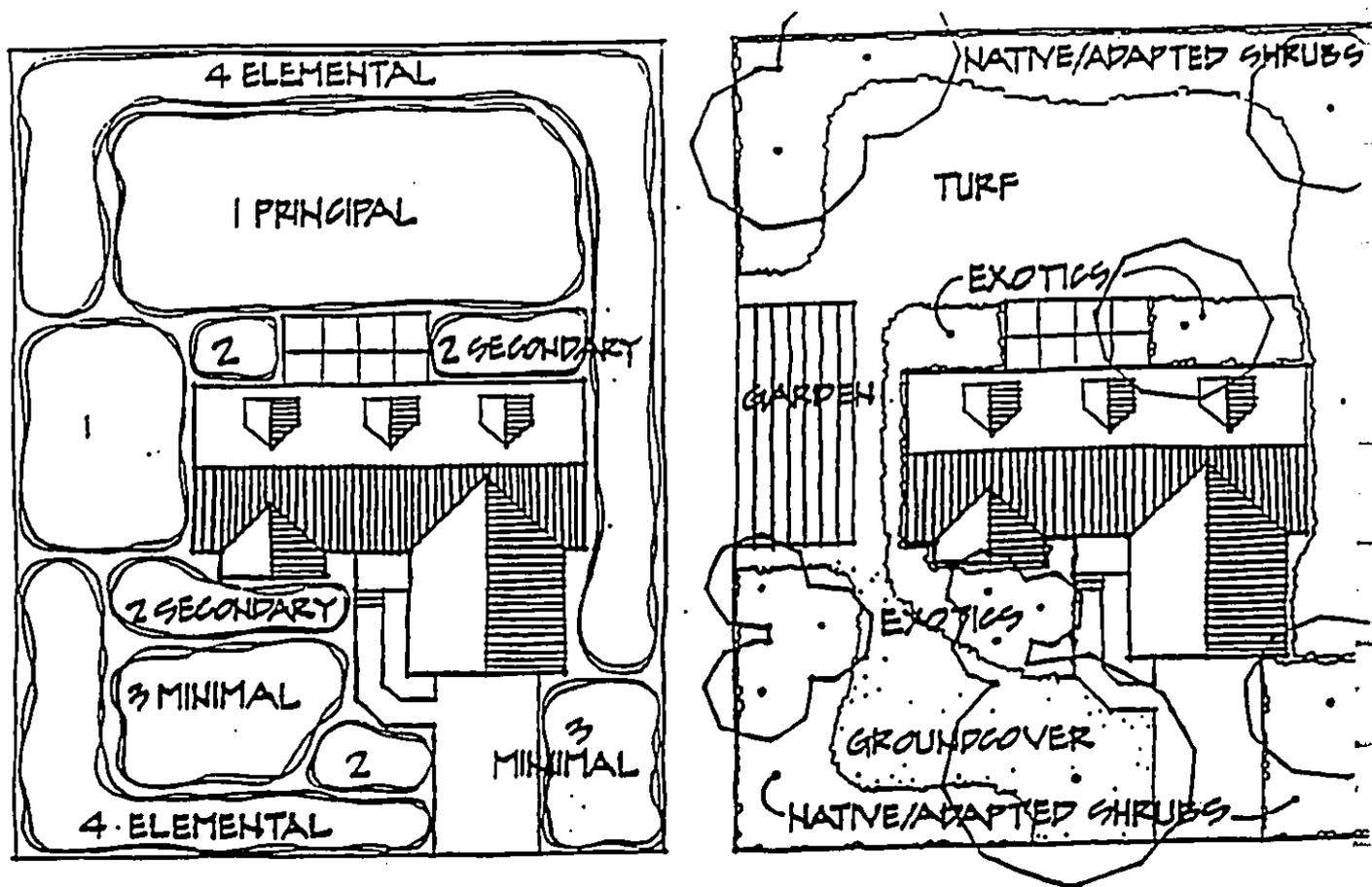


Figure 10-3. Hydrozone Concept Applied to Suburban Lot

Turf should be limited by design to high-use areas in landscapes and separated from other plantings with different water needs. After reviewing the landscape plans, classify the turf areas as either passive or active use and seed and irrigate accordingly. Plant drought-tolerant species with poor resistance to heavy traffic in less-frequented sites.

Not only should the total turf areas be reduced in a landscape, but the perimeter measurement also must be reduced as much as possible. Long, narrow strips of turf are difficult to properly mow, fertilize, keep pest free, and irrigate. Such strips require hand work to keep them attractive, which increases maintenance time and labor costs. Water from over-spraying turf in narrow planter islands, parkways, side yards, and around entrances not only runs off and is wasted but also contributes to the deterioration of paint, walls, walks, and asphalt in parking lots and streets. Mulches or groundcovers and shrubs on drip or underground irrigation can appropriately replace turf in many landscape sites. Drip emitters or bubblers can be used to irrigate individual plants and eliminate waste caused by overspray. Mulches need no water, and well chosen groundcovers require less water and maintenance than turf.

Likewise, the amount of turfgrass in a landscape may be reduced by increasing the hardscape. Patios, wooden decks, rocked and graveled walks limit the turf area while reducing the water requirement.

Use of Mulches

Mulches function to buffer soils against climatic extremes. In summer, they reduce soil heating and slow evaporation water loss from soil surfaces. They also reduce weeds and make those present easier to remove. Proper use of mulches reduces or prevents soil erosion. Organic mulches also contribute to the nutritional level and tilth of the soil as they breakdown.

These practical functions are important; however, many mulches are included in the landscape for their design flexibility and attractiveness, not simply because they save water, protect roots, and reduce maintenance.

Mulches are classified as organic, inorganic, and living. Organic mulches include plant refuse, such as chips and slash from tree trimming operations, saw dust, composted leaves and manures, peat moss, and graded bark products. Sized and washed rocks and gravels are popular inorganic mulches which come in many sizes, colors, and textures. Impervious sheet plastics covered with either organic or inorganic mulches were popular, but because sheet plastic prevents gas and water exchange between air and soil and creates a water-logged root environment, woven, porous plastics are now preferred. Mulches are applied 3 to 4 inches deep over bare soil and only 2 to 3 inches deep over woven fabrics. Living mulches include low growing groundcovers and low maintenance turfgrasses. They function well as mulches, but may be heavy competitors for water and nutrients under newly planted trees and shrubs. If used, select hardy, drought-tolerant species that resist common diseases. These species provide the best results and require less maintenance.

Use Of Low Water-Demand Plants

Many beautiful and functional plants, both exotics and natives, are available that thrive with natural precipitation or small amounts of supplemental water.

Chapter Two lists tree characteristics including their water requirements ranging from dry (less-thirsty) to wet (very-thirsty).

All types of plants with low water requirements are now available and more will become available as demand increases. The range of drought-tolerant plant species and those with low water requirements is now wide enough to permit selecting for function, beauty, and seasonal interest. As with all plant selections and planting, take care to match the specific needs of the plant to the environmental conditions and the intensity of human activity at the planting site. This is critical when using drought tolerant and low water use plants in the landscape. Choosing the proper plants and planting them correctly will reduce water consumption and maintenance costs over many years.

Appropriate Maintenance

Low maintenance is not no maintenance. The use of all or most of the Xeriscape principles will reduce but not eliminate maintenance. And generally, the greater the human activity at a site, the greater its maintenance requirements will be. Trees, shrubs, groundcovers, and turfgrasses are living organisms that require care. Timely fertilizing, watering, pruning, pest management, and other cultural practices are necessary in Xeriscape landscapes, but at reduced levels compared to conventional landscape plantings. Even mulched sites without plants must have litter removed periodically. Irrigation components for drip and sprinkler systems require routine checks and servicing. Xeriscape landscaping coupled with sound maintenance produces water and energy savings and environmentally adapted landscapes that are aesthetically pleasing.

As has been stressed, integrating these principles in landscapes will conserve water and reduce annual maintenance costs. Most importantly though, Xeriscape landscaping provides these benefits without sacrificing function or beauty. And although these seven points are stressed in Xeriscape literature and are the basis for Xeriscape programming, there is no substitute for creativity as a means of discovering and sharing new ways to conserve water without making yards and parks into zeroscapes.

Community education in Xeriscape landscaping is the key to successful water conservation program. The principles of Xeriscape landscaping challenge the widespread but mistaken belief that water is cheap, unlimited resource which will always be available. Hopefully, the public will recognize that this is a misconception and that water conserving landscapes are necessary and should be considered "normal" within our society. At the same time, it teaches people the "whys" and "hows" of effective water conserving horticulture. To reach these objectives requires the cooperation of government leaders,

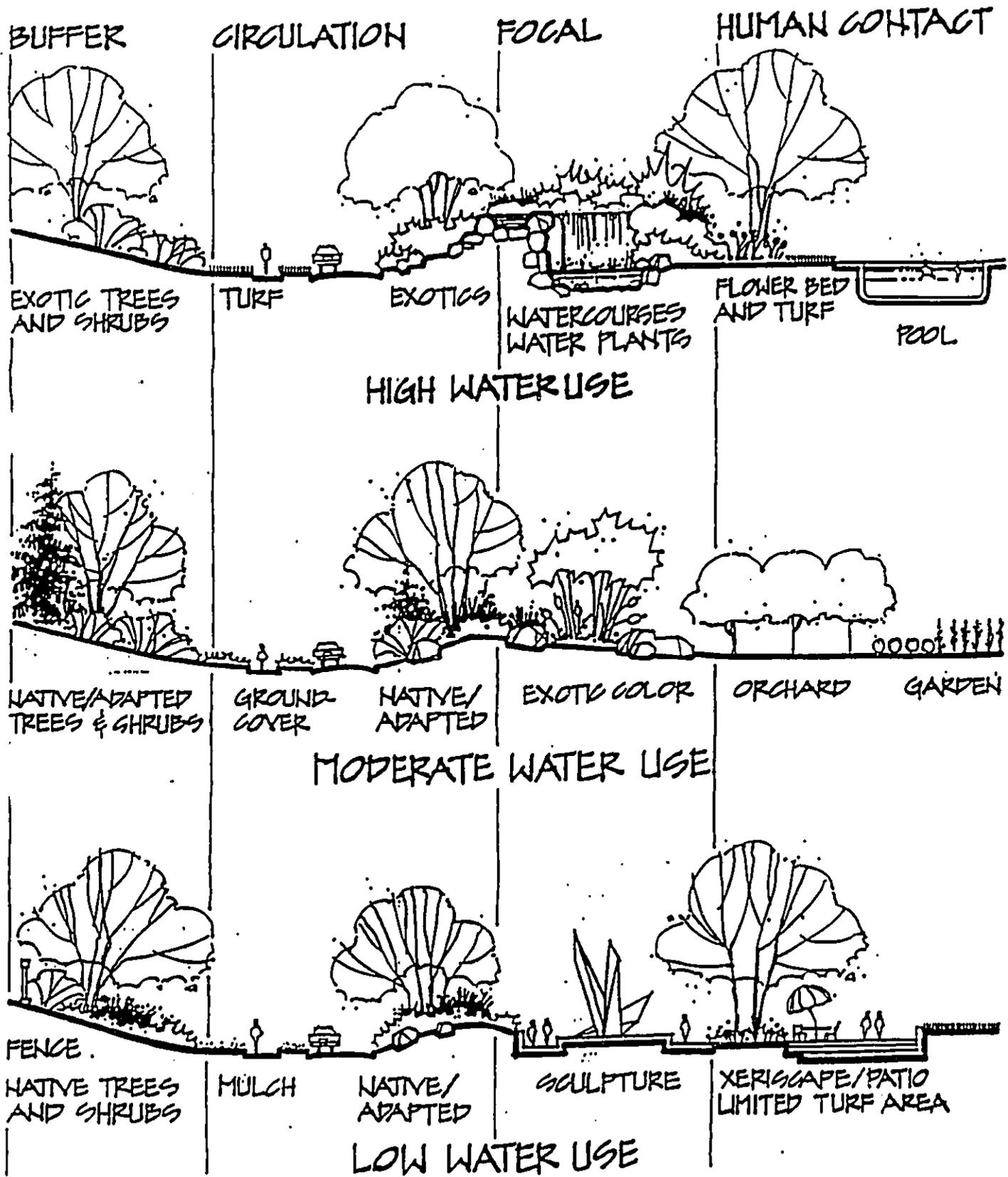


Figure 10-4. Water Use Relating to Human Use—Three Approaches

agencies, landscape professionals, horticulturists, irrigation specialists, concerned citizens, and an army of volunteers enthusiastically supporting and promoting xeriscape programming.

Community Water Management

Xeriscape landscaping, when followed, will conserve water, reduce maintenance costs, and establish beautiful, environmentally sound landscapes, parks, recreational facilities and greenspaces throughout a community. Conserving water averts the need to construct costly new delivery systems and waste treatment plants that would otherwise be needed to meet periods of peak loading. Xeriscaping also leads to changes in attitudes about water quality, water use, and how a community's water should be managed, especially in landscape irrigation.

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Thayer, Jr., Robert L. and TG. Richman, "Water-Conserving Landscape Design." In Energy Conserving Site Design, Ed. G. McPherson, Am. Soc. Landscape Architects, 1984.

LOW WATER USE/DROUGHT TOLERANT PLANT LIST

All plants require water for establishment. After they are rooted and growing well their water requirements will vary.

The following is an incomplete list of drought tolerant plants. It is provided for your convenience.

Please review the following reference lists for many other suggestions.

1. Drought Resistant Plants For Hawaiian ardens by Norman C. Benzona, County Extension Agent, Cooperative Extension Service.
2. Drought Tolerant Native Hawaiian Plants for the Landscape - by Heidi Bornhorst Horticulturist, Honolulu Botanic Gardens.
3. Halawa Xeriscape Garden Registry of Nurseries that grow Less-Thirsty-Plants-Honolulu Board of Water Supply, November 1989.

Key to Symbols

A Accent Plant
F Flower Color
GC Groundcover
G Grass
OG Ornamental Grass
S Shrub
SC Succulent
ST Small Tree
MT Medium Tree
LT Large Tree
V Vines

Key to Zones

Zone 1 - Normal watering level.
Includes lush lawns and gardens.

Zone 2 - Moderate watering level.
Includes lawns, ground covers and shrubs.

Zone 3 - Low watering level.
Includes self-sustaining plant materials and natural vegetation with emphasis on plants that require little or no supplemental irrigation.

Type	Botanical Name	Zone	Common Name
S	<u>Abutilon menziesii</u>	3	Ko'o Loa'ua
MT	<u>Acacia koa</u>	2	Koa
A,F,S,SC	<u>Adenium obesum</u>	3	Desert Rose
A,F,GC	<u>Agapanthus africanus</u>	2	Lily of the Nile
A,SC,S	<u>Agave attenuata</u>	3	Agave
MT	<u>Aleurites moluccana</u>	2	Kukui
S,GC,F	<u>Aniscanthus thurberi</u>	3	Desert Honeysuckle
V,GC,F	<u>Antigonon leptopus</u>	3	Mexican Creeper (3 colc
S,GC,A	<u>Asparagus densiflorus</u>	2	Foxtail Asparagus
	cv 'Meyers'		
S,GC,A	<u>A. densiflorus</u>	2	Sprenger Asparagus
	'Sprengeri'		
A	<u>Aspidistra elatior</u>	2	Cast Iron Plant
	'variegata'		
GC	<u>Asystasia gangetica</u>	3	Asystasia
V,SC,GC	<u>Aptenia cordifolia</u>	3	Hearts and Flowers
MT,F	<u>Bauhinia blakeana</u>	2	Hong Kong Orchid Tree
V,F	<u>B. galpinii</u>	2	Red Bauhinia
ST,F	<u>B. tomentosa</u>	3	Yellow Bauhinia
A,SC,ST	<u>Beaucarnea recurvata</u>	3	Pony tail
A,V,F	<u>Bougainvillea 'Crimson</u>	2	
	<u>Jewel'</u>		
A,V,F	<u>Bougainvillea 'Jamaica</u>	2	
	<u>White'</u>		
A,V,F	<u>Bougainvillea 'Rosenka'</u>	2	
A,V,F	<u>Bougainvillea 'Temple</u>	2	
	<u>Fire</u>		
ST	<u>Brexia madagascariensis</u>	2	Brexia

Type	Botanical Name	Zone	Common Name
MT	<u>Caesalpinia ferrea</u>	2	Brazilian Ironwood
A,S,F	<u>Caesalpinia pulcherrima</u>	3	Ohai ali'i (3 colors)
S	<u>Calotropis gigantea</u>	3	Crown Flower
ST	<u>Canthium odoratum</u>	3	Alahe'e
S	<u>Carissa grandiflora</u>	3	Natal Plum
S,GC	<u>C. grandiflora prostrata</u>	3	Creeping Natal Plum
S,ST,F	<u>C. surratensis</u>	3	Kolomona
SC,GC	<u>Carpobrotus edulis</u>	3	Hotentot Fig
MT,F	<u>Cassia fistula</u>	3	Yellow Shower
MT,F	<u>Cassia fistula x</u>	2	Rainbow Shower
	<u>C. javanica</u>	3	(All Colors)
ST	<u>Ceratonia siliqua</u>	3	Carob Tree
V,GC,S	<u>Clerodendron inerme</u>	3	Glory Bower
MT	<u>Clusia rosea</u>	3	Autograph Tree
S	<u>Clusia sp.</u>	3	Small Leaf Clusia
MT,F	<u>Cochlospermum vitifolium</u>	3	Buttercup Tree
MT,F	<u>Cordia subcordata</u>	2	Kou
OG	<u>Cortaderia selloana</u>	3	Pampas Grass
S,SC,A	<u>Crassula argentea</u>	3	Jade Plant
ST	<u>Crescentia cujete</u>	3	Calabash Tree
V	<u>Cryptostegia grandiflora</u>	3	India Rubber Vine
A,S	<u>Cycas revoluta</u>	2	Sago Palm
G	<u>Cynodon dactylon</u>	3	Bermuda Grass
A,S,SC	<u>Dasyliiron wheeleri</u>	3	Spoon Flower
MT,A,F	<u>Delonix regia</u>	2	Royal Poinciana
			(3 colors)
S	<u>Dodonaea viscosa</u>	3	'A'ali'i
LT	<u>Enterolobium cyclocarpum</u>	3	Earpod
MT	<u>Eriobotrya japonica</u>	2	Loquat
MT	<u>Erythrina sandwicensis</u>	3	Wiliwili
MT	<u>Erythrina "Tropic Coral"</u>	2	Tropic Coral
			Wiliwili
MT	<u>E. variegata</u> var.	2	Tigers Claw
	<u>orientalis</u>		
S,SC,A	<u>Euphorbia cotinifolia</u>	2	Hierba mala
A,GC,SC	<u>E. millii</u>	3	Crown of Thorns
ST,A	<u>Feijoa sellowiana</u>	2	Pineapple Guava
S	<u>Ficus buxifolia</u>	2	Boxwood Ficus
ST,A	<u>Ficus carica</u>	3	Fig
S,A	<u>F. diversifolia</u>	2	Mistletoe Fig
LT	<u>F. microcarpa</u>	3	Chinese Banyan
S,GC	<u>F. microcarpa</u> var.	3	Taiwan Ficus
	<u>crassifolia</u>		
A,SC	<u>Furcraea</u> aff. <u>giantea</u>	3	Variegated Furcraea
	<u>variegata</u>		

Type	Botanical Name	Zone	Common Name
S,A	<u>Gardenia brighamii</u>	2	Nanu
S,GC	<u>G. radican</u>	2	Creeping Gardenia
S	<u>Gossypium tomentosum</u>	3	Ma'o
S,A	<u>Grewia occidentalis</u>	2	Lavendar Star
ST,A	<u>Guaiacum officinale</u>	3	Lignum Vitae
S,A,F	<u>Hibiscus brackenridge</u>	2	Ma'o hau hele
S,GC	<u>H. calyphyllus</u>	3	Rock's Hibiscus
S,A,F	<u>H. 'Carnation'</u>	2	Carnation Hibiscus
S,A,F	<u>H. 'Cooperi'</u>	2	Calico Hibiscus
S,A,F	<u>H. schizopetalus</u>	2	Coral Hibiscus
S,A,F	<u>H. schizopetalus 'Pagoda'</u>	2	Pagoda Hibiscus
S,A,F	<u>H. waimeae</u>	2	Koki'o ke'o ke'o
S,F	<u>Jasminum sambac</u>	2	Pikake
S,F	<u>J. sambac 'Duke of Tuscany'</u>	2	Giant Pikake
GC	<u>Juniperus chinensis</u>	2	Japanese Garden
	<u>procumbens</u>	2	Juniper
S,GC,F	<u>Lantana camara 'Radiation'</u>	2	Lantana
GC,F	<u>Lantana cv 'Gold Mound'</u>	2	
GC,F	<u>L. montevidensis</u>	2	Trailing Lantana
S,A	<u>Laurus nobilis</u>	2	Bay Laurel
ST	<u>Myoporum sandwicense</u>	3	Naio
S,A	<u>Nandina domestica</u>	2	Dwarf Nandina
	<u>compacta nana</u>		
S,F	<u>Nerium oleander</u>	3	Oleander
S,F	<u>Nerium oleander f. 'dwarf'</u>	3	Dwarf Oleander
S	<u>Nototrichium sandwicense</u>	3	Kului
MT	<u>Olea europaea</u>	3	Olive
S	<u>Osteometes anthylliditolia</u>	3	'Ulei
G	<u>Paspalum vaginatum</u>	2	Seashore Paspalum
MT	<u>Pithecellobium dulce</u>	2	Variegated Opium
	<u>'variegata'</u>		
S,GC	<u>Pittosporum tobira</u>	2	Wheeler's
	<u>'wheeleri'</u>		Pittosporum
S,F	<u>Plumbago auriculata</u>	3	Cape Leadwort
S,GC	<u>P. zeylanicum</u>	3	'Ilie'e
MT,F	<u>Plumeria hybrid (and spp.)</u>	2	Plumeria
S,A,SC	<u>Potulacaria afra</u>	3	Miniature Jade
MT,F	<u>Pseudobombax ellipticum</u>	2	Pink Bombax
S,ST	<u>Punica granatum</u>	3	Pomegranate
A,GC	<u>P. granatum nana</u>	3	Dwarf Pomegranate

Type	Botanical Name	Zone	Common Name
S	<u>Rosemarinus officinalis</u>	3	Rosemary
GC	<u>R. officinalis</u> var. prostrata	3	Creeping Rosemary
S,A,F	<u>Russelia equisetifolia</u>	2	Coral Plant
T	<u>Samanea saman</u>	3	Monkey Pod
A	<u>Sansevieria</u> spp.	3	Sansevieria
MT	<u>Sapindus saponaria</u>	2	Soapberry Tree
S	<u>Scaevola taccada</u>	3	Naupaka
ST	<u>Schinus molle</u>	3	California Pepper Tree
GC,SC	<u>Sedum</u> spp.	3	Sedum
V,F	<u>Senecio confusus</u>	2	Mexican Flame Vine
V,GC	<u>Stapelia nobilis</u>	3	Giant Carrion Flower
G	<u>Stenotaphrum secundatum</u>	2	St. Augustine Grass
OG	<u>S. secundatum variegatum</u>	2	Veriegated St. Augustine Grass
A,F	<u>Strelitzia reginae</u>	2	Bird of Paradise
MT	<u>Tabebuia argentea</u>	2	Silver Trumpet Tree
LT	<u>T. chrysantha</u>	2	Trumpet Tree
LT	<u>T. donnel-smithii</u>	2	Gold Tree
MT	<u>Tamarix aphylla</u>	3	Desert Athel
V,GC,F	<u>Thevetia peruviana</u>	3	Be-still Tree
GC	<u>Tradescantia spathacea</u>	3	Oyster Plant
S,GC	<u>Wikstroemia uva-ursi</u>	3	'Akia
A,SC	<u>Yucca gloriosa</u>	3	Spanish Bayonet
G	<u>Zoysia tenuifolia</u>	2	
G	'Elegance'	2	
G	<u>Z. tenuifolia</u> 'Emerald'	2	

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Appendices

Appendix A

Archaeological Inventory Survey

ASC93-5

Archaeological Inventory Survey
of the Proposed Hale Mahaolu-Eha
Elderly Low/Moderate Income Housing Project,
Kahului, Maui Island
(TMK 3-8-7: por. 111)

by

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and

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ABSTRACT

An archaeological inventory survey was conducted for the proposed Hale Mahaolu-Eha Project in Kahului, Maui Island. This investigation determined that extensive surface alterations occurred within the project area. These disturbances involved agricultural production during the early 1970's, the mechanical removal of vegetation which posed a fire hazard in the early 1980's, and the grubbing and clearing of areas surrounding a neighboring subdivision development. These changes are chronologically documented on aerial photographs. Based on the lack of surface cultural remains, signs of extensive ground disturbances, and negative results of previous archaeological subsurface investigations in adjacent areas, subsurface testing in the subject project area was considered to have minimal to no potential for encountering cultural remains. Thus, in consultation with Ms. Theresa Donham, resident Maui Island archaeologist for HPD/DLNR, and Ms. Annie Griffin, staff archaeologist in charge of Maui County, the requirement for subsurface testing was waived.

INTRODUCTION

At the request of Michael T. Munekiyo Consulting, Inc., Aki Sinoto Consulting of Honolulu, conducted an archaeological inventory survey for the proposed Hale Mahaolu-Eha Project, in Kahului, Maui, Hawai'i (TMK 3-8-7: por. 111) (Fig. 1). This project is slated for an elderly low/moderate income housing subdivision. The property is currently owned by the County of Maui. The purpose of this survey was to identify any archaeological remains that may exist within the project area. The project area has been significantly altered by previous bulldozing activities. These activities occurred during modern agricultural use, the construction of the neighboring Luana Gardens II Condominiums, and the later removal of vegetation to eliminate a fire hazard. An initial field inspection took place on 10 March 1993 and the survey was conducted on 17 March 1993, by Coral Rasmussen and Kiyoshi Maruyama. Theresa Donham, resident Maui Island archaeologist for the State Historic Preservation Division, Department of Land and Natural Resources (HPD/DLNR), conducted a field visit on 18 March 1993.

PROJECT AREA

The project area is located in Wailuku ahupua'a on the island of Maui. The 3.544 acre project area is bounded by South Kamehameha Avenue to the west, Luana Gardens II Condominiums to the west and north, Luana Gardens III to the east, and a vacant lot to the south (Fig. 2).

ENVIRONMENT

The project area occurs on relatively flat terrain at an elevation of approximately 80 to 100 feet (24 to 30 meters) above sea level. Annual rainfall averages between 20 to 30 inches (0.50 to 0.76 meters), with most of the precipitation occurring during the winter months between November and March (Foote et al, 1972).

Soil in the project area consists of Puuone sands, characterized as a partially consolidated, excessively drained, grayish-brown sand. These sands, occurring on 7% to 30% slopes, were developed from coral and sea shell. The Puuone sands, formed during the Late Pleistocene epoch, extend southward from Kahului towards Kihei.

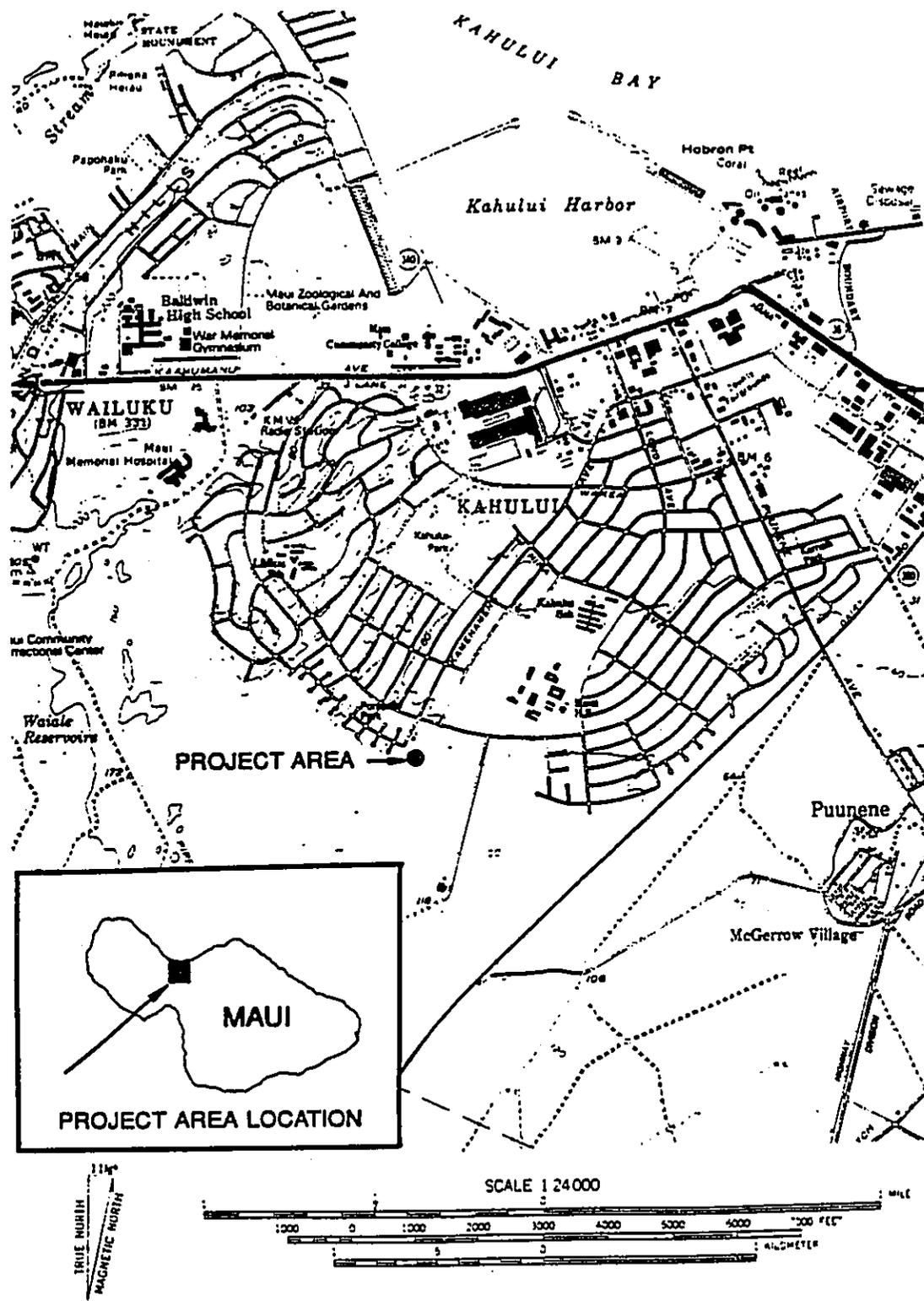


Figure 1. Location of Project Area.

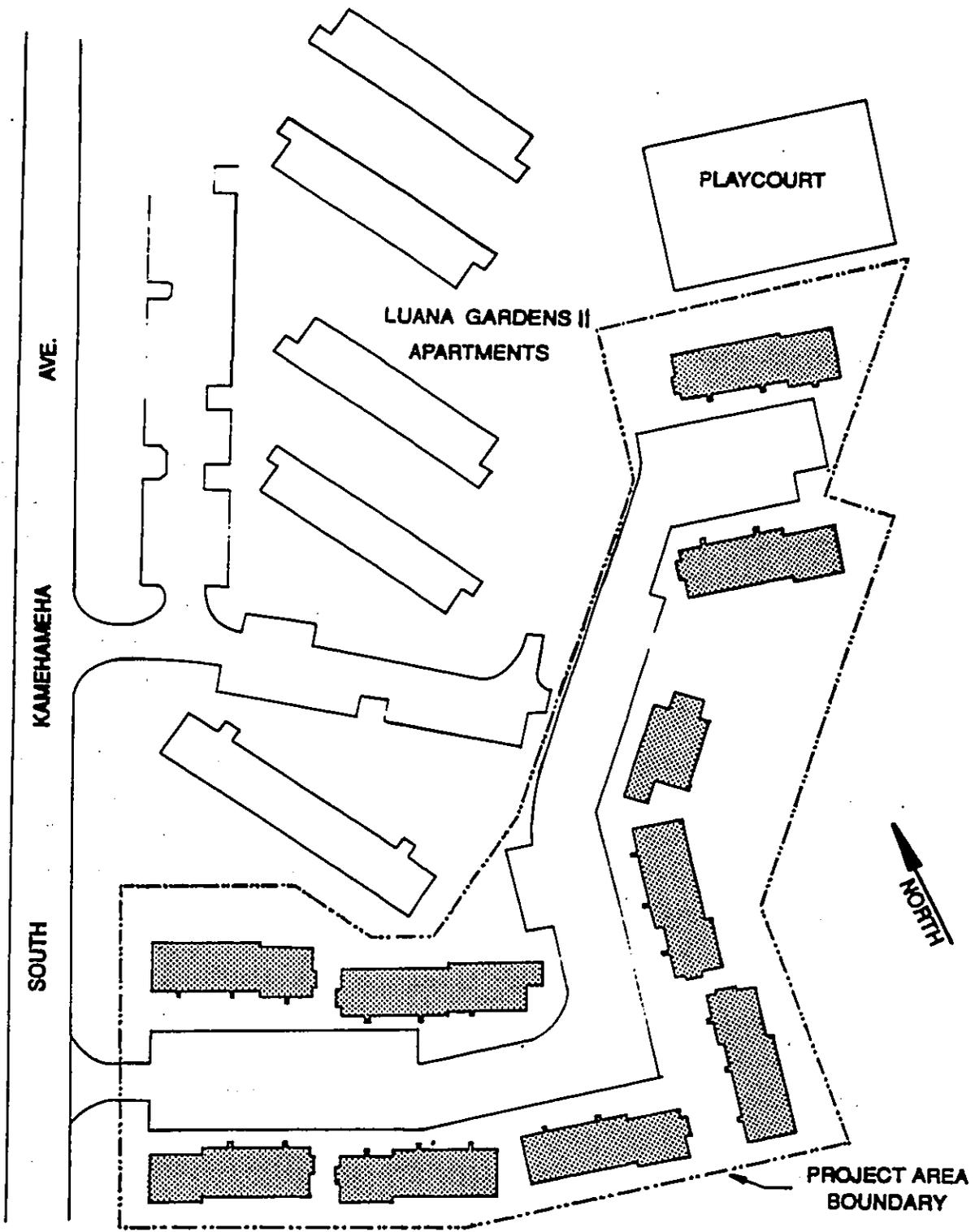


Figure 2. Project Parcel Boundaries

Vegetation in the project area is dominated by common grasses and weeds, with a remnant stand of *kiawe* (*Prosopis pallida*) and *koa haole* (*Leucaena glauca*). According to a maintenance person associated with the Luana Gardens II Condominiums, several years ago, most of the vegetation in the subject project area was cleared by bulldozers to eliminate a fire hazard (Benny (last name unknown), personal communication).

LAND USE HISTORY

Wailuku or "Water of Killing," is the name of a legendary battle fought between owls and men in which "the owls retaliated against a cruel act committed by a cruel man by flocking to Wailuku and descending upon him," (Pukui/Curtis 1974:179 in Silva n.d.:9).

The seventeenth and eighteenth centuries were periods of frequent warfare in the Hawaiian Islands. During this time, Wailuku was the center of political and military power on Maui. Although High Chief Pi'ilani unified Maui, his two sons, Lono-a-Pi'ilani and Kiha-a-Pi'ilani, fought over political control after his death (Speakman 1978:9). A battle was fought in 'Iao Valley in which Kiha-a-Pi'ilani barely escaped with his life. In the following battle, with the assistance of Hawaii Island warriors, he emerged victorious and eventually became ruler of Maui (Thrum 1923:77-86, in Silva n.d.:9).

In the early eighteenth century, Kekaulike, a descendant of Pi'ilani, established a united 'kingdom' on Maui through warfare. Before he died in 1736, he designated his son, Kamehameha-nui, as his successor. Ka-uki challenged his half brother, and a series of battles were fought, with Kamehameha-nui emerging victorious (Speakman 1978:13-14).

After King Kahekili succeeded his brother to the throne, intense warfare resumed between Maui and Hawaii islands. During this time, King Kahekili's *kalaihale*, or royal residence, was located in Wailuku (Speakman 1978:16-17). Kepeawai, "damming of the waters," was the last battle at Wailuku. This battle was fought between Kahekili and Kamehameha I in 'Iao Valley in 1790. Kamehameha I conquered and gained control of Maui Island (Speakman 1978:51).

Sugar cane was initially introduced in Wailuku ahupua'a in 1823, with the founding of Hungtai Sugar Works (Morrow 1930:51-52). In 1848, Wailuku ahupua'a was declared Crown Land after the Mahele, or division of lands.

Princess Ruth Ke'elikolani, great-granddaughter of King Kamehameha, was the last of the royalty to own the land. She inherited the ahupua'a after the death of her brother Kamehameha V, in 1872 (Zambucka 1977:16-17).

The eastern portion of the Wailuku ahupua'a was awarded to Claus Spreckels by King Kalakaua on 30 September 1882. This grant (Grant 3343) consisted of 24,000 acres. In 1882, Spreckels founded the Hawaii Sugar Company. In 1951 the property was transferred to Hawaiian Commercial and Sugar Company. Records show a merger with Alexander and Baldwin, Ltd., in 1961, and in 1962, Alexander and Baldwin, Ltd., changed its name to Alexander and Baldwin, Inc. The land was leased to RJR Foods, Inc. in 1976, and then to Orchards of Hawaii, Ltd., in 1980. In 1981, the land was transferred to the County of Maui, and the lease with Orchards of Hawaii was canceled. A 1966 aerial photograph (Fig. 3) indicates the project area as undisturbed, however, a 1977 aerial (Fig. 4) shows the project area in agricultural production. A 1985 aerial (Fig. 5) shows the project area vacated and extensively disturbed.

PREVIOUS ARCHAEOLOGY

Barrera (1976) conducted an archaeological survey on an approximately 1,020 acre parcel in the Maui Sand Hills. This archaeological survey area is located along the southern edge of the subject project area. No prehistoric structural remains were observed, but two isolated pre-contact artifacts, a basalt flake fragment and a possible basalt hammerstone, were found in disturbed areas beyond the boundaries of the subject project area. The basalt flake fragment was found in the area northeast of Maui Memorial Hospital, and the possible basalt hammerstone was found on the grounds of Passion Acres (located south of Maui High School).

Barrera (1983) also conducted backhoe excavations for the proposed Hale Laulea Subdivision (TMK 3-8-07:107). These excavations consisted of 35 backhoe trenches approximately 7 feet long and at least 3 feet deep. No prehistoric or early historic cultural materials were encountered.

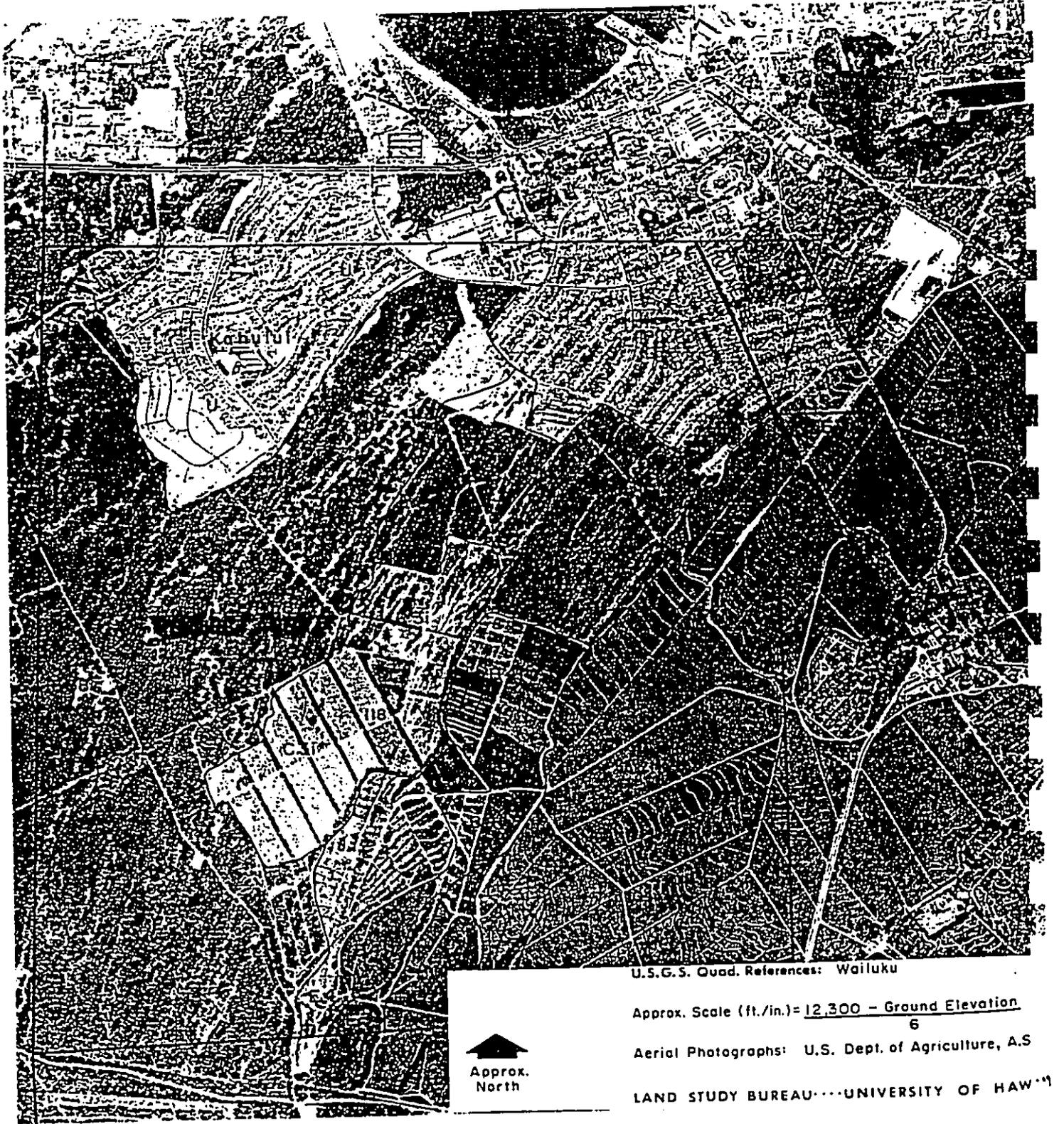


Figure 3. 1966 Aerial Photograph with Project Area Location.

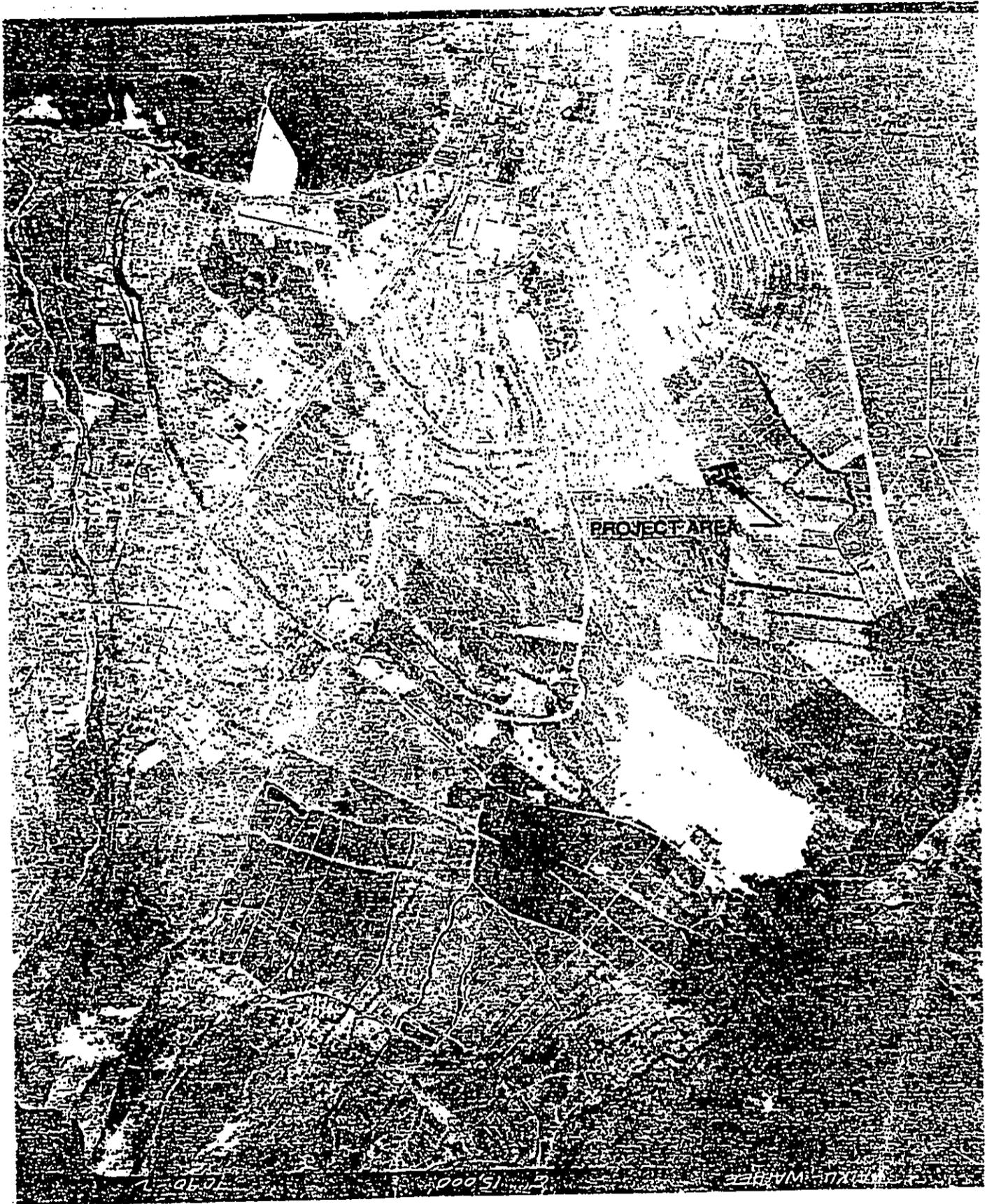


Figure 4. 1977 Aerial Photograph with Project Area Location.

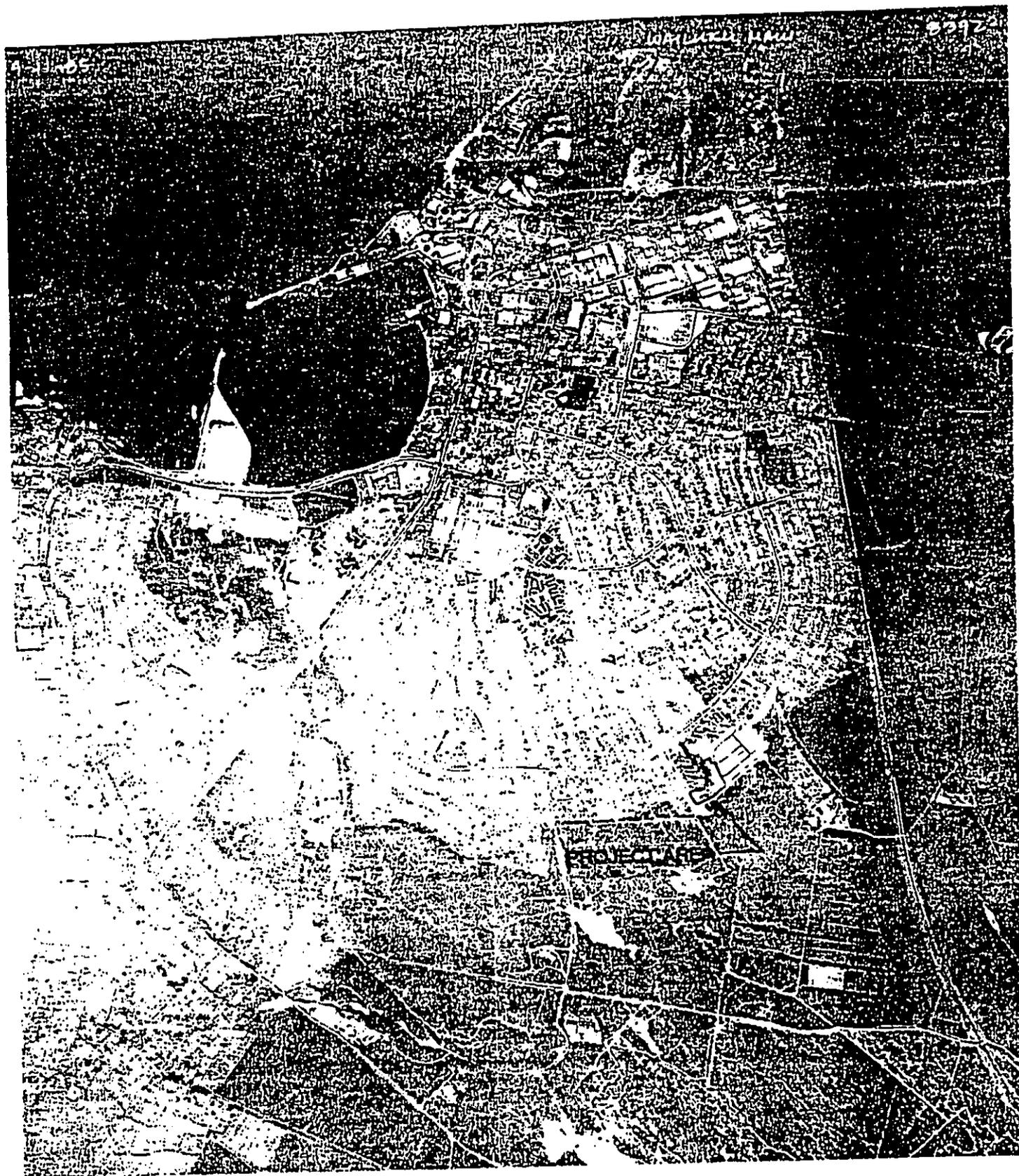


Figure 5. 1985 Aerial Photograph with Project Area Location.

Bordner (1983) conducted an archaeological reconnaissance survey for the Phase I Hale Laulea Subdivision (TMK 3-8-07:106). No prehistoric or early historic cultural materials were observed. Site 1064, the Kalahau burials, were identified in the early 1970's by Drs. Merry and Bowen. Due to extensive ground clearing activities and disturbances caused by recreational off-road racing, these burials could not be relocated.

Bishop Museum (Clark 1984) conducted an archaeological reconnaissance survey and 6 backhoe excavations at Luana Gardens III Subdivision, located adjacent to the eastern boundary of the Hale Mahaolu-Eha project area. No surface or subsurface cultural remains were observed. Recent land modifications may have destroyed any evidence of cultural remains.

Bishop Museum (Williams 1988) conducted 15 backhoe excavations at the Maui Intermediate School site (TMK 3-8-07:2). No cultural material was observed. The sand dunes had previously been grubbed of vegetation, removing possible traces of surface features. Yamauchi (1988) monitored the site during initial construction activities and encountered no cultural materials.

Bishop Museum (Rotunno and Cleghorn 1990) conducted an archaeological reconnaissance survey in the Wailuku Sand Hills for the proposed Maui Lani Subdivision (TMK:3-8-07:2 and 110). Two archaeological sites were identified, including a cobble alignment and a rock mound. The alignment, approximately 15 m long, was initially interpreted as a possible path. This alignment is located on top of a knoll. The rock mound is constructed of piled basalt cobbles and also located on top of the knoll. A subsequent phase of work determined both sites to be recent modifications with no archaeological significance.

Kennedy (1990) conducted archaeological subsurface testing for the proposed Maui Community Arts and Cultural Center (TMK 3-8-07). During a previous reconnaissance survey in 1988, no cultural material was observed. The sand dunes had been leveled, removing any possible subsurface cultural remains. During Kennedy's testing in 1990, random subsurface sampling was undertaken, including 51 backhoe trenches. No cultural materials were revealed.

Kennedy (1990) conducted an archaeological inventory survey for C. Brewer Properties (TMK:3-3-01: por. 16, 33 and 39 and TMK:3-4-32: por. 10, 18 and 01). An earlier reconnaissance survey conducted in 1983 located four surface features: a small rock mound, a probable grave marker with Asian characters on one side, a terrace complex, and the Mahalani Cemetery. A surface and subsurface survey in the Piihana Ridge Sand Dune was conducted in 1989. Kennedy's subsurface testing in 1990 revealed no cultural material. When sand mining began, a number of burials were encountered in unsuspected soft pockets of sand near the surface of the dunes, including the remains of a high ranking individual whose status was determined by associated grave goods.

Donham (1992) disinterred two adult female skeletal remains and one primary adult male for the Maui Homeless Shelter Construction project (State Site 50-50-04-2916) in Wailuku (TMK 3-8-46:21). The site is located near the west central edge of the Puone sand dune formation.

Bishop Museum (Dixon in prep.) tested four archaeological sites in the Maui Lani Property (TMK:3-8-07:2 and 110), including State Site 50-50-04-2797. This site, human burials located in the Maui Sand Hills, was determined to be culturally significant. Eleven burials were recorded, of which one was exhumed and the other ten were left *in situ*.

SETTLEMENT PATTERN

A synthesis of currently available archaeological data suggests that early settlement occurred on the Island of Maui between A.D. 300-600 in the windward and coastal areas, with population expansion into the dry leeward areas by A.D. 1000 (Kirch 1979). Later prehistoric expansion into harsher or more ecologically marginal regions, as postulated by Kirch (1970), took place in order to broaden the range of resource exploitation.

The majority of archaeological investigations in Wailuku ahupua'a have been conducted along the coastal and valley areas. These surveys revealed permanent habitation and religious sites at Kahului Bay, and irrigated taro pondfields in 'Iao Valley. The Wailuku Sand Dunes area where the current project is located has not been fully documented in the archaeological record. Since most of the dunes have been disturbed by large-scale agriculture, the probability of identifying *in-situ* cultural remains is low. However, human skeletal remains have been found in isolated areas in the sand dunes.

Recent studies have attempted to address settlement patterns in Wailuku ahupua'a by postulating theories (Kennedy and Brennan 1992:19):

1. Due to the lack of adequate rainfall and sandy soils in much of the interior portions of Wailuku ahupua'a, pre-contact settlements may have been restricted to the immediate coastal areas.
2. The lack of structural remains in the sand dune areas could be attributed to the natural absence of basalt building materials. If people were living in these areas, their residences may have been made of less permanent materials.
3. Natural and human-induced disturbances may have hidden or destroyed evidence of occupation, especially in the coastal areas.

Based upon the results of previous archaeological investigations and historical documentation, isolated burials would be the most probable site type to be encountered in the project area. Although human remains have been found in the vicinity, extensive ground disturbing activities in the current project area and negative results from subsurface testing in adjacent areas minimize the potential for burials within the project area.

METHODOLOGY

Since the entire project area has been extensively disturbed by bulldozing activities, the survey concentrated on the inspection of exposed surface areas, cut banks, and in a remnant stand of secondary vegetation. Standard archaeological survey procedures were followed, which included recording, mapping, and photographic documentation. 35mm black and white photographs were taken, showing the project area and existing surface conditions.

Background research was conducted on the history of Wailuku ahupua'a in order to determine previous land use and types of prehistoric and historic remains, and to aid in predicting the location and extent of potential subsurface remains. This research was conducted at the State Historic Preservation Division Libraries at State Department of Land and Natural Resources in Honolulu and Kahului, the State Bureau of Conveyances, DAGS Survey Office, and at R.M. Towill Corporation.

SURVEY RESULTS

No surface prehistoric or historic archaeological remains were located within the project area. Bulldozer berms and recent trash cover the surface of the project area. Due to extensive disturbances from recent agriculture and other ground disturbing activities, no further archaeological work was conducted. Based on the lack of surface remains, extensive ground disturbances, and negative results from previous archaeological subsurface testing in surrounding areas, subsurface testing was deemed unnecessary. In consultation with Ms. Theresa Donham, resident Maui Island archaeologist for HPD/DLNR, and Ms. Annie Griffin, staff archaeologist in charge of Maui County, the requirement for subsurface testing waived.

DISCUSSION

Although the absence of cultural remains may be attributed to the compounded effects of agriculture and land clearing activities in the project area, other archaeological investigations in the Wailuku Sand Hills have identified only limited traces of archaeological remains. In addition to the other probable reasons discussed earlier, this may be due to the dry and sandy environment of the Sand Hills. Since this inland area was probably not extensively used during pre-contact occupation, limited information exists in the archaeological record.

Changing land use in the project area are documented on aerial photographs taken in 1966, 1977, and 1985 (See Figs. 3, 4, and 5). The 1966 aerial photograph indicates that the subject project area had not yet been disturbed by any large-scale ground disturbing activities. But by 1977, extensive agricultural disturbances in both the project area and surrounding lands occurred, probably by RJR Foods, Inc., after they leased the land from Alexander and Baldwin, Inc., in 1976. The 1985 aerial photograph shows that agricultural production was abandoned following the purchase of the area by the County of Maui in 1981. Extensive disturbance is also indicated from the construction of the neighboring Luana Gardens II project.

Although the sand dune areas to the southwest yielded prehistoric burials, subsurface investigations in adjoining parcels did not expose any human remains or other cultural material (Clark 1984 and Barrera 1976, 1983). Thus, the potential for cultural remains in the current project area appears extremely low.

RECOMMENDATIONS

In view of the extensive nature of previous ground disturbing activities in the project area documented by the aerial photographs, as well as the negative results obtained by previous investigations of adjoining areas; upon consultation with HPD/DLNR, the requirement for further archaeological investigations, primarily subsurface testing, prior to construction was deemed unnecessary.

Full-time archaeological monitoring during construction is also not recommended. However, should any unanticipated remains be exposed during construction-related activities, work in the immediate area should be halted, and Ms. Theresa Donham, resident archaeologist on Maui Island for HPD-DLNR, should be notified at 243-5169 (Maui).

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Appendix B

Preliminary Drainage and Erosion Control Report

DRAINAGE AND EROSION CONTROL REPORT

FOR

HALE MAHAOLU ELIMA

AT

KAHULUI, MAUI, HAWAII

TMK: 3-8-07:111

PREPARED FOR:

HALE MAHAOLU INC.
200 HINA AVENUE
KAHULUI, MAUI, HAWAII

PREPARED BY:

RICHARD M. SATO & ASSOCIATES, INC.
CONSULTING ENGINEERS
2115 WELLS STREET
WAILUKU, MAUI, HAWAII 96793

JANUARY 1994

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I. PROJECT LOCATION

The project site is located in Kahului on the Island of Maui. The proposed Hale Mahaolu-Elima abuts the Luana Gardens Phase III multi-family development to the North. Luana Gardens Phase I single family residential subdivision abuts the project site on its east side. Vacant lands are located to the south and west of the project site. The site can further be identified by Tap Map Key No. 3-8-07:Parcel 111. Refer to Exhibits 1, 2 and 4.

II. PROJECT DESCRIPTION

Hale Mahaolu Elima will consist of the construction of ten single level structures. Two of the ten will be constructed in the future. Other improvements will include paved roadways, underground utilities, and roadside landscaping.

III. FLOOD HAZARD

According to the Flood Insurance Rate Map (FIRM), for the County of Maui, the project is located on land designated as Zone "C". Zone "C" designates areas of minimal flooding, (Reference 4 and Exhibit 3).

IV. EXISTING STORM RUNOFF CONDITIONS

The existing surface runoff for Luana Gardens flows into three separate drainlines which connect into a 48 inch drainline along Papa Avenue. The 48 inch drainline transports the runoff into a sump located at the corner of Papa Avenue and Pomaikai Street. The sump was designed to receive a runoff of 64.3 cfs from Luana Gardens. Refer to Richard M. Sato's July 30, 1980 Drainage & Erosion Control Report for further information.

V. DEVELOPED STORM RUNOFF CONDITIONS

Storm runoff for existing conditions at Luana Gardens and developed conditions at Hale Mahaolu Elima were calculated using the Rational Method. Based on a 1-hour, 10-year storm, the project and Luana Gardens will produce runoff at a rate of 48.59 cfs. The developed runoff is lower than the original design capacity of 64.3 cfs. This is due to Luana Gardens original design for dense hotel-

apartment development type throughout all three phases. However, the less dense, single family residential subdivision was actually constructed for Luana Gardens Phase I.

VI. SOIL EROSION CONTROL

According to the U.S. Department of Agriculture (Reference 3), soil within the project site is classified as Puuone Sands, 7 to 30 percent slopes (PZUE).

Calculations show that grading of the entire site will result in a total soil loss during construction of 8.8 tons/acre/year with a severity number of 312. The allowable erosion rate is 1412.4 tons/acre/year and present standards allow for a maximum severity number of 50,000. Therefore, normal erosion control measures implemented during construction should be adequate to control soil loss from the project site.

Estimated soil loss was calculated using the universal soil loss equation in accordance with the County of Maui's Grading Ordinance.

VII. CONCLUSION

Development of the Hale Mahaolu-Elima will not be expected to cause any adverse effects to adjacent or downstream developments. Finally, soil loss during construction is below the County's allowable rate so erosion during construction is not expected to be a problem. Runoff from Luana Gardens was designed for dense hotel-apartment development type throughout the entire site. Hale Mahaolu-Elima when completed and Luana Gardens runoff is lower than the design capacity for the sump.

VIII. REFERENCE

1. R.M. Towill Corporation, "Drainage Master Plan for the County of Maui", Honolulu, Hawaii, October 1971.
2. U.S. Department of Agriculture, Soil Conservation Service, "Soil Survey of Island of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii", Washington, D.C., August 1972.

3. U.S. Department of Agriculture, Soil Conservation Service, "Erosion and Sediment Control Guide for Hawaii", Honolulu, Hawaii, March 1981.
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7. Richard M. Sato & Associates, Inc. "Drainage & Erosion Control Report for Luana Gardens", July 31, 1980.

IX. APPENDICES

- A - HYDROLOGIC CALCULATIONS - EXISTING CONDITIONS**
- B - HYDROLOGIC AND HYDRAULIC CALCULATIONS -
DEVELOPED CONDITIONS**
- C - EROSION CONTROL CALCULATIONS**

APPENDIX A

HYDROLOGIC CALCULATIONS - EXISTING CONDITIONS

Information regarding hydrologic calculations for existing runoff was taken from Richard M. Sato's Drainage & Erosion Control Report for Luana Gardens.

APPENDIX B

HYDROLOGIC AND HYDRAULIC CALCULATIONS DEVELOPED CONDITIONS

Hydrologic calculations for developed on-site runoff were done using the Rational Method. Factors used in the calculations were taken from the County of Maui's Drainage Master Plan

The following factors were used:

1. Recurrence Interval:
10-Year, 1-Hour Storm $I=2.0''$ (Plate III)
2. Time of Concentration:
 T_c - Determined from Plate 3
3. Rainfall Intensity:
 i - Determined from Plate 4
4. a. Runoff Coefficient for Luana Gardens Phase I
 c - Determined from Table 1, as follows:

Infiltration	0.07 (Medium)
Relief	0.00 (Flat)
Vegetal Cover	0.03 (Good)
Dev. Type	<u>0.40 (Residential)</u>
$c = 0.50$	
- b. Runoff Coefficient for Luana Gardens Phase II
 c - Determined from Table 1, as follows:

Infiltration	0.07 (Medium)
Relief	0.00 (Flat)
Vegetal Cover	0.00 (High)
Dev. Type	<u>0.45 (Hotel-Apartment)</u>
$c = 0.52$	

Developed runoff conditions and quantities are shown in the Runoff Summary Chart.

APPENDIX C

EROSION CONTROL CALCULATIONS

A. SITE CONDITIONS

According to the "Soil Survey of Island of Kauai, Oahu, Maui, Molokai and Lanai", State of Hawaii, August 1972, the soil within the project site is classified as Puuone Sand, 7 to 30 percent slopes (PZUE). The characteristic of this soil is rapid permeability above the cemented layer, slow runoff, and the hazard of wind erosion is moderate to severe.

B. ESTIMATED SOIL LOSS

The equation used for estimating soil loss, as set forth by the County of Maui's Grading Ordinance is as follows:

$$E = R K L_s C P$$

Where:

E = Soil Loss in Tons/Acre/Year
R = Rainfall Factor = 180 Tons/Acre/Year
K = Soil Erodibility Factor = 0.10
(Both Soil Types)
L_s = Topographic Factor = 0.49
Slope Length (L) = 750
Average Slope (S) = 2.8%
C = Cover Factor = 1.0 (Bare Soil)
P = Erosion Control Practice Factor 1.0
(For Non-Agricultural Lands)
E = 180 x 0.10 x 0.49 x 1 x 1 =
8.8 Tons/Acre/Year

C. ALLOWABLE SOIL LOSS

Coastal Water Hazard (D) = 2 (Class "A" Water)
Downstream Hazard (F) = 4 (Adjacent to an existing
subdivision)
Time Duration of Project (T) = 0.5 Year
Maximum Allowable Construction Area x Erosion Rate =
5,000 Tons/Acre
Area of Disturbance (A) = 3.54 Acres
Maximum Allowable Erosion Rate = 5,000/3.54 =
1,412.4 Tons/Acre/Year

D. SEVERITY RATING

ALLOWABLE RATING = 50,000

CALCULATED SEVERITY RATING (H) = (2FT + 3D)AE

WHERE:

Downstream Hazard (F) = 4 (Adjacent to an existing Subdivision)

Time Duration of Project (T) = 0.5 Year

Potential Sediment Damage (D) = 2 (Class "A" Water)

Area of Disturbance (A) = 3.54

Annual Soil Loss (E) = 8.8 Tons/Acre/Year

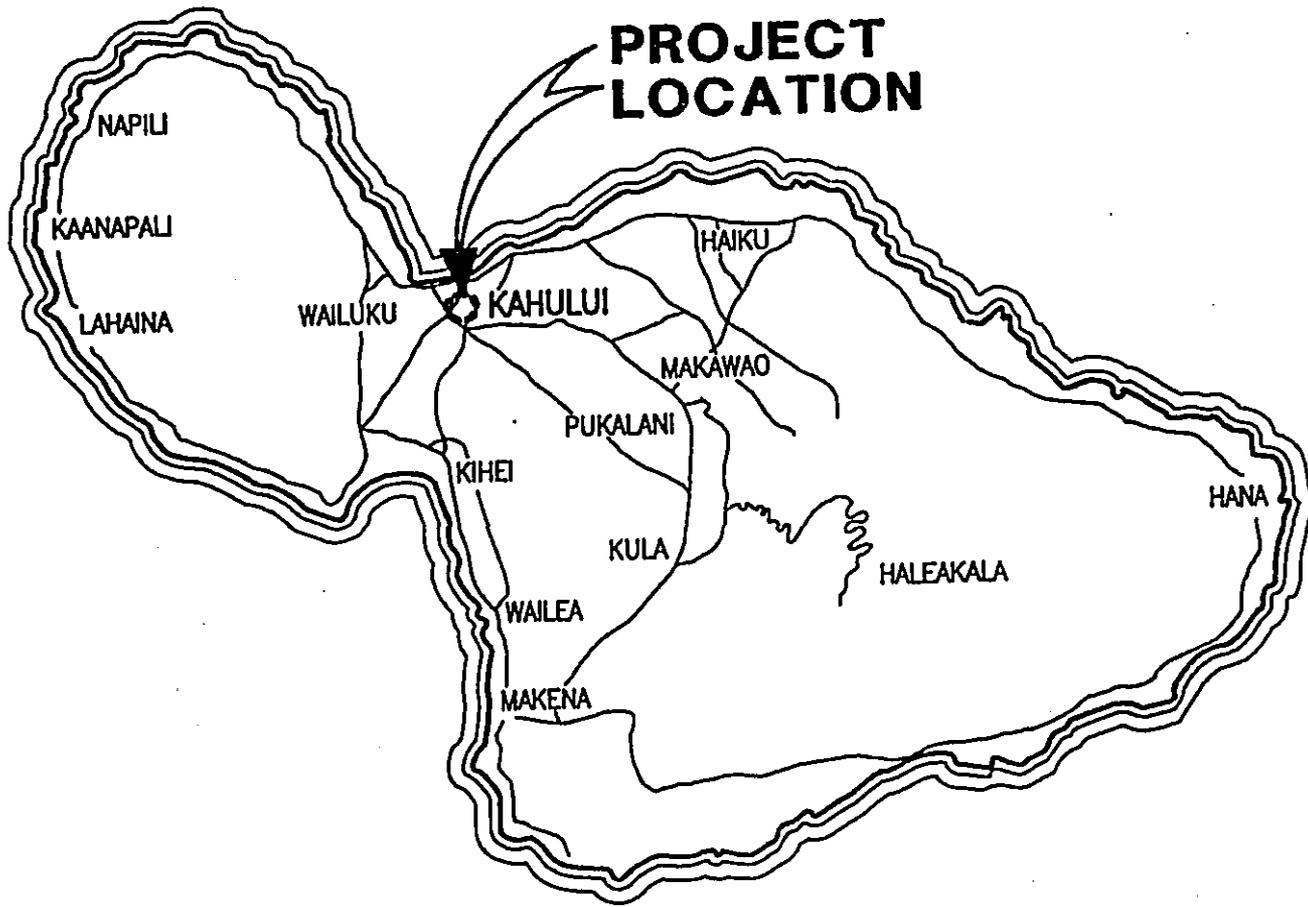
$H = (2 \times 4 \times 0.5 + 3 \times 2) (3.54) (8.8) = 312 < 50,000$ allowable rating

E. EROSION CONTROL REPORT

The following procedures should be implemented during construction of the project.

1. Leave natural vegetation undisturbed in areas not needed for immediate construction.
2. Use waterwagons and/or sprinklers to control dust.
3. Water down graded areas after construction activity has ceased for the day and during weekend and holidays.
4. Construct drainage improvements as soon as possible.
5. Grass or landscape exposed areas immediately after grading work is finished.

Other erosion control measure may be implemented if necessary.

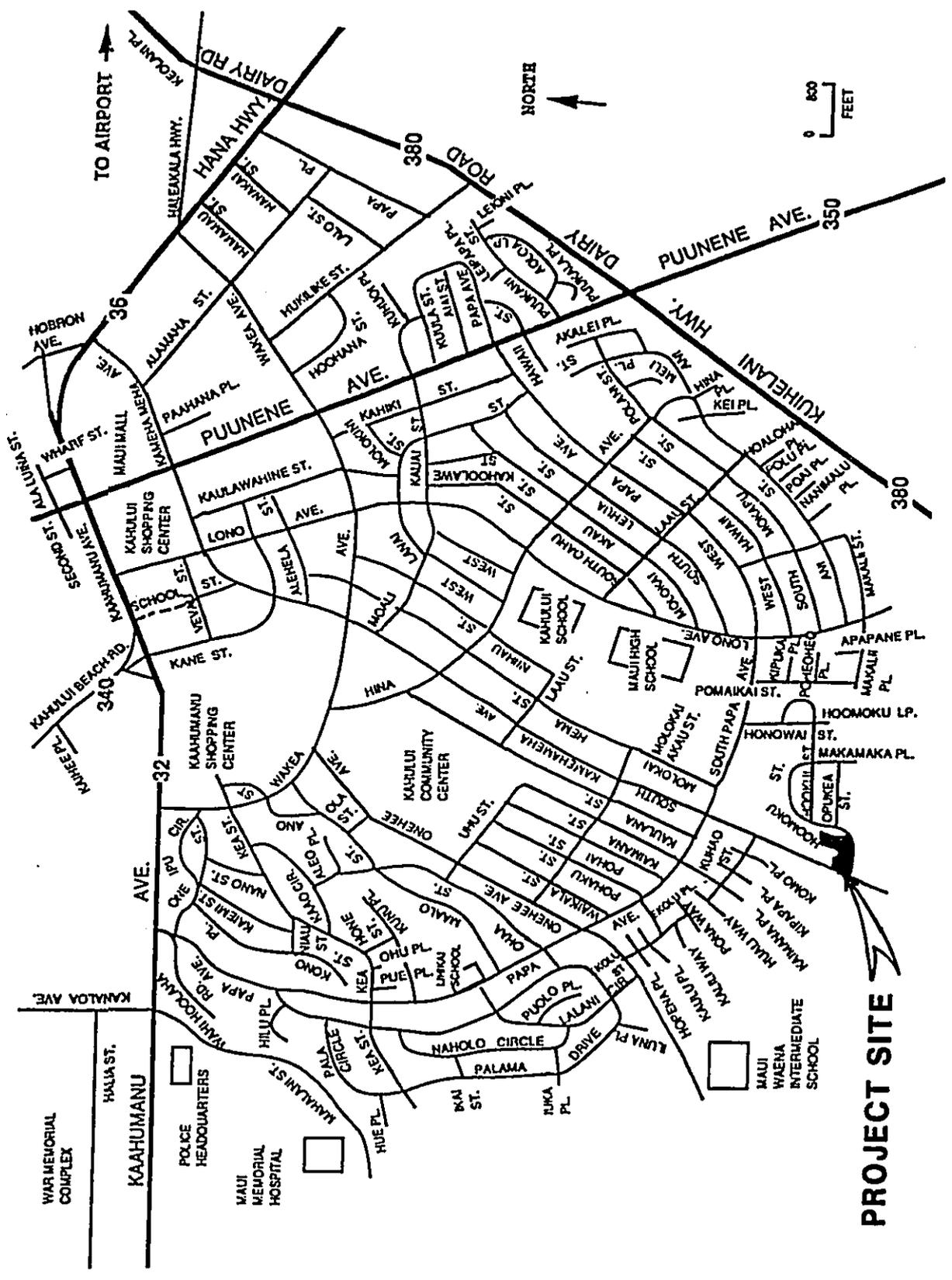


NORTH

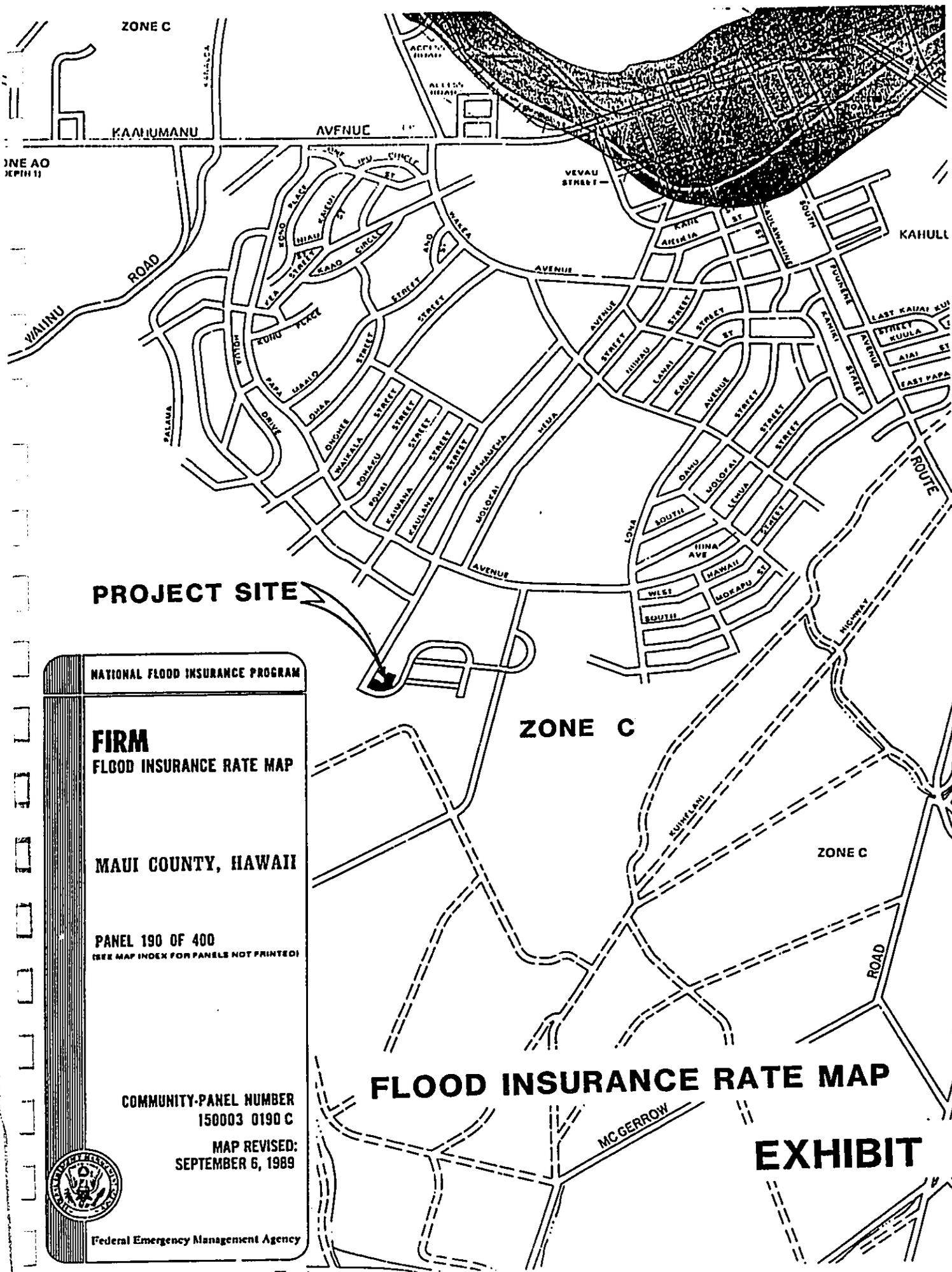
ISLAND OF MAUI

N.T.S.

EXHIBIT 1



SITE LOCATION MAP



ZONE C

KAHUMANU

AVENUE

WAINU ROAD

KAHULA

KAHULA DRIVE

PROJECT SITE

ZONE C

ZONE C

FLOOD INSURANCE RATE MAP

EXHIBIT 3

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

PANEL 190 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0190 C

MAP REVISED:
SEPTEMBER 6, 1989



Federal Emergency Management Agency

**OVERSIZED
DRAWING/MAP**

**PLEASE SEE
35MM ROLL**

0070 B

