



DEPARTMENT OF  
**HOUSING AND HUMAN CONCERNS**  
COUNTY OF MAUI

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Mayor

STEPHANIE AVEIRO  
Director

HENRY OLIVA  
Deputy Director

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OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

June 21, 1993

Office of Environmental Control  
Central Pacific Plaza  
220 South King Street, 4th Floor  
Honolulu, Hawaii 96813

**SUBJECT: Makawao Elderly Independent Living Community**  
**TMK: 2-4-24:3; Makawao, Maui, Hawaii**

Gentlemen:

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

Notice of availability of the Draft Environmental Assessment was published in the April 23, 1993 OEQC Bulletin. Letters received during and after the public comment period as well as applicable responses have been included in the Final Environmental Assessment.

As the approving agency, we are forwarding herewith one copy of the OEQC Bulletin Publication Form, and four 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 Environment Assessment as a negative declaration. We respectfully request that the notice of the Final Environmental Assessment be published in the OEQC Bulletin.

Sincerely,

Stephanie Aveiro, Director  
Department of Housing and Human Concerns

/lc

Housing Division

Senior Services Division

Youth Services Division

Immigrant Services

Volunteer Action Division

Office on Aging

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1993-07-08-MA-FEA-Makawao Elderly Independent Living  
Community

JUL - 8 1993

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# **FINAL ENVIRONMENTAL ASSESSMENT**

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## **Makawao Elderly Independent Living Community**

Prepared for:

June 1993

HALE MAHAOLU



Michael T. Munekiyo Consulting, Inc.



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**FINAL  
ENVIRONMENTAL  
ASSESSMENT**

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**Makawao Elderly  
Independent Living  
Community**

Prepared for:

June 1993

HALE MAHAOLU



  
Michael T. Munekiyo Consulting, Inc.

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Preface

Hale Mahaolu, Inc. proposes to construct the Makawao Elderly Independent Living Community, a 40-unit elderly affordable rental project in Makawao, Maui, Hawaii (TMK 2-4-24:3). 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, Inc. The landowner of the property is the County of Maui.

Property Location and Description

The subject property fronts Makawao Avenue, and is located between the Makawao Post Office and Makawao Business Center. The property is 50,005 square feet in size. The portion of the site closest to Makawao Avenue is used as temporary public parking. The remainder of the site is vacant.

Existing vegetation on the site consists primarily of kikuyu grass and common weeds. There are several tree species on the site, such as mango, avocado and banyan.

Proposed Action

A total of 40 one-bedroom units are proposed within the independent living facility. Two buildings are proposed with 20 units within each building. Each building is staggered in height, being one, two and three stories in height. A central laundry, manager's office and recreation room are also being provided for use by the tenants of this community.

The County of Maui intends to lease the land to Hale Mahaolu, Inc. for use as an affordable rental project. The County of Maui has also given a \$1.5 million grant towards the construction of the project. Federal funds for construction of the project are also being contemplated.

Federal Section 8 subsidies are intended to be used in order to lower tenant rental payments. Qualified tenants would pay 30 percent of their adjusted gross income for their monthly rental and utility payment.

The contract rent, or tenant share of the rental and utility payment plus the Federal subsidy, would range from approximately \$451 to \$746 per month.

A number of waivers or exemptions from planning, zoning, building and construction standards are being sought under provisions of Chapter 201E-210, HRS.

In accordance with the provisions of Chapter 201E-210, 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.

### Findings and Conclusions

The proposed Makawao Elderly Independent Living Community would provide much needed elderly affordable housing in the Upcountry region. The project would be developed and managed by Hale Mahaolu, Inc. There is a significant community need for elderly 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 necessary, 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. There are no surface indications that significant archaeological remains exist on the property. If significant remains are encountered during construction, applicable procedures to ensure compliance with Chapter 6E, HRS, will be followed. In terms of visual resources, the proposed project would be aesthetically integrated with surrounding developed 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 and Hale Mahaolu regardless of whether they live in the subject project or other environs.

The proposed project is not anticipated to significantly impact peak hour traffic on Makawao Avenue. Since there is an existing restriction on hookup to the County water system, the applicant will work with the Department of Water Supply in order to ascertain whether hookup will be allowed. On-site runoff will be collected via a system of concrete drain inlets. The collected runoff will then be deposited in a perforated pipe subdrain system. Regarding wastewater disposal, on-site treatment works will be utilized. The project should not have significant impacts to roadway, water, drainage and wastewater systems.

The project is also not anticipated to have adverse impacts upon medical and police protection services as well as other infrastructure systems. With regard to fire

protection services, an on-site fire vehicle turn-around has been included in the project plans.

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



# **Chapter 1**

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## ***Property Overview***

## **I. PROJECT OVERVIEW**

### **A. PROJECT LOCATION, EXISTING USE, AND LAND OWNERSHIP**

The Applicant, Hale Mahaolu, Inc., proposes to construct the Makawao Elderly Independent Living Community, an elderly affordable housing project in Makawao, Maui, Hawaii (TMK: 2-4-24:3). The subject property fronts Makawao Avenue, and is between the Makawao Post Office and the Makawao Business Center. See Figure 1.

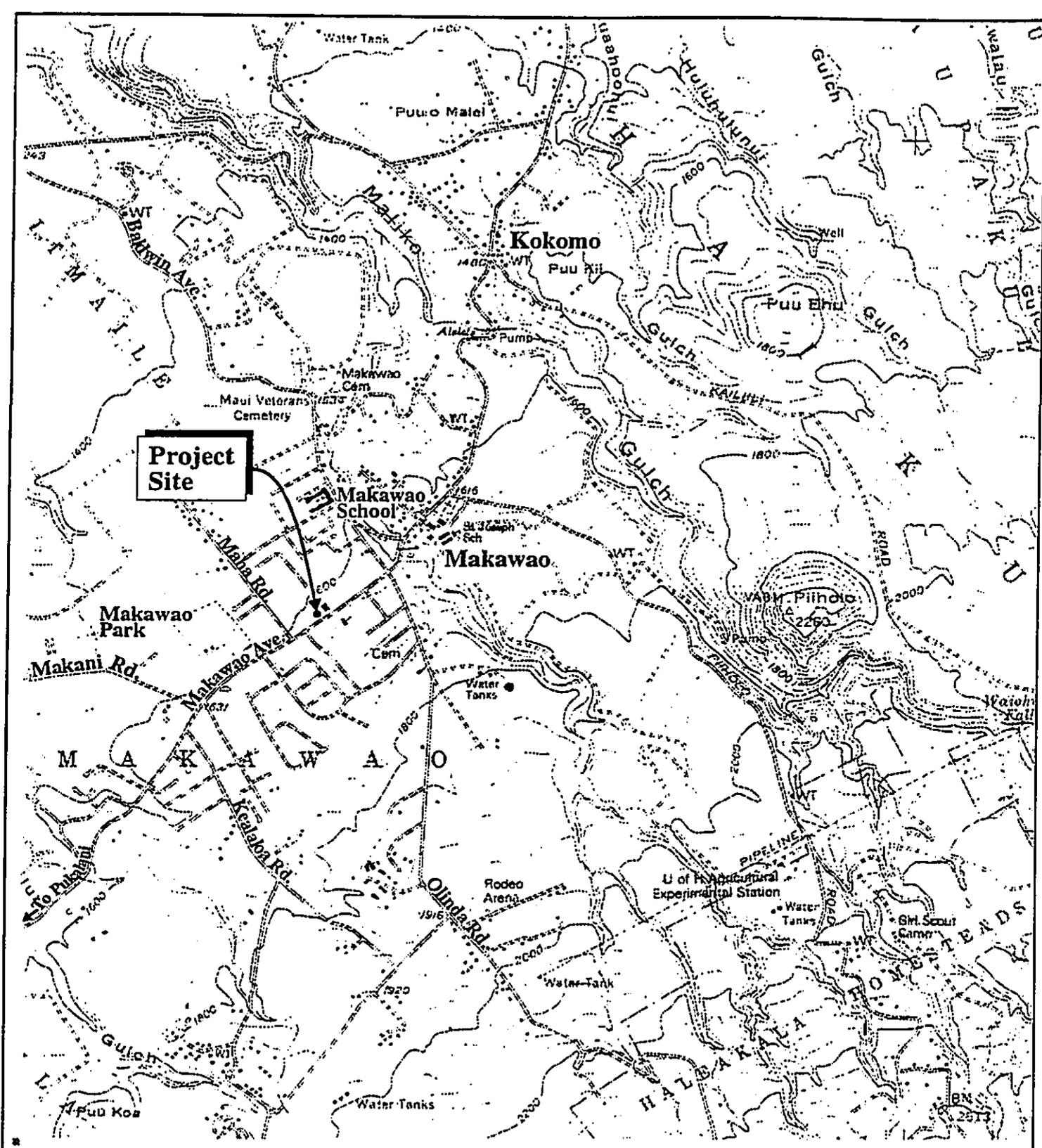
The property is 50,005 square feet in size. The portion of the site closest to Makawao Avenue is used as temporary public parking. The remainder of the site is vacant. Existing vegetation on the site consists primarily of kikuyu grass and common weeds. There are several tree species on the site, such as mango, avocado, and banyan.

The property is within the State Urban District. The Makawao-Pukalani-Kula Community Plan designates the property as Business. The existing zoning is Interim District.

The County of Maui is the owner of the site.

### **B. PROJECT NEED**

The proposed project would provide much needed elderly affordable housing in the Upcountry region. Hale Mahaolu, Inc. is a private non-profit housing corporation which develops, owns and manages affordable rental housing. Existing affordable rental projects provide needed shelter and services in Kahului, Lahaina and Kaunakakai. The proposed project would be the first affordable rental project in the growing Upcountry region.



**Figure 1 Makawao Elderly Independent Living Community Regional Location Map**



**Michael T. Munekiyo Consulting, Inc.**  
 Prepared for: Hale Mahaolu, Inc.

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**C. PROPOSED IMPROVEMENTS**

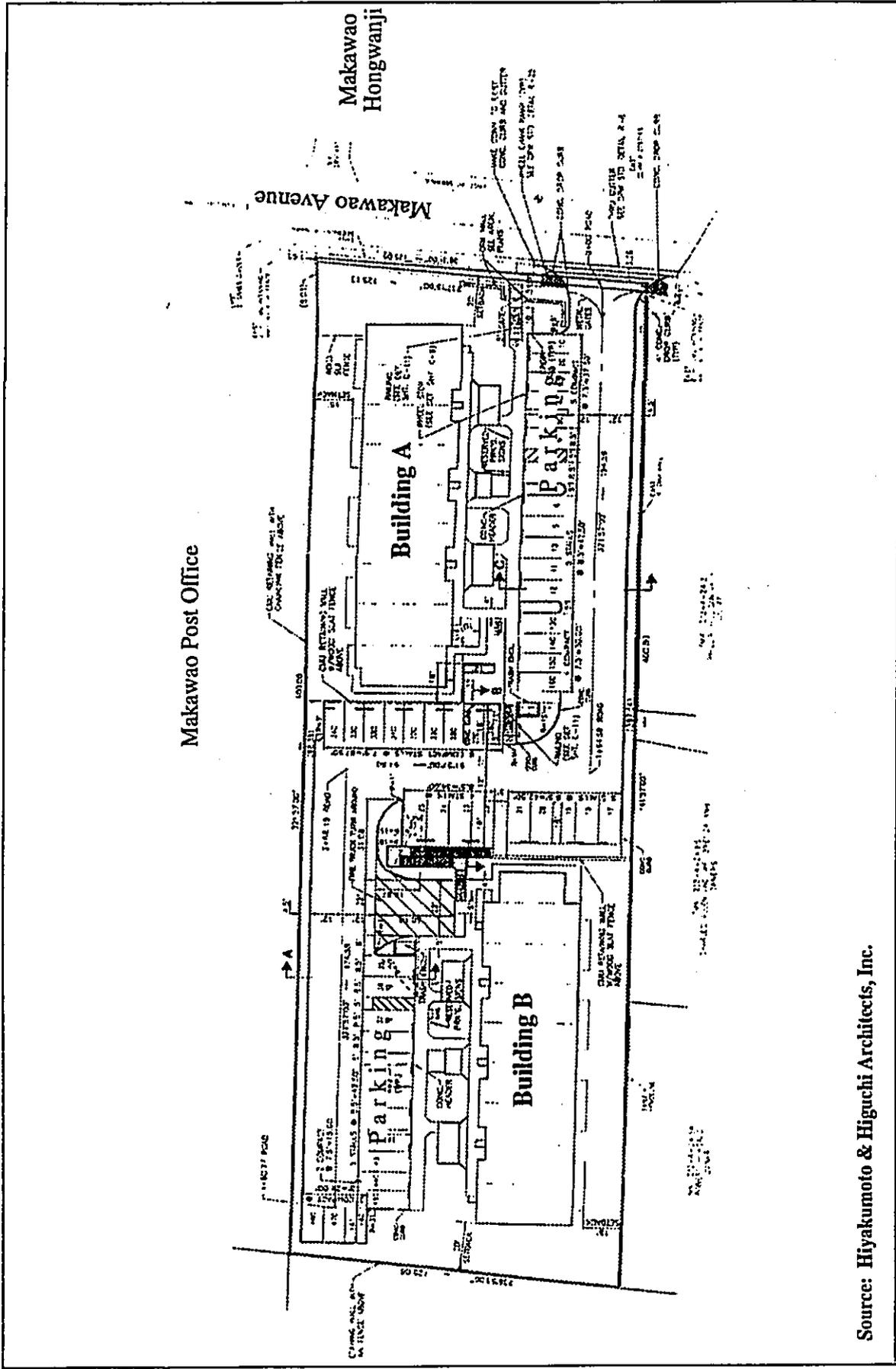
A total of 40 one-bedroom units are proposed within the independent living facility. Two buildings are proposed with 20 units in each building. Each building is staggered in height, being one, two and three stories in height. A central laundry, manager's office and recreation room are also being provided for use by the tenants of this community. See Figure 2, Figure 3, Figure 4, and Figure 5.

The County of Maui intends to lease the land to Hale Mahaolu, Inc. for use as an affordable rental project. The County of Maui has also given a \$1.5 million grant towards the construction of the project. Federal funds for construction of the project are being sought. Federal HOME funds are proposed to be used for site work on the project site. The HOME Program was created under Title II (Home Investment Partnership Act) of the National Affordable Housing Act of 1990.

Federal Section 8 subsidies are intended to be used in order to lower tenant rental payments. Qualified tenants would pay 30 percent of their adjusted gross income for their monthly rental and utility payment.

The contract rent, or tenant share of the rental and utility payment plus the Federal subsidy, would range from approximately \$451 to \$746 per month.

Since use of Federal construction funds are being contemplated, and County funds and lands are involved, an Environmental Assessment is being prepared in accordance with Federal NEPA requirements and the State requirements of Chapter 343, HRS.



Source: Hiyakumoto & Higuehi Architects, Inc.

Figure 2 Makawao Elderly Independent Living Community  
Site Plan



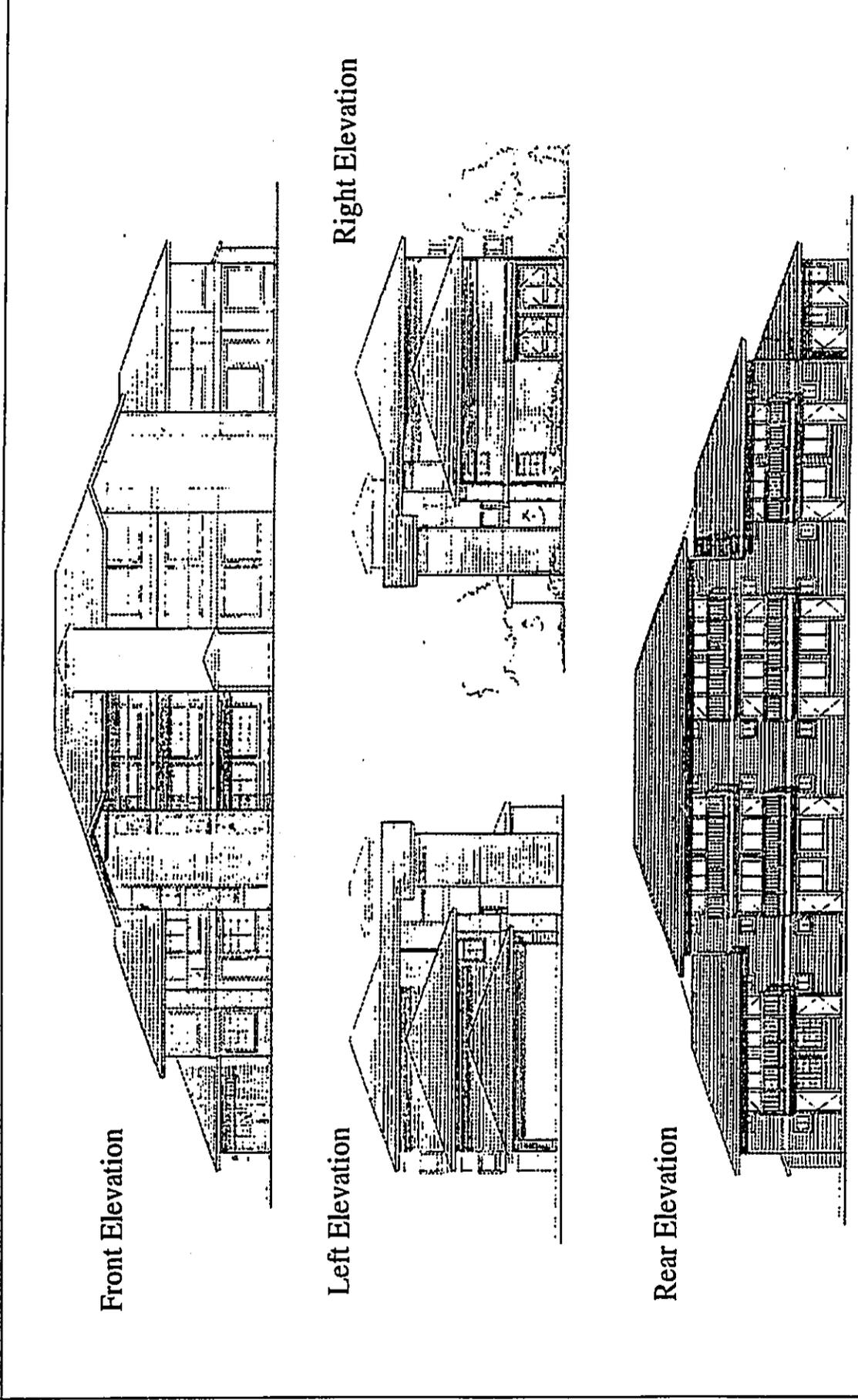
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Prepared for: Hale Mahaolu, Inc.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



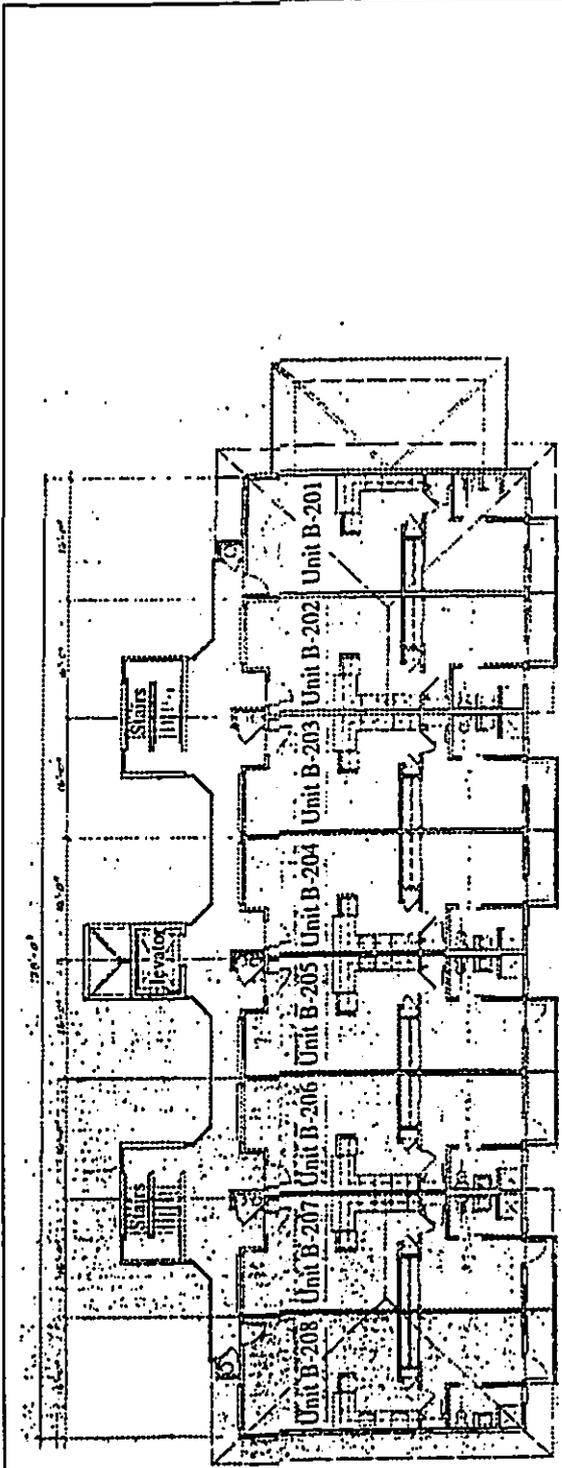
Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 3 Makawao Elderly Independent Living Community Elevations

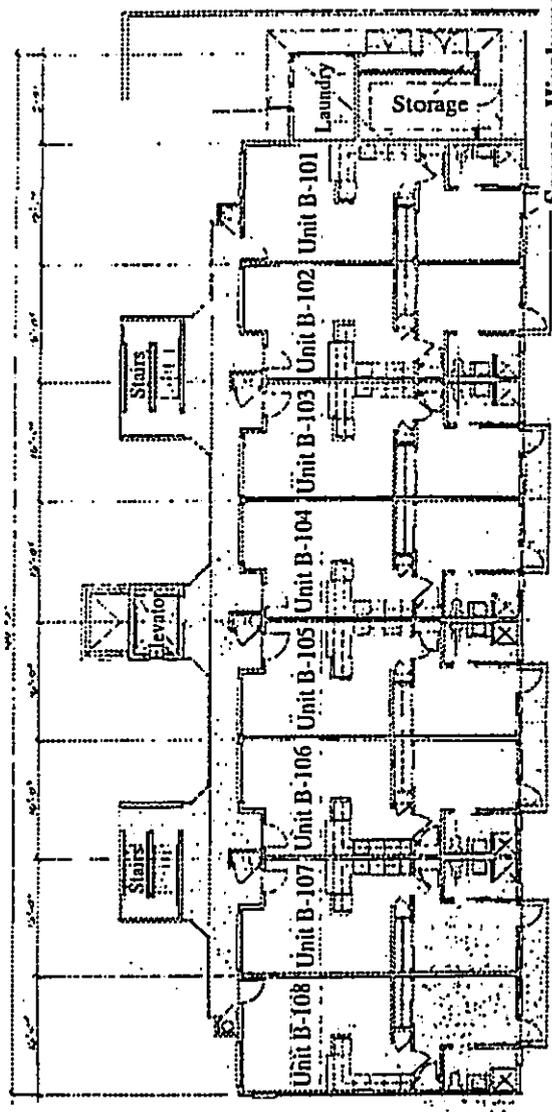
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**Second Floor Plan**



**First Floor Plan**

Source: Hiyakumoto & Higuchi Architects, Inc.

**Figure 4 Makawao Elderly Independent Living Community  
First and Second Floor Plans**

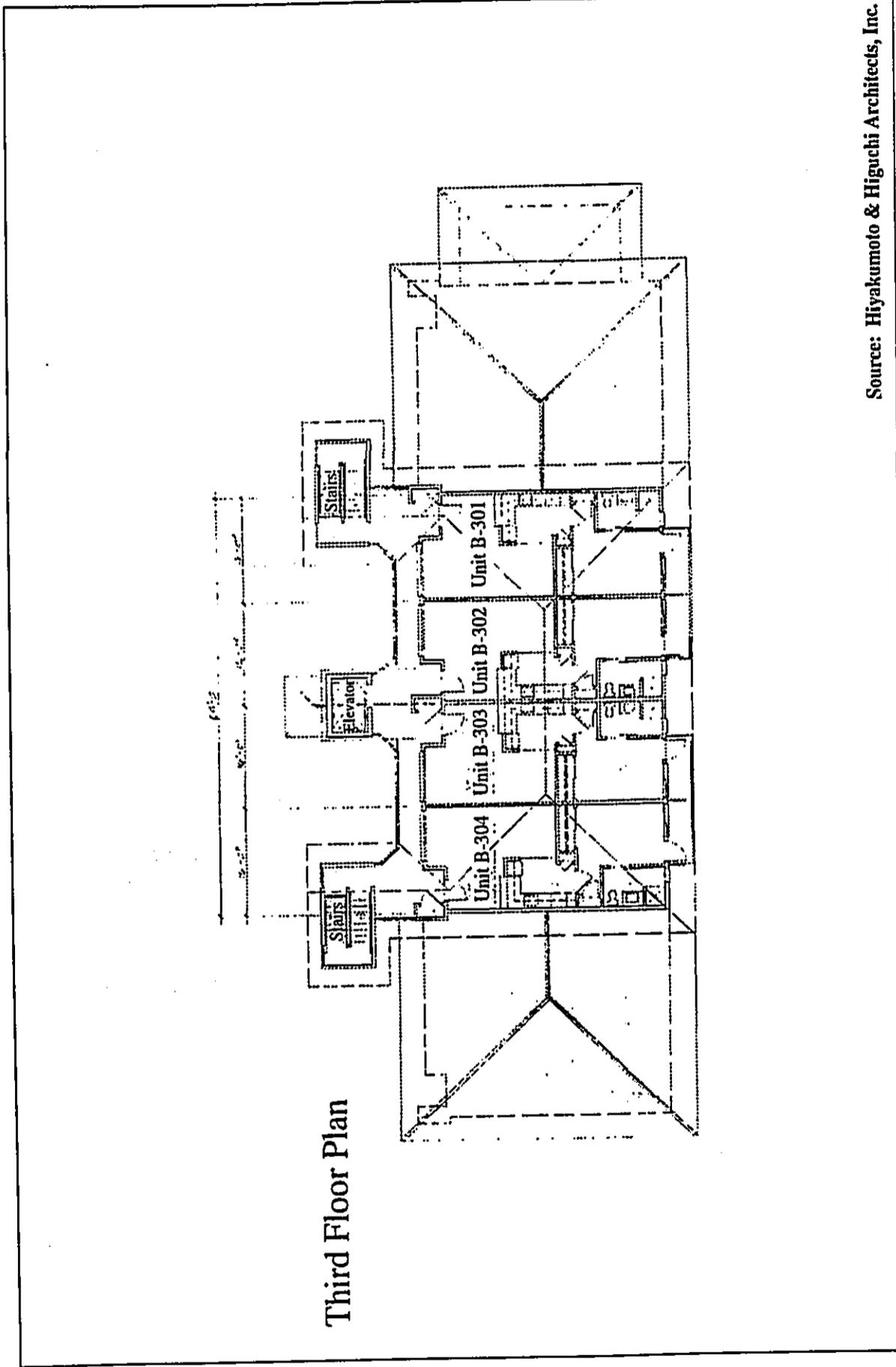
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Prepared for: Hale Mahaolu, Inc.**



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



Source: Hiyakumoto & Higuchi Architects, Inc.

Figure 5 Makawao Elderly Independent Living Community  
Third Floor Plans

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In accordance with Chapter 201E-210, HRS, waivers or exemptions from certain planning, zoning, building and construction standards are being requested. The following waivers are requested to allow for the proposed development:

1. Planning and Zoning

- a. The existing Makawao-Pukalani-Kula Community Plan designation for the property is "Business". A "Multi-Family" designation would be appropriate to allow the proposed elderly housing development. The applicant is requesting a waiver of the requirement to amend the community plan.
- b. The existing zoning for the property is Interim District. The applicant is requesting a waiver of the requirement for a change in zoning. The applicant is requesting a waiver from Interim District provisions to allow the following:
  - (1) Multi-Family Apartment use;
  - (2) Structures which are three stories and 37-feet in height;
  - (3) Maximum lot coverage of 25.4 percent;
  - (4) Maximum floor area to lot area ratio of 49.7 percent;
  - (5) Minimum front yard setback of 20 feet, minimum side yard setback of 15 feet, and minimum rear yard setback of 20 feet; and
  - (6) Accessory uses of central laundromat, manager's office, recreation room and maintenance storage, necessary to facilitate the establishment of the requested permitted use.

2. Off-Street Parking and Loading

- a. Section 19.36.010 of the Maui County Code requires that 2 parking stalls be provided per unit. For the subject project, this provision would require a total of 80 parking stalls. The applicant is proposing to provide a total of 48 parking stalls.

- 
- b. Section 19.36.110(B) of the Maui County Code notes that parking stalls for compact cars cannot exceed 25 percent of the total off-street parking requirements. For the subject project, the provision allows a maximum of 12 compact stalls on the site. The applicant is proposing 23 compact stalls on the site.
  - c. Section 19.36.070(B) of the Maui County Code notes that large crown shade trees shall be provided at minimum regular intervals for every five stalls throughout the parking area. The applicant is proposing a waiver of this requirement.
  - d. The applicant is requesting that landscape irrigation for the project would be able to connect with and utilize water from the County water system.

3. Taxes, Fees and Assessments

- a. The applicant is requesting that the project be exempt from the following:
  - (1) real property taxes in accordance with Section 246-39 of the Hawaii Revised Statutes;
  - (2) all current and future improvement assessments in accordance with Section 46-74-1, Hawaii Revised Statutes;
  - (3) water source and storage assessment fees established by the Board of Water Supply;
  - (4) all current and future sewer assessment fees; and
  - (5) fees for building permits, grading permits and plan review.

4. Traffic and Drainage

- a. On-site disposal of storm water is also being requested by the applicant.

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5. Building Code

a. The applicant is requesting that the following requirements for Uniform Building Code, Chapter 46, be waived:

- (1) Road widening, curbing, and sidewalk improvements;
- (2) Off-site utilities underground; and
- (3) Off-site drainage improvements.

*In accordance with the provisions of Chapter 201E-210, 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 June 1993. Construction start is targeted for August 1993 with completion of construction anticipated in February 1994. Occupancy of the project is scheduled for March 1994. Preliminary estimates indicate the project will cost approximately \$4.5 million.

# ***Chapter II***

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***Description of the  
Existing Environment***

## **II. DESCRIPTION OF THE EXISTING ENVIRONMENT**

### **A. PHYSICAL SETTING**

#### **1. Surrounding Land Use**

The Makawao region is characterized as a mixture of suburban and rural land uses. Towards the north of the property, there are vacant lands and single-family residential uses. On the eastern side of the property, there is the Makawao Post Office. Further east are the residential and commercial heart of Makawao Town. Across Makawao Avenue moving towards the southern direction, there is the Makawao Hongwanji Mission, additional single-family residential uses as well as the Makawao Ranch Acres residential subdivision. Toward the west of the property is the Makawao Business Center flanked by single-family residential uses around Maha Road. Located further west are the Eddie Tam Memorial Center and Makawao Park.

#### **2. Climate**

Temperatures in Makawao are relatively cool but equable, ranging from average lows in the mid-50's to average highs in the mid-70's. Rainfall in the Makawao area averages approximately 10 inches in December with less than 5 inches per month during the summer.

Like most areas of the islands, the prevailing wind throughout the year is the northeasterly tradewind. These are generally more persistent in summer than in winter. Between about October and April, there may be increased frequency of the southerly winds of Kona storms. In the absence of the trades and nearby storms, winds may become light and variable. Then the diurnal heating and cooling of the land gives rise to onshore sea breezes during

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the day and offshore land breezes at night. (Department of Geography, 1983).

3. *Topography and Soil Characteristics*

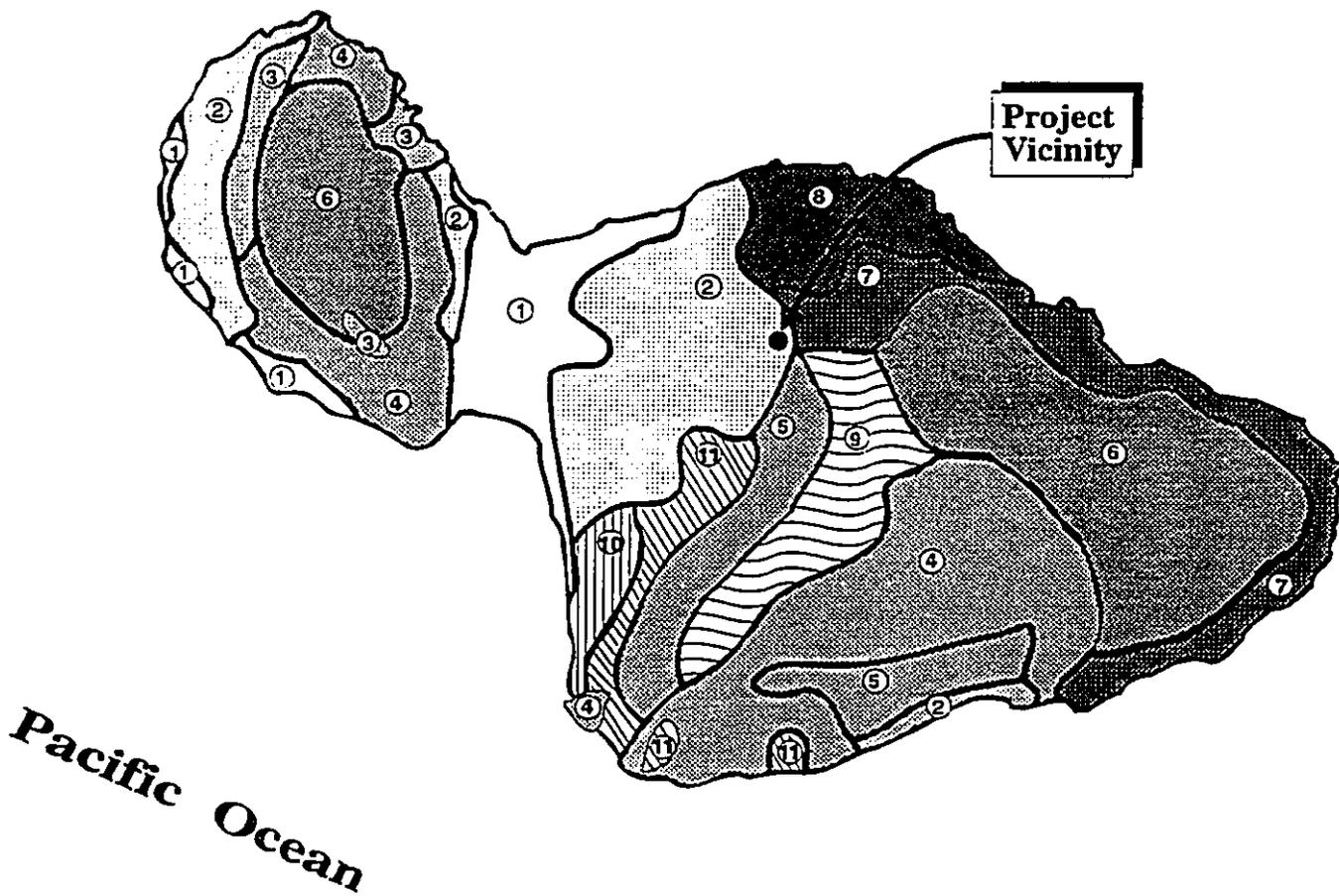
The project site is located approximately at the 1,600 foot elevation on the slopes of Haleakala. Elevations on the site vary by approximately 15 feet between the highest and lowest points, with an average slope of 5 percent.

Underlying the site and surrounding lands are soils belonging to the Waiakoa-Keahua-Molokai association. See Figure 6. This soil association consists of moderately deep and deep, nearly level to moderately steep, well-drained soils that have a moderately fine textured subsoil located on low uplands. The soils specific to the site are Haliimaile silty clay loam, 7 to 15 percent slopes (HgC) and Makawao silty clay, 7 to 15 percent slopes (MfC). See Figure 7. In a representative profile, Haliimaile silty clay loam has a surface layer of dark reddish-brown silty clay about 15 inches thick. The subsoil, to a depth of more than 60 inches, is dark reddish-brown silty clay and very dark grayish-brown clay. Runoff is medium and the erosion hazard is moderate. Makawao silty clay normally has a surface layer of dark reddish-brown silty clay about 9 inches thick. The subsoil, about 30 inches thick, is dark reddish-brown silty clay that has a subangular blocky structure. Runoff is slow to medium and the erosion hazard is slight to moderate.

Lands underlying the project site are designated "C" by the University of Hawaii Land Study Bureau. This classification system rates lands on a scale of "A" to "E", reflecting land productivity characteristics. Lands designated "A" are considered to be of

## LEGEND

- |  |  |
|--|--|
| <p>① Pulehu-Ewa-Jaucas association</p> <p>② Wainkon-Keahua-Molokai association</p> <p>③ Honolulu-Olelo association</p> <p>④ Rock land-Rough mountainous land association</p> <p>⑤ Puu Pa-Kula-Pane association</p> <p>⑥ Hydrandepts-Tropaquods association</p> | <p>⑦ Hana-Makaalae-Kailua association</p> <p>⑧ Pauwela-Hailu association</p> <p>⑨ Launai-Kaipoi-Olinda association</p> <p>⑩ Keawakapu-Makena association</p> <p>⑪ Kamaole-Oanapuka association</p> |
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Map Source: USDA Soil Conservation Service

**Figure 6** Makawao Elderly Independent Living Community Soil Association Map



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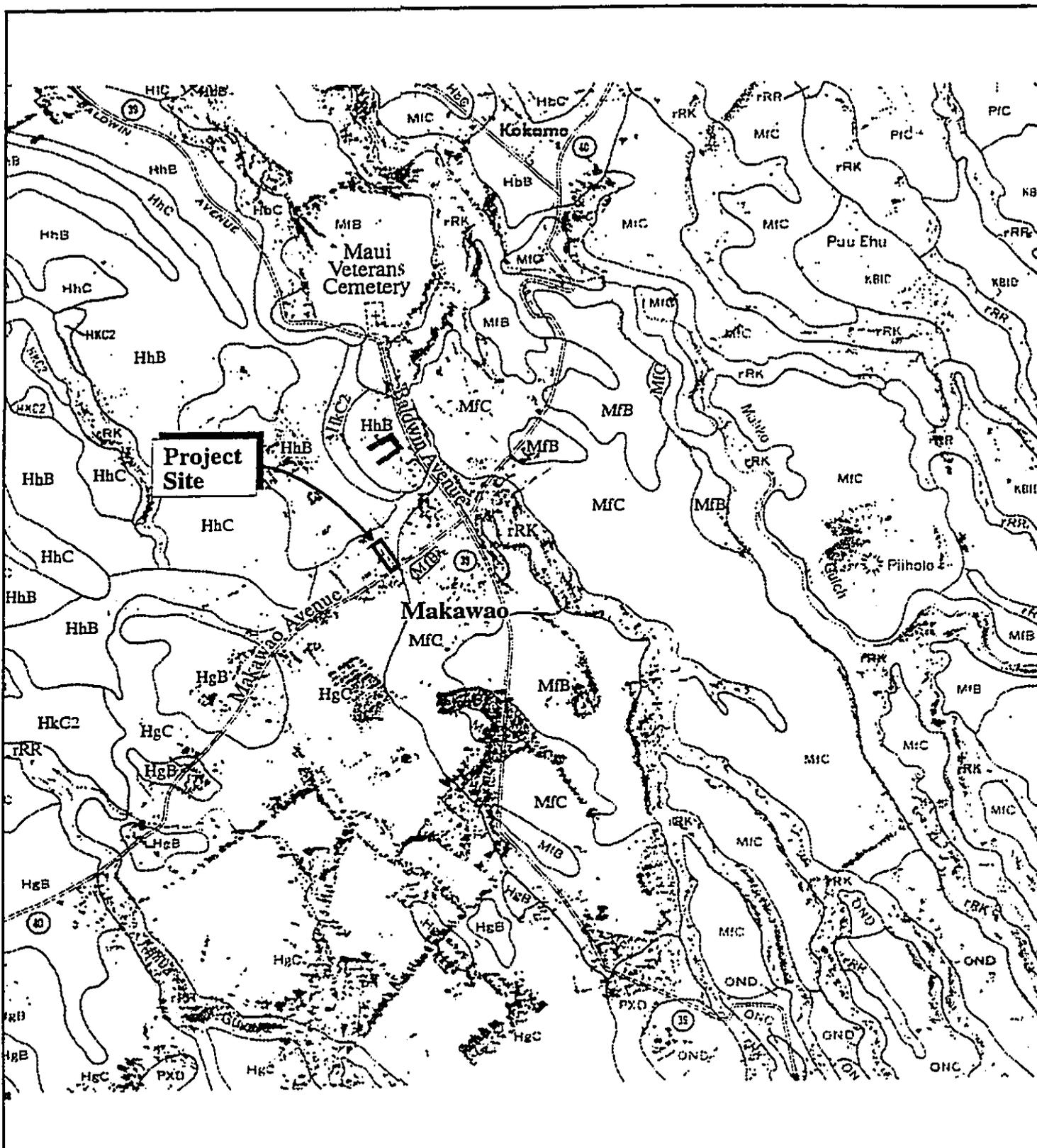


Figure 7 Makawao Elderly Independent Living Community Soil Classifications



Michael T. Munekiyo Consulting, Inc.  
Prepared for: Hale Mahaolu, Inc.

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highest productivity, with "E" lands ranked lowest.

4. **Flood Hazard**

The proposed project is designated by the Flood Insurance Rate Map as Zone C, an area of minimal flooding.

5. **Flora and Fauna**

The project site is located within Makawao Town. Portions of the site closest to Makawao Avenue are temporarily used as a parking lot, with the lower portions of the lot primarily vegetated with kikuyu grass and common weeds. Several tree varieties are scattered throughout the property including mango, avocado and banyan. There are no rare, endangered or threatened species of plants within the project site.

The rural nature of Makawao finds a number of fauna such as mongoose, chickens, rats, dogs, and cats. Avifauna in the region typically include mynas, doves, sparrows, and cardinals.

6. **Archaeological Resources**

Approximately half of the site is currently utilized as a gravel parking lot, with the remainder in kikuyu grass and common weeds. There are no surface indications that archaeological remains exist on the property.

7. **Air Quality and Noise**

There are no point sources of airborne emissions in the immediate vicinity of the project site. The air quality of the Makawao area is considered good, with existing airborne pollutants attributed primarily to automobile exhaust from the region's roadways.

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Surrounding noise levels in the Makawao region are characteristic of its rural atmosphere and are considered relatively low. Background noise levels are attributed to natural (e.g., wind) conditions and traffic from Makawao Avenue.

8. Visual Resources

Situated on the lower slopes of Haleakala, Maui's central isthmus and the West Maui Mountains are partially visible from the project site. Looking in the northeasterly direction, Haleakala is also visible.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Population

The population of Maui has exhibited relatively strong growth over the past decade with the 1990 population estimated at 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 Makawao-Pukalani-Kula Community Plan region is 18,923. A projection of the region's population shows an increase to 21,584 by the year 2000. By the year 2010, population is anticipated to range between 23,318 to 24,310 (Community Resources, Inc., 1992).

2. Economy

Agriculture and tourism are vital components of Maui's economy. The cultivation of pineapple and sugar cane and the tourist industry provides for much of the island's economic stability.

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The Makawao area provides the backdrop for ranching of cattle and other farm animals by various individuals. Pineapple is also cultivated by Maui Land and Pineapple Company on fields surrounding the Makawao area.

**C. PUBLIC SERVICES**

**1. Police and Fire Protection**

The County of Maui's Police Department is headquartered at its Wailuku Station. The Department consists of several patrol, investigative, and administrative divisions. The Department's Upcountry Patrol covers the Makawao-Pukalani-Kula region.

Presently, fire prevention, suppression and protection for the Kula region is offered by the County's Department of Fire Control Makawao Station. The Makawao Station, which is responsible for servicing all of Upcountry Maui (Makawao, Pukalani and Kula), is located on Makawao Avenue.

**2. Medical Facilities**

Maui Memorial Hospital, the only major medical facility on the Island, services the Makawao region. Acute, general and emergency care services are provided by the 145-bed facility which is located in Wailuku. Medical/dental offices are located in Pukalani and Makawao to serve the Upcountry region's residents.

**3. Solid Waste**

With the closure of the Makawao Landfill, all solid wastes generated in the Upcountry region are transported to the Central Maui Landfill in Puunene. Outside of Hana, the Central Maui

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Landfill is the only disposal site on the island of Maui. In 1988, solid waste was arriving at the Central Maui Landfill at a rate of 640 tons per day. The Makawao-Pukalani-Kula and Paia-Haiku regions accounted for approximately 6% of the volume entering the landfill.

4. **Schools**

The State of Hawaii, Department of Education, operates four (4) public schools in Upcountry Maui. They are (with 1993 projected enrollment in parenthesis): Makawao Elementary School (748), Kalama Intermediate School (1165), Pukalani Elementary School (601), and Kula Elementary School (526). High school students from Upcountry are serviced by Maui High School located in Kahului.

The region is also served by privately operated Haleakala School (grades K-8th) and Seabury Hall (grades 6th-12th).

5. **Recreational Facilities**

Upcountry Maui is served by numerous recreational facilities offering diverse opportunities for the region's residents. These facilities include the County's Eddie Tam Park/Gym, Pukalani Recreation Center, Keokea Park, Rice Park, Kula Gym, and the County's proposed Kula Recreation Center.

D. **INFRASTRUCTURE**

1. **Roadways**

The project site abuts Makawao Avenue which is a two-way, two-lane County roadway linking Makawao Town and Pukalani. Within Makawao Town, the roadway links with Baldwin Avenue which

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winds its way toward Paia Town. Makawao Avenue extends in the northeast direction past Makawao Town providing access to Kaupakalua, Kokomo and the greater Haiku region. Moving southwest from the project site, Makawao Avenue intersects the Pukalani Bypass, which is under construction. At its Pukalani terminus, Makawao Avenue links with Haleakala Highway (State Highway 377), which provides access to the Kula region as well as the Wailuku-Kahului region.

2. Wastewater

The Makawao-Pukalani-Kula region is not serviced by a County wastewater treatment system. A portion of Pukalani is serviced by a private wastewater treatment system, while the remainder of the Upcountry area is served by cesspools or septic tanks. The State Department of Health (DOH) has designated a critical wastewater disposal area throughout most of the island, including the Makawao-Pukalani-Kula region. Within the indicated critical areas, septic tanks or treatment works are required for wastewater disposal, while in non-critical areas, cesspools are permitted with DOH approval. The proposed project is located within the critical area.

3. Water

The Upcountry system which serves the areas of Haiku, Haliimaile, Kokomo, Peahi, Pauwela, Upper Kula, Makawao, Pukalani, Olinda, Aapueo, Omaopio, Pulehu-Iki to Waiakoa, Lower Kula, Kaonoulu, Waiohuli-Keokea, Kamaole, Paeahu, Ulupalakua, Kanio and the Kula Agricultural Park receive water under normal conditions from the following water sources:

<u>Source</u>	<u>Average Daily Source Available - Feb. 1993</u>
Waiakamoi Intakes	0.6 MGD
Piiholo Intakes	3.75 MGD
Wailoa Ditch (Kamole Weir Treatment Plant)	4.85 MGD
Hamakua Ditch	1.0 MGD

The current daily water demand (averaged over the 1992 Fiscal Year) in the affected areas listed above is 6.1 MGD (million gallons per day). The combined capacity of the sources listed above during the drought conditions of 1992 was 6.7 MGD. During the drought of 1992 the demand rose to more than 6.9 MGD with 10 percent mandatory restrictions imposed after formal declaration of drought. Thus, the current system deficit based on 1992 drought conditions is 0.2 MGD.

The site is serviced by an existing 12-inch line on Makawao Avenue.

**4. Drainage**

Approximately one-half of the property has a gravel surface and is used as a public parking lot. The remaining portion of the lot includes vegetation, such as kikuyu grass and common weeds. Under existing conditions, the site produces peak runoff at a rate of approximately 1.38 cubic feet per second. Presently, surface runoff from the site sheet flows in a northwesterly direction off the property into neighboring residential lots.

The property is at a higher elevation than the Makawao Avenue right-of-way. Therefore, runoff along the road continues downhill

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in a southwesterly direction without entering the site. A berm along the northeast boundary of the site prevents off-site runoff from entering along that side. Thus, off-site runoff does not enter the project site. See Appendix A.

5. **Electrical**

Maui Electric Company, which has utility poles and overhead lines within the Makawao Avenue right-of-way, will provide electrical service to the site.

# ***Chapter III***

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## ***Potential Impacts and Mitigation Measures***

### **III. POTENTIAL IMPACTS AND MITIGATION MEASURES**

#### **A. PHYSICAL ENVIRONMENT**

##### **1. Surrounding Uses**

The project site is in the midst of a rural setting. It is surrounded by public, commercial and residential uses. The proposed project is not anticipated to have any adverse effects on surrounding land uses.

##### **2. Topography/Landform**

The proposed project will involve the clearing, grubbing and grading of 50,005 square feet, approximately half of which is currently used as a public parking lot, with the remainder covered with grasses and weeds.

Excavation and filling will be required for the construction of the new facility. In general, however, finished contours will follow existing grades to minimize earthwork costs, and maintain or enhance existing drainage patterns. Therefore, the project is not expected to result in any negative impacts to the topography or landform.

The soils investigation done for the project concludes that proposed structures may be supported on spread footings bearing on stiff on-site soils, properly compacted fill or the underlying basaltic rock. See Appendix B.

##### **3. Flora and Fauna**

There are no known rare, endangered or threatened species of flora within or surrounding the project. As such, the removal of

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existing vegetation is not considered an adverse impact to this component of this environment.

With regard to fauna and avifauna, the site is utilized exclusively by alien species, none of which are considered threatened or endangered species. The proposed development is also not expected to have a significant negative impact on fauna and avifauna resources.

**4. Archaeological Resources**

There are no surface indications that significant archaeological remains exist on the property. There are no known historic sites on this parcel or in the surrounding vicinity. Should significant remains be encountered during construction, applicable procedures to ensure compliance with Chapter 6E, HRS, will be followed.

**5. Air Quality and Noise**

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

Once the project is completed, project-related vehicular traffic will generate automotive emissions. However, trip generation rates from an elderly housing development are relatively low in comparison to other residential developments. Project-related emissions are not expected to adversely impact local and regional ambient air quality conditions.

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Ambient noise conditions will also be temporarily 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 construction period. All construction activities are anticipated to be limited to normal daylight working hours.

6. Visual Resources

Comments received from the County Planning Department reflect the view that the proposed project should comply with A-1 Apartment District performance standards. The proposed three-story structure of 37 feet in height, lot coverage of 25.4 percent and a floor area ratio of 49.7 percent exceed A-1 Apartment District Standards. The A-1 District allows a maximum of two stories or 30 feet in height, lot coverage of 25 percent and floor area ratio of 40 percent. The proposed three-story structure of approximately 37 feet in height and floor area ratio of 49.7 percent are needed to optimize the number of elderly affordable units on the site. It is noted that the terraced design of the structures creates substantially less massing than a full three-story building. Lateral siding and lanai elements also tend to break up the overall effect of the three-story section. The proposed lot coverage of 25.4 percent is virtually indistinguishable from lot coverage provisions of 25 percent.

Moreover, the project will be fully landscaped to create a site visually and aesthetically integrated with the surrounding developed properties. The proposed project complements the high pitched roof of the single story Makawao Post Office which is located east of the project site toward Makawao Town. On the west or Pukalani

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side of the project is the two story Makawao Business Center with its high false front parapets reminiscent of traditional commercial structures in Makawao Town.

It is noted that since a subsurface drainage system under the parking lot is proposed, large shade trees within the parking area would not be appropriate. A waiver of large crown shade trees within the parking area is sought since large shade trees within the parking area would likely disrupt the distribution of drainage flows within the site. However, other landscaping material will be planted to provide visual relief.

The proposed development is not anticipated to have a significant negative impact on visual resources.

**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 existing waiting lists for housing at Hale Mahaolu projects. Each of the projects maintain separate waiting lists. At the 111-unit Hale Mahaolu Ekahi, for example, there are approximately 200 on the

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waiting list. At the 180-unit Hale Mahaolu Elua, there are approximately 300 people on the waiting list. 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 and Medical Services**

Police and medical services are not expected to be adversely impacted by the proposed project. The project will not significantly increase residential population for the Makawao-Pukalani-Kula region as a whole and will not extend existing service area limits for emergency services.

4. **Fire Protection Services**

A preliminary conditional review by the County Department of Fire Control has revealed concerns regarding an on-site fire vehicle

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turn-around. Thus, the project plans have been revised to include an on-site fire vehicle turn-around.

5. **Recreational and Social Services**

The proposed project has a recreation room for use by residents of the development. 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 recreational and social services because of the relatively small number of units in the project. Moreover, the elderly may utilize programs offered by the County of Maui and Hale Mahaolu regardless of whether they live in the project or other places.

Some of the broad variety of services are noted as follows: there are Congregate Meal Services at the Eddie Tam Gym 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

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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.

6. **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 is from Makawao Avenue. For the 40 units proposed on the site, there are a total of 48 parking stalls which are proposed.

A traffic assessment for the subject project noted that State Department of Transportation traffic counts in 1991 show 908 vehicles per hour (vph) moving in both directions in the vicinity of the project site in the A.M. peak hour. For the P.M. peak hour, the traffic count was 1,019 vph. A more recent traffic survey for the

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Makawao Sugar Plantation, done by Parsons Brinckerhoff Quade & Douglas, Inc. in January 1993, shows 798 vph in the A.M. peak hour and 876 vph for the P.M. peak hour.

Based on generally accepted trip generation methodology, the project is expected to generate a total of 11 vph during the A.M. peak hour. During the P.M. peak hour, the project is anticipated to generate a total of 10 vph. See Appendix C.

The traffic assessment notes that increases in peak hour traffic due to the project are not considered significant. The project driveway is expected to operate at a satisfactory level of service. The traffic assessment also notes that an exclusive left-turn lane on Makawao Avenue at the project driveway is not warranted.

With regard to loading needs, it would appear that there would be a sufficient amount of excess parking stalls to be used for loading purposes. In addition, the fire truck turn-around could also be used for short-term loading.

From a traffic impact standpoint, therefore, the proposed project is not anticipated to adversely affect existing roadway operating service levels.

2. Water

The proposed project is anticipated to generate an average daily water demand of 11,200 gallons per day. Moreover, the project would incorporate Xeriscape principles including the use of low water demand plants which minimize the impact of water usage.

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It is noted that the County Board of Water Supply has found that current demand exceeds the sources which serve the Upcountry system. Thus, the Board, at its meeting of March 16, 1993, has established a restriction on hookup to the County system for new projects. It should be emphasized that the restriction on hookup would continue until such time as the source capacity of the water system is increased and the Director finds that the system is sufficiently developed to take on additional services without detriment to those already served.

Although there are valid system-wide concerns to be resolved, the impact of the proposed project upon the water system is relatively insignificant. Policy issues regarding provision of water for affordable housing projects need to be addressed. The applicant intends to work with the Board of Water Supply in order to ascertain whether hookup to the County system will be allowed.

3. **Drainage**

The project would produce runoff at a rate of 4.71 cubic feet per second (cfs). This represents a 3.33 cfs increase over existing conditions. See Appendix A.

Existing drainage patterns are proposed to be maintained. Runoff along Makawao Avenue will continue to flow past the site into an existing catchbasin along the roadway. Runoff from the abutting Makawao Post Office site also follows existing patterns and sheet flows toward Makawao Avenue. No off-site runoff will flow into the subject property.

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On-site storm runoff will be collected via a system of concrete drain inlets. The collected runoff will then be deposited in a perforated subdrain system for percolation into the ground.

Estimated soil loss was calculated in accordance with the County of Maui's grading ordinance concerning erosion control. Soil loss during construction is well below the County's allowable rate. Erosion control measures during construction include, but are not limited to the following:

- a. Leaving natural vegetation undisturbed in areas not needed for immediate construction;
- b. Restriction of traffic in and around work areas;
- c. Use of water wagons or other acceptable means for dust control; and
- d. Revegetation of barren areas as soon as grading is completed.

Regarding drainage and erosion control, development of the subject project is not expected to cause any adverse effects to any adjacent developments.

**4. Wastewater**

The proposed project is anticipated to generate an average design flow of approximately 8,000 gallons per day of wastewater. The site is not serviced by County wastewater treatment system and is considered a critical wastewater disposal area. Thus, wastewater disposal would be by means of on-site treatment works.

# **Chapter IV**

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***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 8. The proposed action involves the use of the property for an elderly affordable residential development which is 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."

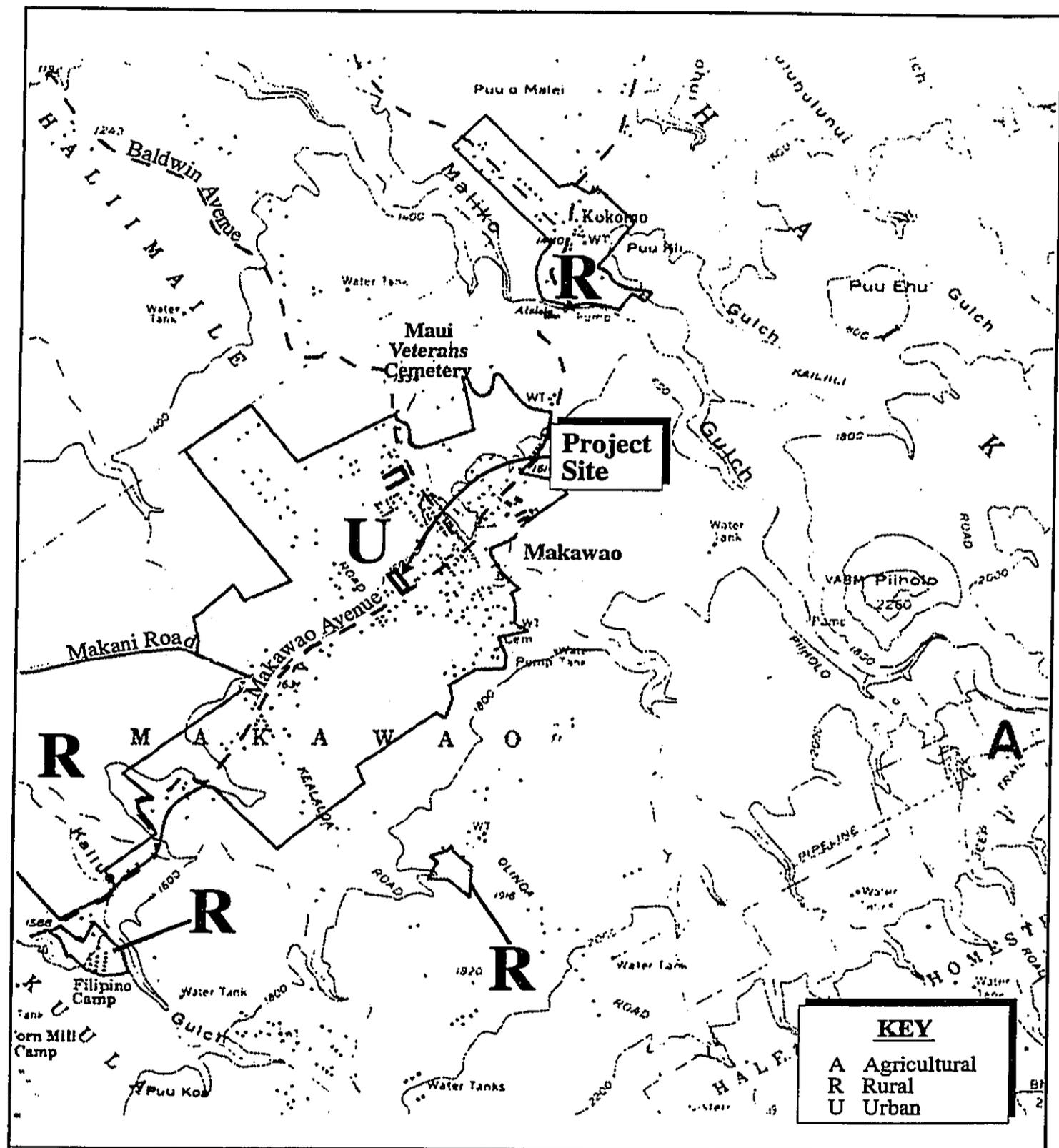
The proposed action is in keeping with the following General Plan objective and policy:

##### **Objective:**

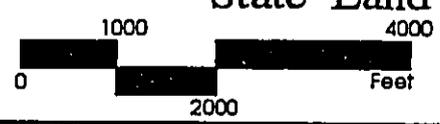
Provide affordable housing to be fulfilled by a broad cross-section of housing types.

##### **Policies:**

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



**Figure 8 Makawao Elderly Independent Living Community State Land Use Classifications**



**Michael T. Munekiyo Consulting, Inc.**  
Prepared for: **Hale Mahaolu, Inc.**

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C. **COMMUNITY PLAN DESIGNATION AND ZONING**

The subject parcel is located in the Makawao-Pukalani-Kula 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 "Business" by the Makawao-Pukalani-Kula Community Plan Land Use Map. See Figure 9.

Although the appropriate Community Plan designation for the subject project would be "Multi-Family", a waiver from the Community Plan process is being sought under the provisions of Chapter 201E-210, HRS.

It is noted that the project implements the following Makawao-Pukalani-Kula Community Plan objective:

Encourage public sector projects, government programs, public-private joint efforts, and other assistance programs to reduce costs and increase housing availability for all income groups.

The existing zoning for the property is "Interim". A waiver from the change in zoning requirement is being sought under the provisions of Chapter 201E, HRS.

Under the provisions of Chapter 201E-210, HRS, waivers and exemptions from certain provisions relating to planning, zoning, building and

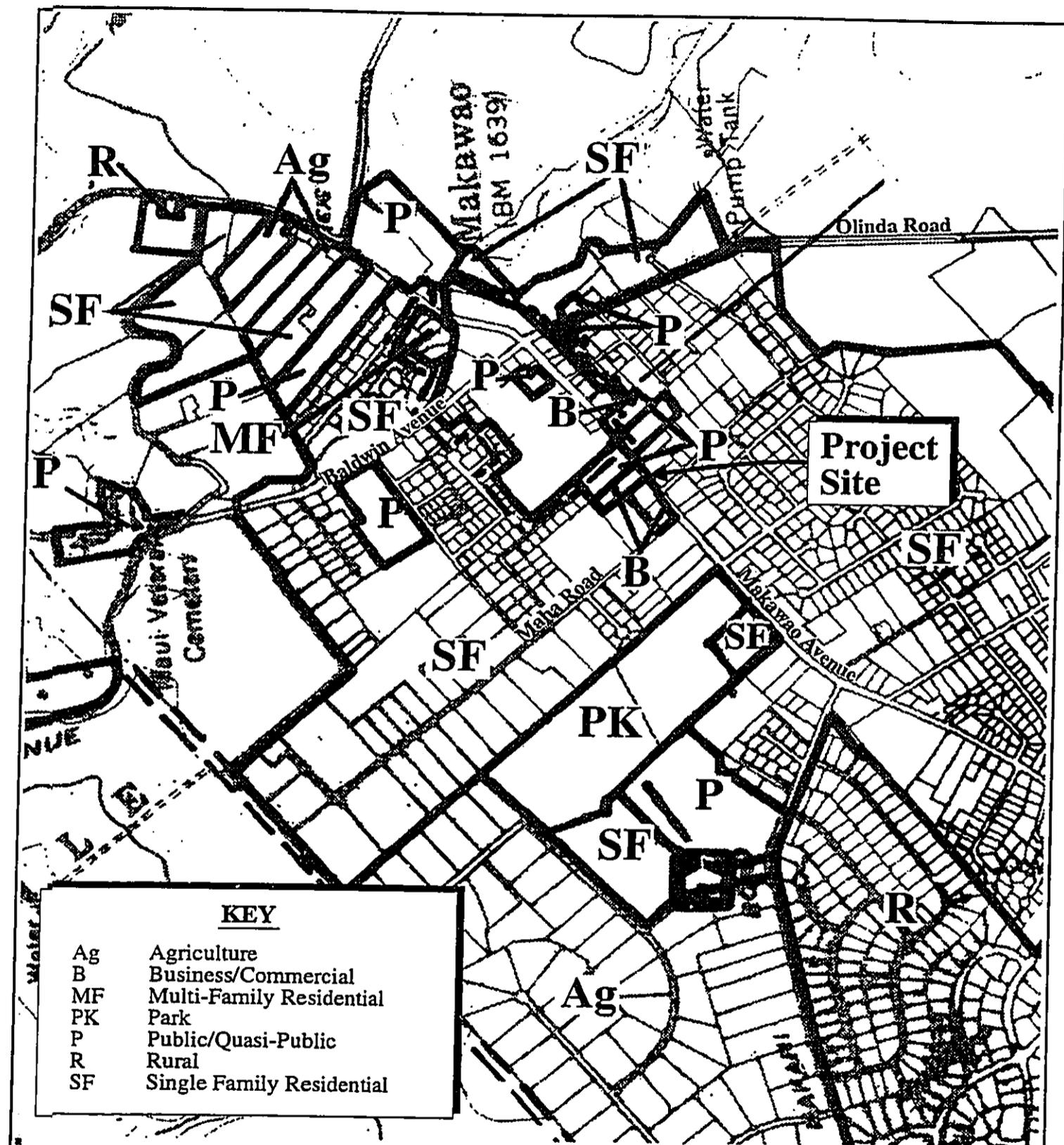
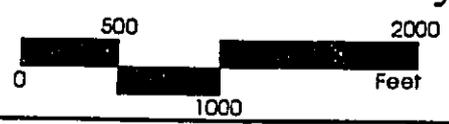
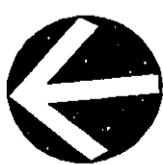


Figure 9 Makawao Elderly Independent Living Community  
Community Plan Designations



Michael T. Munekiyo Consulting, Inc.  
Prepared for: Hale Mahaolu, Inc.

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construction standards may be requested as long as minimum standards of health and safety are met. The proposed project intends to meet all applicable provisions of Chapter 201E-210, HRS.

# ***Chapter V***

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## ***Findings and Conclusion***

## V. FINDINGS AND CONCLUSION

The proposed Makawao Elderly Independent Living Community would provide much needed elderly affordable housing in the Upcountry region. The project would be developed and managed by Hale Mahaolu, Inc. There is a significant community need for elderly 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 necessary, 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. There are no surface indications that significant archaeological remains exist on the property. If significant remains are encountered during construction, applicable procedures to ensure compliance with Chapter 6E, HRS, will be followed. In terms of visual resources, the proposed project would be aesthetically integrated with surrounding developed 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 and Hale Mahaolu regardless of whether they live in the project or other places.

The proposed project is not anticipated to significantly impact peak hour traffic on Makawao Avenue. Since there is an existing restriction on hookup to the

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County water system, the applicant will work with the Board of Water Supply in order to ascertain whether hookup will be allowed. On-site runoff will be collected via a system of concrete drain inlets. The collected runoff will then be deposited in a perforated pipe subdrain system. Regarding wastewater disposal, on-site treatment works will be utilized. The project should not have significant impacts to roadway, water, drainage and wastewater systems.

The project is also not anticipated to have adverse impacts upon medical and police services as well as other infrastructure systems. With regard to fire protection, an on-site fire vehicle turn-around has been included in the project plans.

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

# ***Chapter VI***

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

**VI. AGENCIES CONTACTED IN THE PREPARATION OF THE DRAFT 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. Mr. David Nakagawa, Chief Sanitarian  
Department of Health  
54 High Street  
Wailuku, Hawaii 96793
3. Mr. Robert Siarot, Maui District Engineer  
Department of Transportation  
650 Palapala Drive  
Kahului, Hawaii 96732
4. Mr. Brian Miskae, Director  
Department of Planning  
250 South High Street  
Wailuku, Hawaii 96793
5. Mr. David Craddick, Director  
Department of Water Supply  
200 South High Street  
Wailuku, Hawaii 96793
6. Ms. Charmaine Tavares, Director  
Department of Parks and Recreation  
200 South High Street  
Wailuku, Hawaii 96793
7. Mr. Travis Thompson, Director  
Department of Finance  
200 South High Street  
Wailuku, Hawaii 96793
8. Mr. Ronald Davis, Chief  
Department of Fire Control  
200 Dairy Road  
Kahului, Hawaii 96732
9. Mr. Ralph Nagamine  
Department of Public Works  
Land Use and Codes Administration  
250 South High Street  
Wailuku, Hawaii 96793 (4 sets)
10. Mr. Peter Meagher, President  
Makawao Community Association  
119 Ka Drive  
Kula, Hawaii 96790

JOHN WAIHEE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 8TH FLOOR  
HONOLULU, HAWAII 96813

KEITH AHUE  
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEPPELER II  
DONA L. HANAIKE

AQUACULTURE DEVELOPMENT  
PROGRAM

AQUATIC RESOURCES  
CONSERVATION AND

ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES

FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
DIVISION

LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

March 25, 1993

Mr. Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells St., Suite 3  
Wailuku, Hawaii 96793

LOG NO: 7751  
DOC NO: 9303AG40

Dear Mr. Arakawa:

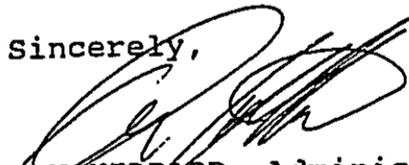
SUBJECT: Historic Preservation Review of the Makawao Elderly  
Independent Living Community  
Makawao, Maui  
TMK: 2-4-24: 03

Thank you for the opportunity to comment on the proposed construction of this elderly affordable housing project.

There are no known historic sites on this parcel or in the surrounding vicinity. This parcel is located in the central area of Makawao community which has been disturbed by construction activities on adjacent properties. As you informed Ms. Annie Griffin by telephone, this parcel is relatively level and is currently used for temporary parking. We believe that the presence of historic sites is unlikely. Therefore, we have determined that the proposed development will have "no effect" on historic sites.

Should you have any questions about these comments, please contact Ms. Annie Griffin at 587-0013.

Sincerely,

  
DON HIBBARD, Administrator  
State Historic Preservation Division

AG:amk

JOHN WAIHEE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
MAUI DISTRICT HEALTH OFFICE  
54 HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

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

PAUL E. HOFFMAN, M.D., M.P.H.  
DISTRICT HEALTH SERVICES ADMINISTRATOR (M.D.)

March 17, 1993

Mr. Michael Munekiyo  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells Street, Suite 3  
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

Subject: Makawao Elderly Independent Living Community

We have reviewed the document on the subject project submitted by your office. The document proposes to construct the Makawao Elderly Independent Living Community, an elderly affordable housing project. The subject project is located in the critical wastewater disposal area as determined by the Maui County Wastewater Advisory Committee. No new cesspools will be allowed in the subject area.

As infrastructure improvements will not be constructed in the near future and there is no existing sewer service system in the area, the Department of Health (DOH) recommends the use of treatment works to be constructed on site. No individual wastewater system should be utilized. The treated effluent should be reused for irrigation wherever possible.

All wastewater plans must conform to applicable provisions of the DOH's Administrative Rules, Chapter 11-62, "Wastewater Systems." However, we do reserve the right to review the detailed wastewater plans for conformance to applicable rules.

Should you have any questions, please contact Ms. Lori Kajiwara of the Wastewater Branch on Oahu at telephone 586-4290.

Sincerely,

  
DAVID H. NAKAGAWA  
Chief Sanitarian

NDA CROCKETT LINGLE  
Mayor



BRIAN W. MISKAE  
Planning Director

**COUNTY OF MAUI  
PLANNING DEPARTMENT**

250 S. HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

March 25, 1993

Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells St. Suite 3  
Wailuku, Maui, HI 96793

Dear Mr. Arakawa:

Re: PROPOSED MAKAWAO ELDERLY INDEPENDENT LIVING COMMUNITY  
TMK:2-4-024:003, MAKAWAO

Thank you for your letter of March 2, 1993 requesting our comments on your proposed petition for 201E-210 certification relating to the subject project.

In reviewing your project specifications we would comment as follows:

- A. Title 19 - Zoning
1. Zoning Districts:
    - a. No objection to waiving the Community Plan designation. Currently it is "B" (Business). During the update process we will recommend a change to "MF" (multi-family)
    - b. The general character of the Makawao area reasonably dictates a two story maximum building height. We feel therefore that the project should be limited to 2 stories.
    - c. For the same reasons, Makawao is rural in nature and should reflect as much open space as possible. We feel that lot coverage should not exceed 25% (A-1 standards)
    - d. FAR should be proportionate therefore to A-1 performance standards. (40%)
    - e. We have no objection setbacks FY:20', SY:15' and RY:15'.
    - f. We have no objection to inclusion of a central laundromat, manager's office, recreation room and maintenance storage in the project.
    - g. We do not object to waiving the Community Plan. (see "a")

- h. We do not object to waiving County zoning. In the overall implementation of up-country zoning, we would recommend A-1 zoning. (appropriate to suggested performance standards).
2. Off-Street Parking and Loading.
    - a. In light of the proposed use of the project, we would not object to reduction in parking provided A-1 performance standards are adhered to.
    - b. We would not object to provision of 50% compact stalls.
    - c. We feel that the provision of large shade trees should not be waived. Parking lot landscaping provides not only off-site aesthetic relief but also a better living environment on-site.
    - d. We have no comment to make regarding water source for irrigation.
    - e. With regard to the loading space we would anticipate there would be a substantial number of deliveries to such a facility therefore a stall should be reserved for loading.
3. Permits:
    - a. We feel the Department of Public Works should have issued permits for both construction and grading prior to commencement. This, to ensure compliance with health, safety requirements.
4. Taxes, Fees and Assessments.

The Planning Department offers no comments on these issues.
5. Traffic and Drainage.
    - a. We would not object to waiving the traffic study.
    - b. On site storm water retention could be allowed provided engineering and site specifications will permit it physically to be done.
6. Other Requests:
    - a. A cursory check should be made of existing records to determine if there is any significant archaeological sites in the area. In any event, during construction, if anything is discovered, work should stop and DLNR

Page 3

Historic Sites Division contacted.

- b. Provided all health and safety requirements are met we would not object to waiving Chapter 46 requirements for the project.

We trust the aforementioned will help you in your EA determination. Should you require anything further, please do not hesitate to contact the writer or Ms. Ann Cua of my staff.

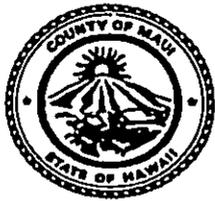
Yours truly,



Brian Miskae, Director  
Department of Planning

cc: S. Aveiro  
A. Cua

makeldcr.bm



DEPARTMENT OF  
**PARKS AND RECREATION**  
COUNTY OF MAUI

LINDA CROCKETT LINGLI  
Mayor  
CHARMAINE TAVARES  
Director  
ARMAND PADUA  
Deputy Director

1580 KAAHUMANU AVENUE, WAILUKU, HAWAII 96793

(808) 243-723

April 1, 1993

Mr. Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells St., Suite 3  
Wailuku, HI 96793

Subject: Makawao Elderly Independent Living Community

Dear Mr. Arakawa:

We have reviewed the subject project and no comments to offer at this time.

Thank you for allowing us the opportunity to comment on the proposed project.

Sincerely,

*Charmaine Tavares*

for CHARMAINE TAVARES  
Director

WANDA CROCKETT LINGLE  
Mayor



COUNTY OF MAUI  
DEPARTMENT OF FINANCE  
2101 SOUTH HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

MAR 18 1993

TRAVIS O. THOMPSON  
Director of Finance

WAYNE Y. FUJITA  
Deputy Director of Finance

March 16, 1993

Mr. Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells Street, Suite 3  
Wailuku, HI 96793

Dear Mr. Arakawa:

SUBJECT: MAKAWAO ELDERLY INDEPENDENT LIVING COMMUNITY

The purpose of this letter is to respond to your request for comments dated March 2, 1993. The project summary and Waivers and Exemptions were reviewed by the Real Property Tax Division of the Department of Finance. The comments are transmitted to you in accordance with your request.

Please let me know if you have any questions.

Sincerely,

TRAVIS O. THOMPSON  
Director of Finance

TOT:eh  
Attachment

LINDA CROCKETT LINGLE  
Mayor



County of Maui  
REAL PROPERTY TAX DIVISION  
Department of Finance  
1580 Kaahumanu Avenue, Wailuku, HI 96793

March 12, 1993

TRAVIS O. THOMPSON  
Director of Finance

WAYNE Y. FUJITA  
Deputy Director of Finance

REC'D  
COUNTY OF MAUI  
DEPARTMENT OF FINANCE  
200 SO. PINE STREET  
WAILUKU, MAUI, HAWAII 96793

MJ  
3.15.93  
JH

MEMO TO: Travis O. Thompson, Director of Finance  
F R O M: Dennis Ichikawa, Real Property Tax Administrator  
SUBJECT: Makawao Elderly Independent Living Community

The subject property identified as Tax Map Key: 2-4-024-003 is presently owned by the County of Maui and exempt from real property taxes. Upon transfer of title to Hale Mahaolu, Inc., a non-profit corporation, the petitioner may qualify for exempt status under Maui County Code (MCC) 3.48.545 (and Hawaii Revised Statutes (HRS) 246-39) Low and Moderate Income Housing.

To qualify for the exemption, the project must be completed, with the elderly housing program in operation prior to January 1st lien date. The initial claim for exemption and the regulatory agreement shall be filed with the Director of Finance within 60 days from the effective date of qualification. The effective date of qualification is the date the qualifying mortgage obtained under Section 202 of the National Housing Act is properly recorded or filed with the Bureau of Conveyance. Thereafter, exemption claims shall be filed annually on or before December 31st. Although the subject property will be exempted, it shall be subject to the minimum tax of \$60.00 for each year the project qualifies for the exemption.

The parties in question should also qualify for exemption from improvement assessments under the proposed County Community Facilities District (CFD) Program upon formal adoption of Section 14.78. The exempt status does include a provision that upon the dissolution of the corporation, the land shall be distributed to other non-profit or charitable corporations engaged in similar activities as required under the Hawaii Revised Statutes 46.74.1.

Should the representative from Hale Mahaolu Inc. require additional information regarding this matter, please ask them to contact our office at their convenience. Thank you.

Attachments - HRS 246-39 and HRS 46-74.1

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GENERAL PROVISIONS

46-76

the improvement district shall be assessed for improvements without contribu-  
tion from the county or the State. [L 1967, c 35, §1; HRS §46-74]

Cross References

Improvement by assessment, see chapter 67.

[§46-74.1 Exemption from improvement assessments.] Subject to sec-  
tions 67-8 and 70-111, any land exempted by law from payment of property  
taxes which land is owned by a society, association, or corporation engaged in  
religious, charitable, educational, scientific, literary, or other benevolent pur-  
poses, whose charter or other enabling act contains a provision that, in the event  
of dissolution, the land owned by such society, association, or corporation shall  
be distributed to another society, association, or corporation engaged in  
religious, charitable, educational, scientific, literary, or other benevolent pur-  
poses shall be exempt from assessments to pay for the cost of any improvements  
included in any improvement district. [L 1968, c 65, §2]

§46-75 Improvement bonds exempt from taxation. All bonds issued by  
any of the counties of the State for improvements by assessments, and the  
interest thereon, shall be exempt from all state, county, and municipal taxation,  
except inheritance, transfer, and estate taxes. [L 1963, c 128, §1; Supp. §138-71;  
HRS §46-75]

§46-76 Location of utility facilities in improvement districts. Notwith-  
standing any provision of law to the contrary, whenever any public improve-  
ment is established, constructed, improved, or altered pursuant to the improve-  
ment by assessment statutes or ordinances, and in conjunction therewith it is  
necessary to provide for the installation or require the removal, relocation,  
replacement, or reconstruction of public utility facilities that are privately  
owned, the respective legislative bodies of the counties shall determine whether  
the whole or a portion of such utility facilities shall be located overhead or  
underground. Where it is decided that the whole or a portion of the utility  
facilities shall be relocated, replaced or reconstructed, which installation shall  
constitute a public improvement, the respective legislative bodies of the counties  
shall determine what portion of the costs of the installation or the removal,  
relocation, replacement, or reconstruction of the utility facilities required shall  
be borne by the utility companies, counties and the properties specially benefited  
within the improvement district; provided that such costs borne by the counties  
and the utility companies shall be paid in a lump sum, that the portion of the  
costs to be borne by the utility companies shall be the same percentage of the  
total relocation cost for each utility company required to remove, relocate,  
replace or reconstruct its facilities within the improvement district and the costs  
that are allocated against the properties specially benefited in the improvement  
district shall be assessed and paid for in accordance with the provisions of the  
improvement by assessment statutes or ordinances; provided further that the  
counties may issue bonds under any applicable laws to pay their share of such  
costs and the costs allocated against the properties specially benefited may be  
financed under any applicable laws as are other special assessments against  
specially benefited property.

The foregoing provisions shall not be applicable to the subdivision of lands  
which require the installation of utility facilities in new streets established by the

REAL PROPERTY

246-39.1

§246-38 Property of the United States leased under the National Housing Act. Real property belonging to the United States leased pursuant to Title VIII of the National Housing Act, as amended or supplemented from time to time:

- (1) Shall not be taxed under this chapter upon the lessee's interest or any other interest therein, except as provided in paragraph (2).
- (2) Shall be taxed under this chapter to the extent of and measured by the value of the lessee's interest in any portion of the real property (including land and appurtenances thereof and the buildings and other improvements erected on or affixed to the same) used for, or in connection with, or consisting in, shops, restaurants, cleaning establishments, taxi stands, insurance offices, or other business or commercial facilities. The tax shall be assessed to and collected from the lessee. The assessment of such property shall not impair, and shall be so made as to not impair, any right, title, lien, or interest of the United States.

Nothing in this section shall be deemed to be an expression by the legislature as to the construction of this chapter as it read prior to January 1, 1956. [L 1955, c 177, §§1, 2; RL 1955, §128-22.5; HRS §246-38]

§246-39 Exemption for low and moderate-income housing. (a) For the purposes of this section, "nonprofit or limited distribution mortgagor" means a mortgagor who qualifies for and obtains mortgage insurance under sections 202, 221(d)(3), or 236 of the National Housing Act as a nonprofit or limited distribution mortgagor.

(b) Real property used for a housing project which is owned and operated by a nonprofit or limited distribution mortgagor or which is owned and operated by a person, corporation or association regulated by federal or state laws or by a political subdivision of the State or agency thereof as to rents, charges, profits, dividends, development costs and methods of operation, shall be exempt from property taxes.

(c) Exemptions claimed under this section shall disqualify the same property from receiving an exemption under section 53-38.

(d) The director of taxation shall, pursuant to chapter 91, promulgate rules and regulations necessary to administer this section. [L 1967, c 135, §§1, 2; HRS §246-39; am L 1969, c 89, §1; am L 1972, c 200, §6]

Cross References

Other exemptions:  
Orchard property, see §154-5.  
Tree farms, see §186-7.

§246-39.1 Claim for exemption. (a) Notwithstanding any provision in this chapter to the contrary, any real property exempt from property taxes under section 246-39 shall be exempt from property taxes from the date the property is qualified for the exemption; provided that a claim for exemption is filed with the assessor within sixty days of the qualification. As used herein, the date of the qualification shall be the date when the mortgage made by a nonprofit or limited distribution mortgagor and insured under sections 202, 221(d)(3), or 236 of the National Housing Act is filed for recording with the registrar of the bureau of conveyances or the assistant registrar of the land court of the State, whichever is applicable; provided that in the case of a mortgage made by a nonprofit or

MAR 1 9 1993

PB Form 104

DEPARTMENT OF FIRE CONTROL  
County of Maui  
21 KINIPOPO ST., WAILUKU, HAWAII 96793

MEMORANDUM TO: Milton Arakawa DATE: March 17, 1993  
NAME OF PROJECT: Makawao Elderly Independent Living Community  
ADDRESS: \_\_\_\_\_  
TAX MAP KEY: TMK:2-4-24:3

The following are requirements for this project

Dear Mr. Arakawa,

The following are my comments of the review of your project submittal.

1. We would not be able to grant an exemption to a fire vehicle access turnaround. Project will have to provide an approved fire vehicle turnaround in accordance with Sec. 10.207 (h) of the Uniform Fire Code, 1988 as amended. If this is not possible, then project will have to provide a complete vehicle drive-thru to another street.

2. Provisions of fire apparatus access roads may be modified when buildings are completely protected with an approved automatic fire sprinkler system.

3. Provide fire flow calculations for the structures, prepared by a licensed engineer, in accordance with Hawaii Insurance Bureau, Fire Flow schedule, or ISO 1980 Rating Schedule.

4. Provide electrically supervised manual fire alarm system in accordance with Sec. 14.104 (f) of the UFC 1988, as amended. Please provide visual requirements for fire alarm system, per ADA.

5. Provide proper fire flow (gpm) and hydrant spacing in accordance with State of Hawaii, Water Systems Standards.

6. Provide blue reflective fire hydrant road markers for all fire hydrants.

7. Provide information on type and quantity of storage in storage areas.

Mr. Arakawa  
Page 2.

8. Comply with all design requirements of Accessibility Standards for disabled persons.

Thank you for your time in this matter. Please be advised that this was only a preliminary conditional review of your project. When the project is submitted for permit application, a more complete review will be performed. Further questions may be directed to me at 243-7242.

Sincerely,

*Michael R. Cummings*

Michael R. Cummings, Lieutenant  
Fire Prevention Bureau, Plans Review

xc: Henry Olivia, Dept. Human Concerns  
FPB/file  
Chron/file

# ***Chapter VII***

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***Comment Letters on  
Draft EA and Agency Responses***

DA CROCKETT LINGLE  
Mayor



JUN 9 1993

BRIAN W. MISKAE  
Planning Director

**COUNTY OF MAUI  
PLANNING DEPARTMENT**

200 S. HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

June 3, 1993

Mr. Milton Arakawa  
Michael T. Munekiyo Consulting Inc.  
1823 Wells Street, Suite 3  
Wailuku, Maui, HI 96793

Dear Mr. Arakawa:

Re: **MAKAWAO ELDERLY INDEPENDENT LIVING COMMUNITY DRAFT  
CHAPTER 201E-210 APPLICATION, TMK:2-4-24:003, MAKAWAO**

With respect to the above mentioned matter, we would advise that following a meeting with the project architect, we wish to revise our comments of March 25, 1993.

The revisions are with respect to our comments on building height, lot coverage, floor area ratio and parking lot shade trees.

Building Height This department feels very strongly about maintaining a two story height limit for the Makawao area. The subject buildings however, intend to incorporate a terraced design character thus creating substantially less massing than a full three story building. Only a small portion of the building will actually be three stories with the overall height being about 37 feet. Lateral siding and lanai elements also tend to break up overall effect of the three story section. For these reasons, we withdraw our objection to the height but would emphasize that our withdrawal is based on site specific criteria and is not to be construed as being an overall view of the Makawao area.

Lot coverage In light of the staggering of footprints using two structures, the proposed increase in lot coverage over normal A-1 standards should not pose a substantial impact on the residential character of the area.

Floor area ratio The allowance for the third floor increases the FAR accordingly. Although we would prefer to maintain A-1 standards in this area, the site specific design might allow some increase in the FAR without substantial impacts.

Shade Trees We understand that with the installation of the subsurface on-site drainage system and with the 200% redundancy

Milton Arakawa  
June 3, 1993  
Page 2

waste water treatment system, installation of the deep root plant materials is not appropriate. With this understanding, we would still encourage plant materials that would provide some shade and also tend to soften the massing of the buildings.

We trust the aforementioned to be satisfactory. If you have any questions, please do not hesitate to contact the writer at 243-7735.

Yours truly,



Brian Miskae, Director  
Department of Planning

cc: Honorable Linda Crockett Lingle  
Henry Oliva, Deputy Director-Human Concerns  
Ann Cua



DEPARTMENT OF  
**HOUSING AND HUMAN CONCERNS**  
COUNTY OF MAUI

LINDA CROCKETT LINGLE  
Mayor

STEPHANIE AVEIRO  
Director

HENRY OLIVA  
Deputy Director

200 SOUTH HIGH STREET, WAILUKU, HAWAII 96793

(808) 243-7805

June 21, 1993

Mr. Brian Miskae, Director  
Planning Department  
County of Maui  
250 South High Street  
Wailuku, Hawaii 96793

**SUBJECT: Makawao Elderly Independent Living Community**

Dear Mr. Miskae:

Thank you for your letters of May 17, 1993 and June 3, 1993 offering comments on the subject project. We would like to provide a response to your comments as follows:

1. With the installation of the subsurface drainage system under the proposed parking lot, the planting of large shade trees within the parking lot would likely disrupt the distribution of drainage flows within the site. Although no large shade trees are proposed within the parking area, other landscaping material will be planted to provide visual relief. The mature trees which exist at the boundary of the site also provide an aesthetic buffer. We would be willing to submit a landscape plan to your department for review prior to the issuance of the building permit for the project.

We appreciate the opportunity to respond to your comments. If you have any questions or desire further information, please feel free to call me.

Very truly yours,

Stephanie Aveiro, Director  
Department of Housing and Human Concerns

/lc

ANDA CROCKETT LINGLE  
Mayor

GEORGE N. KAYA  
Director

CHARLES JENCKS  
Deputy Director

AARON 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

May 25, 1993

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

Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells Street, Suite 3  
Wailuku, HI 96793

SUBJECT: Draft Chapter 201E-210 Application  
MAKAWAO ELDERLY INDEPENDENT LIVING COMMUNITY  
TMK:2-4-24:03

Dear Mr. Arakawa:

We reviewed the subject application and have the following comments:

1. Comments from the Engineering Division:

- a. A road widening lot be provided for the adjoining half of Makawao Avenue to provide for future right-of-way and improved to County standards, to include but not be limited to, pavement widening, construction of curb, gutter and sidewalk, and relocation of utilities underground. Said lot shall be dedicated to the County upon completion of the improvements.
- b. The existing Makawao Avenue does not meet County standards based on roads located in urban zoning.
- c. A final detailed drainage and erosion control plan including, but not limited to, hydrologic and hydraulic calculations, scheme for controlling erosion and disposal of runoff water, and an analysis of the soil loss using the HESL erosion formula, be submitted to the Department of Public Works, Engineering Division for our review and approval. The plan shall provide verification that the grading and runoff water generated by the project will not have an adverse effect on the adjacent the downstream properties.



- d. The applicant proposes an amendment to the parking requirements of 80 stalls to 49 stalls and increased compact parking stalls. Since this project deals with elderly housing, it is not anticipated that these people will not be driving cars, and therefore, we offer no objections to these proposed amendments.
- e. During the construction of this project, all construction employee parking shall be accommodated on the project site and not within the County road right-of-way.
- f. The applicant proposes a waiver from the requirement for conducting a traffic impact study for this project. We offer no objections to this waiver. However, we request that a traffic assessment report be provided to address additional traffic conflicts at this project's driveway on to Makawao Avenue; and,
- g. The applicant requests a waiver from constructing road and drainage improvements fronting this development on Makawao Avenue. We recommend denial of this request for the following reasons:
  - (1) The required improvements ensures public and elderly home users safety along a major collector road (Makawao Avenue); (i.e. road widening, curbs/gutters/sidewalks, etc.)
  - (2) If this development does not improve frontage, then the County must obtain funds to construct these improvements to mitigate liability.

The applicant is requested to contact the Engineering Division at 243-7745 for additional information.

2. Comments from the Solid Waste Division:

- a. The owners and their contractors shall implement solid waste reduction, re-use and recycling programs to reduce the amount of solid waste to be disposed of at the County landfills.
- b. All yard debris shall be composted and re-used on their landscape plantings.
- c. Alternative means of disposal of grubbed material and rock shall be utilized other than disposed of at the County landfills.

Page 3 of 3  
May 25, 1993  
Milton Arakawa  
TMK:2-4-24:03

d. Refuse collection shall be by a private collector.

The applicant is requested to contact the Solid Waste Division at 243-7875 for additional information.

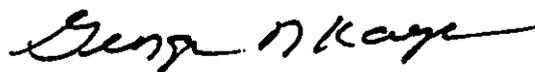
4. Comments from the Land Use and Codes Administration:

- a. Paved parking spaces and loading space must be provided, with appropriate landscaping and fencing pursuant to the County's Off-Street Parking and Loading Ordinance.
- b. Requires community plan amendment from business to multi-family.
- c. Requires zoning change from interim to apartment district.
- d. Requires conformance to the Fair Housing Act and Uniform Federal Accessibility Standards design review by the Commission on Persons with Disabilities.
- e. The applicant's request for a waiver from the placement of overhead utilities underground may be granted if the applicant agrees to participate in any future project to place the utilities on Makawao Avenue underground.

The applicant is requested to contact the Land Use and Codes Administration at 243-7250 for additional information.

If you have any questions regarding this letter, please call Mitzi H. Tanaka at 243-7250.

Very truly yours,



GEORGE N. KAYA  
Director of Public Works

RMN:mht  
1052f; Page 50-52

xc: L.U.C.A.  
Engineering Division  
Solid Waste Division  
Wastewater Reclamation Division



DEPARTMENT OF  
**HOUSING AND HUMAN CONCERNS**  
COUNTY OF MAUI

LINDA CROCKETT LINGLE  
Mayor

STEPHANIE AVEIRO  
Director

HENRY OLIVA  
Deputy Director

200 SOUTH HIGH STREET, WAILUKU, HAWAII 96793

(808) 243-7805

June 21, 1993

Mr. George Kaya, Director  
Department of Public Works  
and Waste Management  
County of Maui  
200 South High Street  
Wailuku, Hawaii 96793

**SUBJECT: Makawao Elderly Independent Living Community**

Dear Mr. Kaya:

Thank you for your letters of April 8, 1993 and May 25, 1993 offering comments on the subject project. We would like to provide a response to your comments as follows:

1. The subject property's Makawao Avenue frontage has recently been upgraded to include a standard curb, gutter and sidewalk. However, the overhead utility lines have been maintained. It is noted that there are existing overhead utility lines along this portion of Makawao Avenue. The undergrounding of overhead lines for the subject property's frontage of approximately 125 feet would involve added cost for the project with little aesthetic benefit since overhead lines along adjacent properties would remain.
2. Regarding Makawao Avenue not meeting County standards, it is noted that the project is a 40 unit elderly housing project which is not anticipated to generate significant vehicular traffic. This, the impact upon Makawao Avenue should not be significant.
3. The drainage and soil erosion report has been submitted to your department for review. It is anticipated that the project will have no adverse effect on adjacent and downstream properties.
4. It is noted that we anticipate that perhaps 20 of the residents in the 40 unit project will drive cars.
5. We will make our best efforts to accommodate all construction employee parking on the project site and not within County road rights-of-way.

Housing Division

Senior Services Division

Youth Services Division

Immigrant Services

Volunteer Action Division

Office on Aging

Printed on recycled paper (RP)

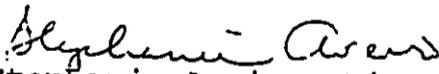
Mr. George Kaya, Director  
June 16, 1993

Page 2 of 2

6. We have done a traffic assessment pursuant to your request.
7. A solid waste management program will be prepared by Hale Mahaolu, Inc. and submitted to the Solid Waste Division for review.
8. The project will provide paved parking and loading spaces. However, through the Chapter 201E-210 process, a waiver is being requested from Sec.19.36.070(B) of the Maui County Code. This requires the planting of a large crown shade tree per every 5 parking stalls. This is being requested since large shade trees would eventually disrupt the subsurface drainage system being proposed under the parking area. Applicable provisions on fencing will be followed.
9. The project proposes a waiver from going through the community plan amendment and change in zoning process due to the added cost and time to the affordable housing project.
10. The applicant will comply with applicable provisions of the Fair Housing Act and Federal Accessibility Standards.
11. The specific scope and cost of any regional project to place overhead utilities underground should be discussed with the future owner(s) of the project.

We appreciate the opportunity to respond to your comments. If you have any questions or desire further information, please feel free to call me.

Very truly yours,

  
Stephanie Aveiro, Director  
Department of Housing and Human Concerns

/lc

LINDA CROCKETT LINGLE  
Mayor



MAY 14 1993  
BRIAN W. MISKAE  
Planning Director

**COUNTY OF MAUI  
PLANNING DEPARTMENT**

200 S. HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

May 7, 1993

Mr. Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells Street, Suite 3  
Wailuku, Maui, Hawaii 96793

Dear Mr. Arakawa,

RE: Makawao Elderly Independent Living Community,  
Draft Chapter 201E-210 application, TMK 2-4-24:003,  
Makawao, Maui.

The Planning Department by letter dated March 25, 1993 has offered comments on the proposed Makawao Elderly Independent Community. Please be advised that our comments of March 25th have not changed.

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

Very truly yours,

A handwritten signature in dark ink, appearing to read "B. Miskae".

BRIAN MISKAE  
Director of Planning

cc: Clayton Yoshida  
Project File  
Ann Cua

LINDA CROCKETT LINGLE  
Mayor



COUNTY OF MAUI  
DEPARTMENT OF FINANCE  
200 SOUTH HIGH STREET  
WAILUKU, MAUI, HAWAII 96793  
April 21, 1993

APR 26 1993

TRAVIS O. THOMPSON  
Director of Finance

WAYNE Y. FUJITA  
Deputy Director of Finance

Mr. Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells Street, Suite 3  
Wailuku, Hawaii 96793

Dear Mr. Arakawa:

SUBJECT: MAKAWAO ELDERLY INDEPENDENT LIVING COMMUNITY

Thank you for the opportunity to comment on the draft of the Chapter 201E-210 application for the subject project.

The draft application is acceptable to the Department of Finance.

Sincerely,

A handwritten signature in black ink, appearing to read "Travis O. Thompson", is written over a horizontal line.

TRAVIS O. THOMPSON  
Director of Finance

TOT:rt

APR 20 1993

NDA CROCKETT LINGLE  
Mayor  
GEORGE N. KAYA  
Director  
CHARLES JENCKS  
Deputy Director  
AARON SHINMOTO, P.E.  
Chief Staff Engineer



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

COUNTY OF MAUI  
DEPARTMENT OF PUBLIC WORKS  
AND WASTE MANAGEMENT  
LAND USE AND CODES ADMINISTRATION  
250 SOUTH HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

April 8, 1993

Milton Arakawa  
Michael T. Munekiyo Consulting, Inc.  
1823 Wells Street, Suite 3  
Wailuku, HI 96793

SUBJECT: Makawao Elderly Independent Living Community  
TMK:2-4-24:03

Dear Mr. Arakawa:

We reviewed the subject application and have the following comments:

1. Comments from the Engineering Division:
  - a. "Exempt this project from provisions of a fire truck turn-around on-site." Recommend denial for public safety.
  - b. "Waive requirement for loading space." Suggest using guest spaces as combination loading space.
  - c. "Waive Requirement for building permit to start construction." Recommend denial for public safety.
  - d. "Waive requirement for grading permit to start site work." Recommend denial for public safety.
  - e. "Waive any requirement for a traffic study." Traffic study could be waived. However, traffic assessment report shall not. Consultant to check with Engineering Division for requirements of traffic assessment report.
  - f. "Waiver requirements . . . for the following: (1) Road widening, curbing, sidewalk improvements; (3) Off-site drainage improvements." Information furnished is inadequate to grant exemption. In addition, public safety for the elderly and general public would be compromised. Recommend denial at this time.

Page 2 of 3  
April 8, 1993  
Milton Arakawa  
TMK:2-4-24:03

- g. Provide location map.
- h. Provide details of existing improvements (i.e. curb, gutter, sidewalks, right-of-way widths, pavement widths, etc.).

The applicant is requested to contact the Engineering Division at 243-7745 for additional information.

3. Comments from the Solid Waste Division:

- a. The owners and their contractors shall implement solid waste reduction, re-use and recycling programs to reduce the amount of solid waste to be disposed of at the County landfills.
- b. All yard debris shall be composted and re-used on their landscape plantings.
- c. Alternative means of disposal of grubbed material and rock shall be utilized other than disposed of at the County landfills.
- d. Refuse collection shall be by a private collector.

The applicant is requested to contact the Solid Waste Division at 243-7875 for additional information.

4. Comments from the Land Use and Codes Administration:

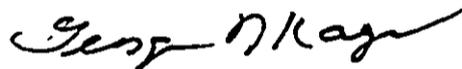
- a. A detailed drainage and erosion control plan, to include, but not limited to, hydrologic and hydraulic calculations, scheme for controlling erosion and disposal of runoff water is required, and an analysis of the soil loss using the HESL erosion formula, must be submitted for our review and approval. The plan should provide verification that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties.
- b. Paved parking spaces and loading space must be provided, with appropriate landscaping and fencing pursuant to the County's Off-Street Parking and Loading Ordinance.
- c. A use variance is required.
- d. A height variance is required.

Page 3 of 3  
April 8, 1993  
Milton Arakawa  
TMK:2-4-24:03

- e. The project is subject to the building permit process.
- f. A variance for road widening Chapter 46 of the Uniform Building Code.
- g. The project plans must be reviewed by the commission on Persons with Disabilities.
- h. Must meet all zoning requirements.
- i. The adjacent Makawao Post Office would like an opportunity to discuss a coordinated access through the subject property to improve post office parking circulation.

The applicant is requested to contact the Land Use and Codes Administration at 243-7373 for additional information.

Very truly yours,



GEORGE N. KAYA  
Director of Public Works

RMN:mht  
1052f; Page 99-101

xc: L.U.C.A.  
Engineering Division  
Solid Waste Division

# References

References

Community Resources, Inc., Maui County Community Plan Update Program Socio-Economic Forecast Report, March 1992.

Department of Geography, University of Hawaii, Atlas of Hawaii, Second Edition, University of Hawaii Press, 1983.

State of Hawaii, Department of Business and Economic Development, Data Book, 1990.

University of Hawaii, Land Study Bureau, Detailed Land Classification - Island of Maui, L.S.B. Bulletin No. 7, May 1967.

U.S. Soil Conservation Service, Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, U.S. Government Printing Office, 1972.

# ***Appendix A***

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## ***Drainage and Soil Erosion Report***

DRAINAGE AND SOIL EROSION REPORT

FOR

MAKAWAO ELDERLY

INDEPENDENT LIVING COMMUNITY

AT

MAKAWAO, MAUI, HAWAII

TMK: 2-4-24:03

PREPARED FOR:  
HALE MAHAOLU, INC.  
200 HINA AVENUE  
KAHULUI, MAUI, HAWAII 96732

PREPARED BY:  
RICHARD M. SATO & ASSOCIATES, INC.  
2115 WELLS STREET  
WAILUKU, MAUI, HAWAII 96793

MARCH 1993

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- V. STORM RUNOFF
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  - B. DEVELOPED RUNOFF CONDITIONS
- VI. DRAINAGE PLAN
- VII. EROSION CONTROL
- VIII. CONCLUSION
- IX. REFERENCES
- X. APPENDICES
  - APPENDIX A - DRAINAGE CALCULATIONS
  - APPENDIX B - EROSION CONTROL CALCULATIONS
- XI. EXHIBITS

I. INTRODUCTION

Hale Mahaolu, Inc., plans to develop affordable elderly housing units in Makawao, Maui, Hawaii. This report examines how existing drainage patterns from lands surrounding the proposed site will affect the project. The report also evaluates how development of the project will affect downstream properties. Finally this report will study the movement of soil off the site as a result of erosion due to construction activities.

I. PROJECT LOCATION

The propose project site is located in Makawao on the Island of Maui, Hawaii. The subject property is situated along the northwest side of Makawao Avenue and is bordered by the Makawao Post Office to the northeast and the Makawao Business Center to the southwest. The site is also adjacent to residential properties to the west. The property can be further identified by Tax Map Key 2-4-24 Parcel 03, refer to Exhibit A, Project Location Map.

III. PROJECT DESCRIPTION

Hale Mahaolu, Inc., plans to develop affordable multi-family housing for the elderly. Plans call for the construction of two (2) three-story buildings which will contain a total of 40 one-bedroom units. Space will also be provided for a central laundry area, manager's office and recreation room. Other improvements to the site will include paved parking areas, concrete walkways, underground utilities, and landscaping. See Exhibit B, Site Plan.

IV. FLOOD HAZARD

The subject property is located on the makai side of Makawao Avenue. Elevations on the site range from approximately 1607 to 1635 above mean sea level. According to the "Flood Insurance Rate Maps" for the County of Maui, the project is located on land designated as Zone "C". Zone "C" indicates areas where the risk of flooding is minimal. Refer to Exhibit C, Flood Insurance Rate Map.

## V. STORM RUNOFF

### A. EXISTING RUNOFF CONDITIONS

Ground cover on the site includes various types of weeds and grasses, as well as a few large trees. Approximately one-half of the property has temporary blacktop pavement and is being used as a public parking lot. The average slope through the site is approximately 5 percent. In this condition, the property has a peak runoff rate of approximately 1.38 cubic feet per second (cfs). Presently, runoff from the site sheet flows in a northwesterly direction off the property and into neighboring residential lots.

The property is at a higher elevation than Makawao Avenue, therefore runoff from the road continues downhill without entering the site. A berm along the site's northeast boundary also prevents runoff from entering the site along that side. Due to these conditions no runoff enters the project site, refer to Exhibit D, for existing runoff conditions.

### B. DEVELOPED RUNOFF CONDITIONS

Developing the subject property will increase the amount of storm water discharge from the area. Runoff from the site will increase by 3.33 cfs to a rate of 4.71 cfs. This increase is due to the improvements associated with the project. Storm runoff for both existing and developed conditions were calculated using the Rational Method. The calculations can be found at the end of this report under Drainage Calculations.

## VI. DRAINAGE PLAN

Although development of the project will increase the amount of runoff, existing drainage patterns will be maintained. In otherwords, contributing drainage areas and the general direction of the runoff will not be altered. Runoff along Makawao Avenue will

continue to flow past the site and will be deposited in an existing catchbasin on the road. Runoff from the Post Office will also follow existing drainage patterns and sheet flow off to Makawao Avenue.

To reduce the impact caused by the increased site runoff, a new drainage system will be installed. On-site runoff will be collected via a system of concrete drain inlets. The collected runoff will then be deposited in a perforated subdrain system where it will percolate into the ground, refer to Exhibit D for the proposed drainage plan.

## VII. EROSION CONTROL

According to the "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai", State of Hawaii, August 1972, soils within the site are classified as Haliimaile Silty Clay, and Makawao Silty Clay.

Calculations show grading of the entire site will result in a total soil loss of 41.84 tons/acre/year with a severity number of 481. The allowable erosion rate is 4348 tons/acre/year, and present standards allow for a maximum severity number of 50,000. Therefore normal erosion control measures during construction should be acceptable. These measures include, but are not limited to the following:

1. Leaving natural vegetation undisturbed in areas not needed for immediate construction.
2. Restriction of traffic in and around work areas.
3. Use of water wagons or other acceptable means for dust control.
4. Revegetation of barren areas as soon as grading is completed.

Estimated soil loss was calculated using the Universal Soil Loss Equation in accordance with the County of Maui's Grading Ordinance concerning erosion control. Soil loss calculations are located in the back of this report under "Erosion Calculations".

## VIII. CONCLUSION

Development of the Makawao Elderly Independent Living Community is not expected to cause any adverse effects to any adjacent developments. Soil loss during construction is below the County's allowable rate. The severity rating of 481 is also well below the maximum rating of 50,000.

The project will also be designed to maintain existing drainage patterns. Runoff from both the Post Office and Makawao Avenue will follow existing patterns and be deposited into a catchbasin on Makawao Avenue. Although development of the project will increase the amount of runoff generated from the site, concrete drain inlets will be used to control flooding. The intercepted runoff will be deposited into a new subdrain system where it will percolate into the ground. Thus the threat of flooding to adjacent areas should be slight.

#### IX. REFERENCES

Drainage Master Plan for the County of Maui, State of Hawaii, October 1971, prepared by R.M. Towill Corporation.

Soil Survey of Island of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, August 1972, Prepared by the United States Department of Agriculture Soil Conservation Service.

Guidelines for computing allowable erosion rate, uncontrolled erosion rate and reduction needed to meet the standards, Island of Maui, Molokai and Lanai.

X. APPENDICES

- A. DRAINAGE CALCULATIONS
- B. EROSION CONTROL CALCULATIONS

APPENDIX A  
DRAINAGE CALCULATIONS

## DRAINAGE CALCULATIONS

Hydrologic calculations for both existing and developed storm runoff conditions were based on the rational method. Factors used in the calculations were taken from the County of Maui's Drainage Master Plan.

The following factors were used:

A. RECURRENCE INTERVAL:

10-year, 1-hour storm I = 2.0" (Plate 111)

B. TIME OF CONCENTRATION:

TC<sub>EXIST.</sub> = 18.5 min.  
TC<sub>DEV.</sub> = 5 min.  
Slope = 5%  
Length = 400 ft.

C. RAINFALL INTENSITY:

i - Determined from Plate 4

D. RUNOFF COEFFICIENT:

c - Determined from Table 1, as follows:

EXISTING CONDITIONS:

Infiltration	0.07	(Medium)
Relief	0.03	(Rolling)
Vegetal Cover	0.03	(Good)
Dev. Type	<u>0.15</u>	(Open)
	c =	0.28

DEVELOPED CONDITIONS:

Infiltration	0.14	(Slow)
Relief	0.00	(Flat)
Vegetal Cover	0.05	(Poor)
Dev. Type	<u>0.45</u>	(Apt)
	c =	0.64

EXIST RUNOFF:

$$Q_{\text{EXIST}} = CiA$$

$$\begin{aligned} C &= 0.28 \\ i &= 4.3 \\ A &= 1.15 \text{ AC} \end{aligned}$$

$$Q_{\text{EXIST}} = 0.28 \times 4.3 \times 1.15 = 1.38 \text{ cfs}$$

DEVELOPED RUNOFF:

$$Q_{\text{DEV}} = CiA$$

$$\begin{aligned} C &= 0.64 \\ i &= 6.4 \\ A &= 1.15 \text{ AC} \end{aligned}$$

$$Q_{\text{DEV}} = 0.64 \times 6.4 \times 1.15 = 4.71 \text{ cfs}$$

APPENDIX B  
EROSION CONTROL CALCULATIONS

## EROSION CONTROL CALCULATIONS

### A. SITE CONDITIONS

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai", State of Hawaii, August 1972, soils within the project site are classified as Haliimaile Silty Clay Loam, 7-15% slopes (HgC), Haliimaile Silty Clay, 3-7% slopes (HhB), and Makawao Silty Clay 7-15% slopes (MfC). The characteristics of these types of soils are as follows:

1. HgC - Runoff for this types of soil is medium and the erosion hazard is moderate.
2. HhB - The permeability of this soil is moderately rapid. Runoff is slow and the erosion hazard is slight.
3. MfC - The runoff is slow to medium while the erosion hazard is slight to moderate. The permeability of this type of soil is moderately rapid.

### 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:

$$E = RKL_sCP$$

Where:

- E = Soil loss in tons/acre/year
- R = Rainfall factor = 230
- K = Soil erodibility factor = 0.17  
(Max. Value All Soil Types)
- L<sub>s</sub> = Topographic factor = 1.07  
Slope length = 400 ft.  
Average slope = 5%
- CP = Cover Protection Factor = 1.0  
C = Cover Factor = 1.0 (Bare Soil)  
P = Protection Factor = 1.0  
(Construction Site)

$$E = 230(0.17)(1.07)(1.0) = \underline{41.84} \text{ tons/acre/year}$$

C. ALLOWABLE SOIL LOSS

Coastal Water Hazard (D) = 2 (Class A)  
Downstream Hazard (F) = 4 (Adjacent to Exist Dev.)

Time Duration of Project (T) = 6 months  
Maximum Allowable Construction Area  
X Erosion Rate = 5000 tons/yr  
Area of Disturbance (A) = 1.15 AC

Max Allowable Erosion Rate = 5000/1.15  
= 4,348 tons/acre/year

D. SEVERITY RATING

Allowable Rating = 50,000

Calculated Severity Rating

H = (2FT x 3D)AE  
F = 4 (Adjacent to Existing Development)  
T = 1/2 Year  
D = 2 (Class "A" Water)  
A = 1.15 Acres  
E = 41.84 tons/acre/year

H = (2 x 4 x 0.5 + 3 x 2) x 1.15 x 41.84  
= 481 < 50,000

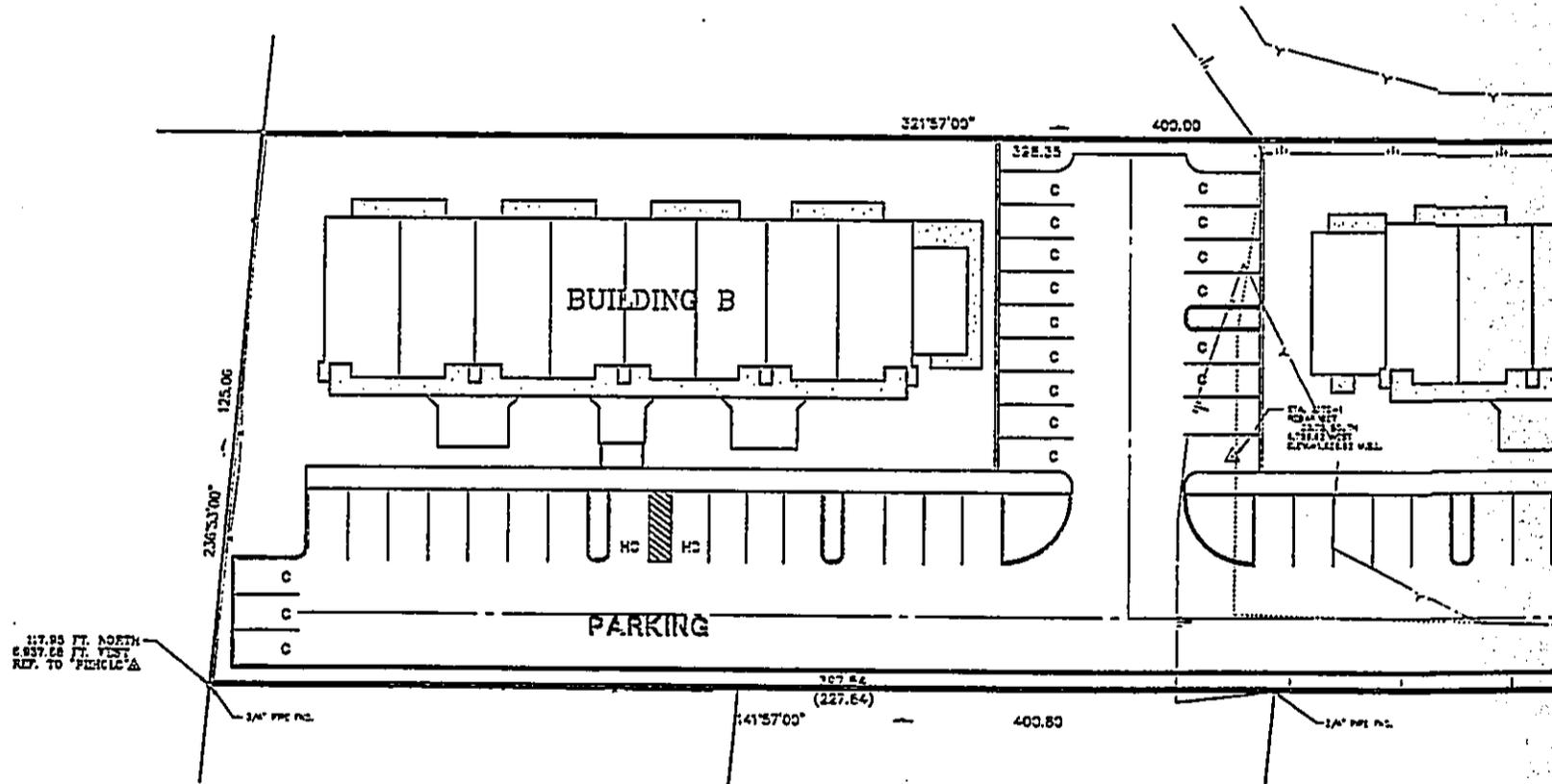
XI. EXHIBITS

- A PROJECT LOCATION
- B SITE PLAN
- C FLOOD INSURANCE MAP
- D EXISTING/DEVELOPED RUNOFF  
CONDITIONS



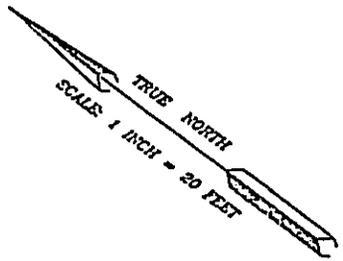


MAKAWAO POST OFFICE

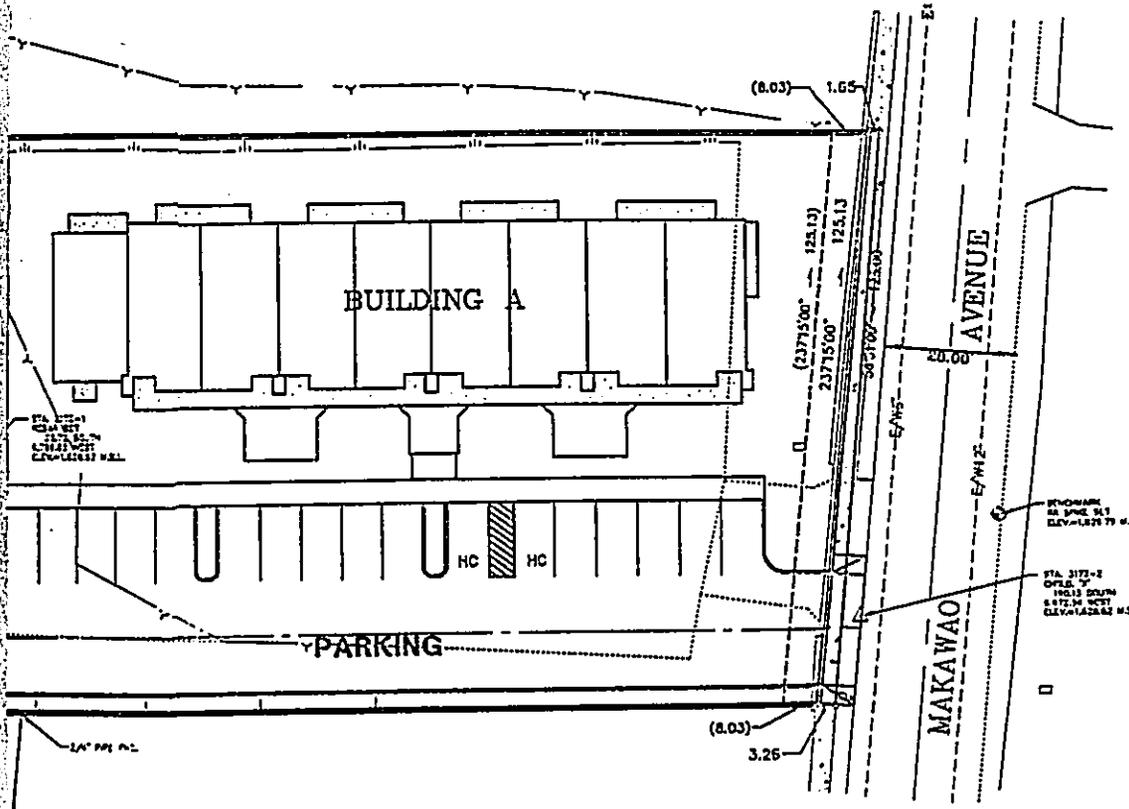


MAKAWAO

ST OFFICE



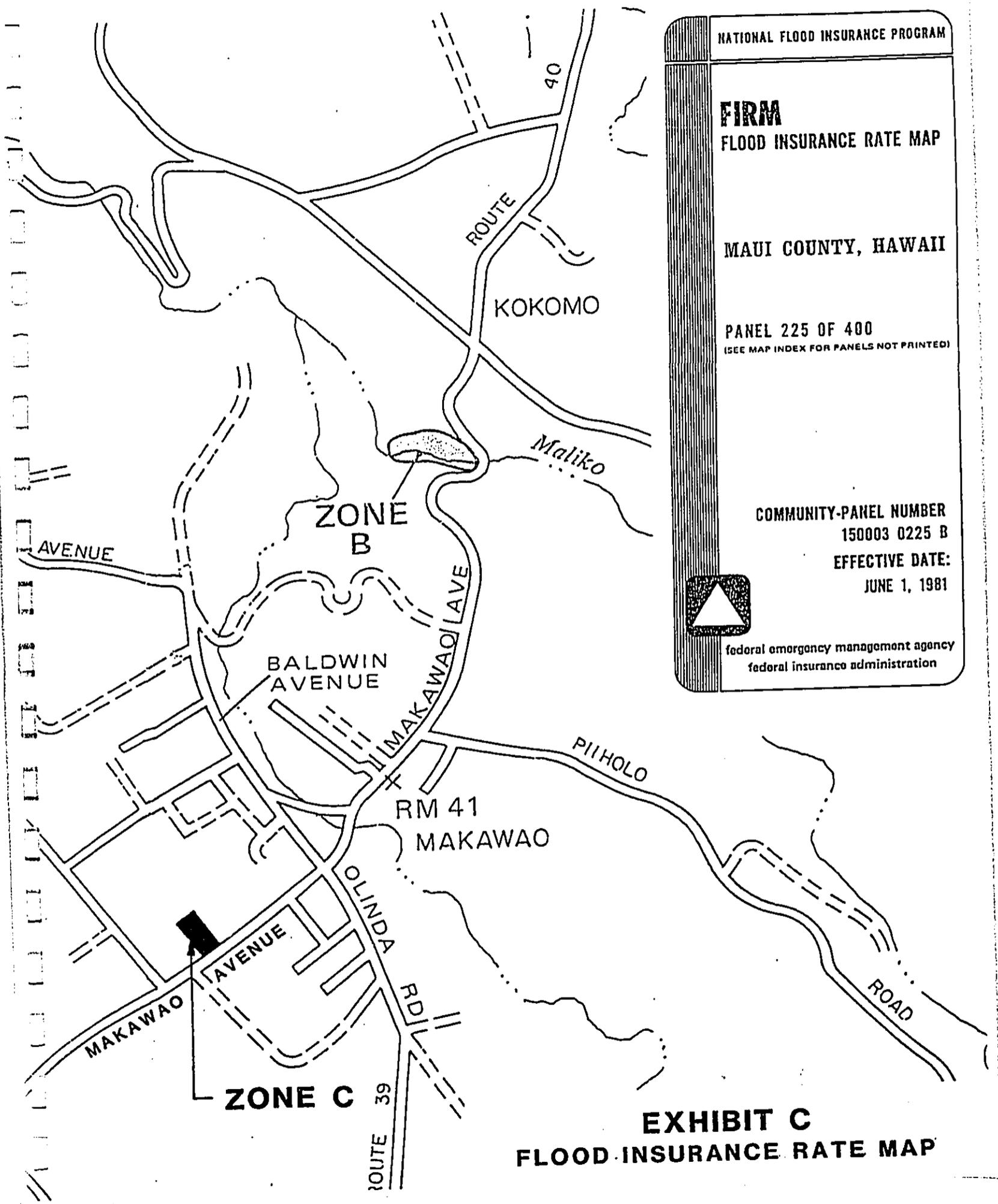
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MAKAWAO BUSINESS CENTER

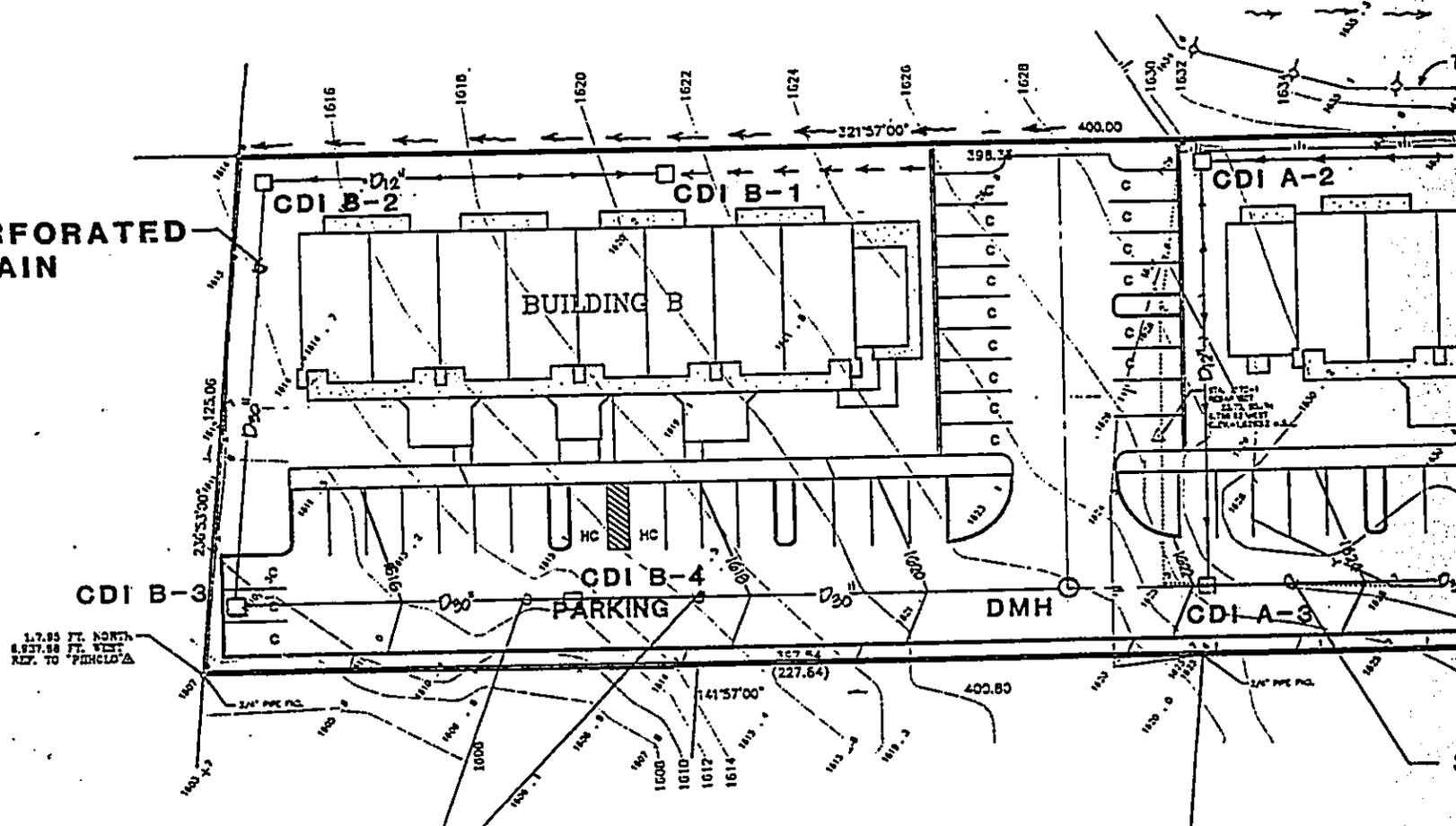
To Pukalani

**EXHIBIT B  
SITE PLAN**



MAKAWAO POST OFFICE

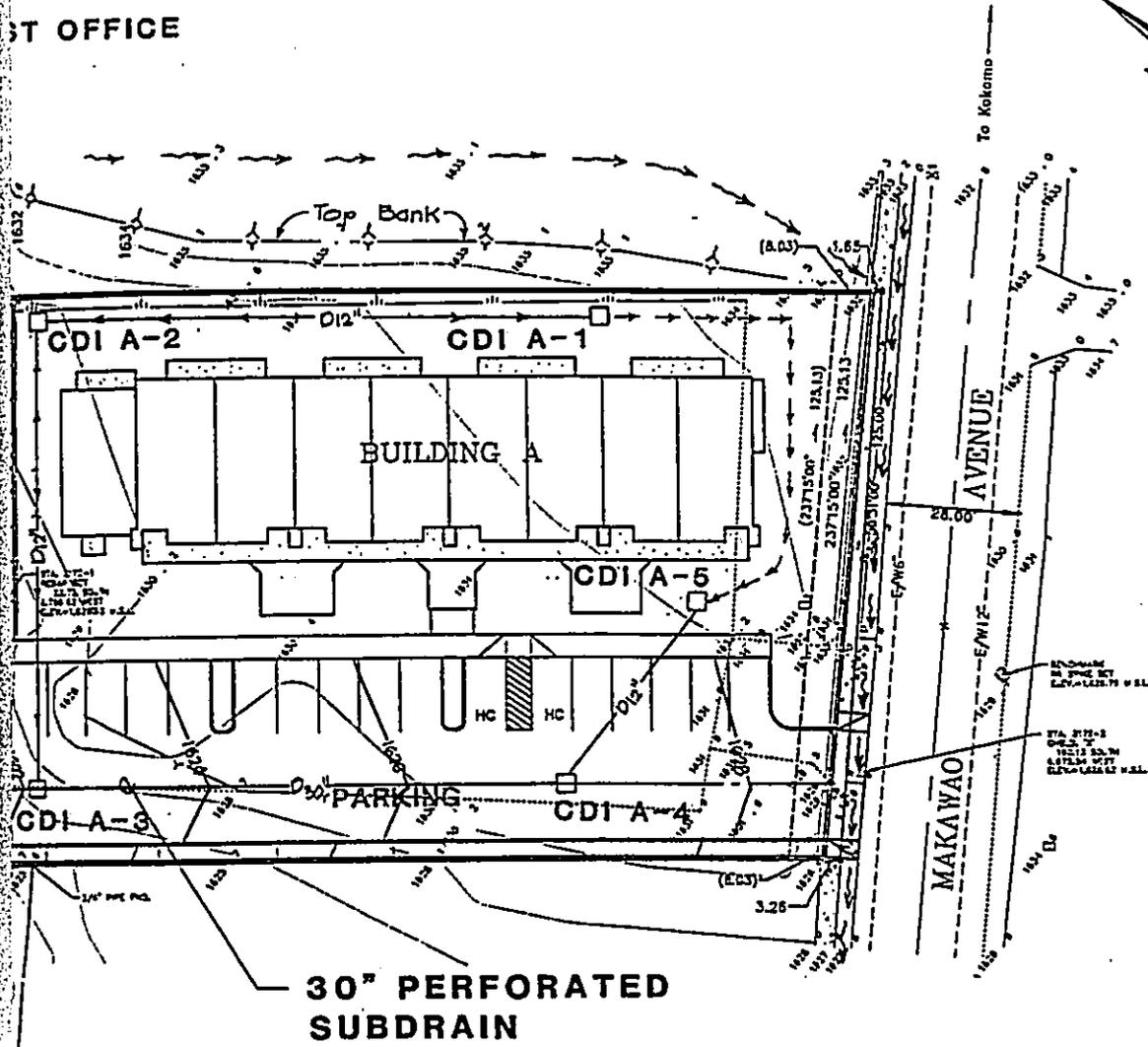
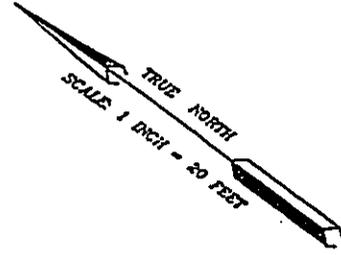
30" PERFORATED  
SUBDRAIN



30" PERFORATED  
SUBDRAIN

MAKAWAO

ST OFFICE



MAKAWAO BUSINESS CENTER

**EXHIBIT D**  
**EXISTING/DEVELOPED**  
**RUNOFF CONDITIONS**

# ***Appendix B***

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## ***Soils Investigation Report***

REPORT  
SOILS INVESTIGATION

PROPOSED INDEPENDENT LIVING COMMUNITY FOR ELDERLY  
MAKAWAO AVENUE  
MAKAWAO, MAUI, HAWAII  
TMK: 2-2-24: 03

for

HALE MAHAOLU, INC.

HIYAKUMOTO + HIGUCHI ARCHITECTS, AIA  
Architects

Project No. M-2081-F  
November 6, 1992



99-1255 WAIUA PLACE  
AIEA, HAWAII 96701  
PHONE: (808) 488-0433  
FAX: (808) 488-9535

360 PAPA PLACE, #102  
KAHULUI, MAUI, HAWAII 96732  
PHONE: (808) 877-3789  
FAX: (808) 871-1592

99-1255 WAIUA PLACE, AIEA, HAWAII 96701

(808) 488-0433 FAX (808) 488-9535

November 9, 1992  
Project No. M-2081-F

Hale Mahaolu, Inc.  
c/o Hiyakumoto + Higuchi Architects, AIA  
1860 Main Street  
Wailuku, Maui, Hawaii 96793

Gentlemen:

The attached report presents the results of a soils investigation at the site of the proposed Independent Living Community for Elderly to be located in Makawao, Maui, Hawaii; TMK: 2-2-24: 03.

A summary of the findings is as follows:

- 1) The subsurface conditions were explored by drilling six (6) test borings to depths of 14.5 to 19 feet below existing grade. In general, the test borings disclosed the site to be overlain by moderately stiff to very stiff, brown to gray brown clayey SILT to depths of 6 to 18.5 feet below existing grade. The clayey SILT was underlain by gray to dark gray brown, highly weathered BASALTIC ROCK to the final depths of the borings at 14.5 to 19 feet below existing grade; the consistency of the rock ranged from soft to moderately hard. At Borings 4 and 6, the BASALTIC ROCK was preceded by moderately dense, gray brown to brown silty GRAVEL at depths of 6 to 13.5 feet below existing grade. Borings 2, 3 and 4 were located in an existing parking lot and the top 6 inches of these borings consisted of loose GRAVEL.
- 2) No groundwater was encountered in any of the explorations at the time of the investigation.
- 3) Based on the findings and observations, no soil or geologic conditions were encountered which would preclude the planned development provided the recommendations contained herein are included in the design and construction of the project.
- 4) Field percolation tests were performed at the site. The tests indicate that leach fields constructed in the gray-brown/silty zone (minimum depth of 7 feet below existing grade) may be used for disposal of septic sewage effluent.

Hale Mahaolu, Inc.  
November 9, 1992  
Page Two

- 5) Spread footings bearing on firm on-site soils, properly compacted fill or the underlying ROCK may be used to support the proposed structures.
- 6) The on-site soils exhibit high to very high expansion potential from an air-dry to saturated condition. In order to minimize the possible adverse effects from expansive soils, it is recommended that slabs-on-grade be designed with a minimum of 24 inches of non-expansive fill (preferably granular) beneath the slab.

Details of the findings and recommendations are presented in the attached report.

This investigation was made in accordance with generally accepted engineering procedures and included such field and laboratory tests considered necessary for the project. In the opinion of the undersigned, the accompanying report has been substantiated by mathematical data in conformity with generally accepted engineering principles and presents fairly the design information requested by your organization. No other warranty is either expressed or given.

Respectfully submitted,

SOILS INTERNATIONAL

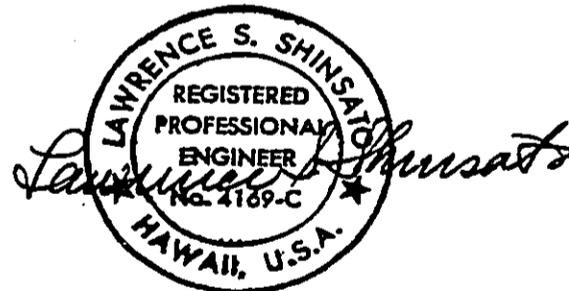
*Charles K. Biegel*

Charles K. Biegel, P.E.  
Project Engineer

*Lawrence S. Shinsato*

Lawrence S. Shinsato, P.E.  
Vice-President

LSS:CKB:cb



This work was prepared by me  
or under my supervision.

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### INTRODUCTION

This investigation was made for the purpose of obtaining information on the subsurface conditions from which to base recommendations for site development and foundation design for the proposed Independent Living Community for Elderly to be located in Makawao, Maui, Hawaii. The location of the site, relative to the existing streets and landmarks, is shown on the Vicinity Map, Plate 1.

### SCOPE OF WORK

The services included drilling 6 test borings to depths of 14.5 to 19 feet, performing 10 field percolation tests to depths of 4.5 to 9 feet, obtaining samples of the underlying soils, performing laboratory tests on the samples to determine their engineering characteristics, and performing an engineering analysis from the data gathered. In general, the following information is provided for use by the Architect and/or Engineer:

1. General subsurface conditions, as disclosed by the borings.
2. Physical characteristics of the soils encountered.
3. Recommendations for foundation design, including bearing values, embedment depth and estimated settlement.
4. Recommendations for placement of fill and backfill.
5. Percolation rates for the underlying soils.
6. Special design considerations.

PLANNED DEVELOPMENT

From the information provided, the project will consist of constructing two, 3-story wood frame structures and accompanying parking lots.

SITE CONDITIONS

Surface

The property, designated by Tax Map Key Number 2-2-24: 03, is located on the makai side of Makawao Avenue in Makawao, Maui, Hawaii. The lot is nearly rectangular in shape and slopes down from Makawao Avenue. No topographic map was available at the time of the investigation, therefore, the elevations at the boring locations could not be determined.

The site is bound on the southeast side by Makawao Avenue, on the northeast side by the U.S. Post Office, on the southwest side by the Makawao Business Center and on the northwest side by an existing residential subdivision.

At the time of the field work, the front half of the site (the Makawao Avenue side of the lot) was covered with gravel and was being used as a public parking lot. The back half of the site was covered with weeds and grass. A few trees were scattered throughout the site.

Subsurface

The subsurface conditions at the site were explored by drilling 6 test borings to depths of 14.5 to 19 feet below the existing grade. The locations of the test borings are shown on the Plot Plan, Plate 2. Detailed logs of the test borings are presented in the Appendix to this report.

In general, the test borings disclosed the site to be overlain by moderately stiff to very stiff, brown to gray brown clayey SILT to depths of 6 to 18.5 feet below existing grade. The clayey SILT was underlain by gray to dark gray brown, highly weathered BASALTIC ROCK to the final depths of the borings at 14.5 to 19 feet below existing grade; the consistency of the rock ranged from soft to moderately hard. At Borings 4 and 6, the BASALTIC ROCK was preceded by moderately dense, gray brown to brown silty GRAVEL at depths of 6 to 13.5 feet below existing grade. Borings 2, 3 and 4 were located in an existing parking lot and the top 6 inches of these borings consisted of loose GRAVEL.

No groundwater was encountered in any of the explorations at the time of the investigation.

From the USDA Soil Conservation Service "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii", the site

is located in an area designated as Haliimaile silty clay loam, 7 to 15 percent slopes (HgC).

The Haliimaile series consist of well-drained soils on uplands that developed in material weathered from basic igneous rock. The substratum is soft, weathered basic igneous rock. These soils have a moderate erosion hazard and the runoff is medium (USDA, 1972, pg. 36 and Plate 114).

#### Geology

The island of Maui is a volcanic doublet formed when lavas from Haleakala ponded against the older West Maui Mountains. The development of the island above sea level is believed to have occurred between late Pliocene and Pleistocene time (approximately 1 to 12 million years ago).

The site is located on the northern slope of the Haleakala Volcano which was built over three rift zones that trend north, southwest and east. These rift zones are studded with large cinder cones. The lava flows making up the main mass of the mountain is known as the Honomanu volcanic series which consists of thin-bedded pahoehoe and aa lava flows. Above the Hononamu volcanics is the Kula volcanic series which consists of thicker andesitic aa flows. Most of the lava flows dip about 12 degrees. Along the southwest and

east rift zones only, the volcano is capped with the Hana volcanic series (Stearns, 1966).

Fresh to slightly weathered pahoehoe flows generally have a relatively smooth, billowy or ropy surface. The vesicles in pahoehoe flows usually have a fairly regular spheroidal shape. Lava tubes and pressure domes are common in this type of flow.

Fresh to slightly weathered aa flows are characterized by very rough, spiny or rubbly surfaces. The clinkery surface covers a massive, relatively dense rock interior (commonly known as blue rock). Vesicles within the rock mass are generally irregular in shape.

The surface soils on the site have generally developed from the weathering of the lavas. Below the soil mantle, the bedrock formation grades harder with depth.

#### CONCLUSIONS AND RECOMMENDATIONS

##### General

Based on the findings and observations of this investigation, it is concluded that the proposed structures may be supported on spread footings bearing on stiff on-site soils, properly compacted fill or the underlying BASALTIC ROCK.

Special Considerations

- 1) The on-site soils were found to have high to very high expansion potential from air-dry to saturated conditions and low expansion potential from field moisture to saturation. It is recommended that slabs-on-grade be designed with a minimum of 24 inches of non-expansive soil beneath the slab.
- 2) The underlying ROCK grades harder with depth and excavations into the ROCK (if necessary) will be difficult to accomplish. Heavy equipment, hoe-ramming and/or blasting (if permitted) will likely be required for removal of the ROCK.

Foundations

For footings bearing on stiff to very stiff on-site soils or on properly compacted fill, an allowable bearing value of 2,000 pounds per square foot may be used. Footings shall be embedded a minimum of 24 inches below the lowest adjacent grade.

For footings bearing on the underlying moderately hard BASALTIC ROCK, an allowable bearing value of 6,000 pounds per square foot may be used.

For footings located adjacent to new or existing utility trenches, the bottom of the footing shall be deepened below a 1 horizontal to

1 vertical plane projected upwards from the edge of the utility trench (see detail, Plate A).

For footings located on or adjacent to slopes, the footing shall be deepened such that there is a minimum horizontal distance of 5 feet or twice the footing width, whichever is greater, from the edge of the footing to the slope face (see detail, Plate A).

The bearing values are for dead plus live loads and may be increased by one-third for momentary loads due to wind or seismic forces. If any footing is eccentrically loaded, the maximum edge pressure shall not exceed the bearing pressure for permanent or for momentary loads.

All loose and disturbed soil at the bottom of footing excavations shall be removed to firm soil or the disturbed soil shall be compacted prior to laying of steel or placing of concrete.

#### Settlement

Under the fully applied recommended bearing pressure, it is estimated that settlement of footings up to 4 feet continuous or 6 feet square bearing on firm on-site soils or properly compacted fill will be less than 1 inch. Settlement of footings bearing on moderately hard to hard BASALTIC ROCK is estimated to be less than 1/4 inch.

Differential settlement between footings will vary according to the size and bearing pressure of the footing.

#### Lateral Resistance

For resistance of lateral loads, such as wind or seismic forces, an allowable passive resistance equivalent to that exerted by a fluid weighing 300 pounds per cubic foot may be used for footings, or other structural elements, provided the vertical surface is in direct contact with undisturbed soil or properly compacted fill.

Frictional resistance between footings and the underlying soils may be assumed as 0.4 times the dead load.

Lateral resistance and friction may be combined.

#### Retaining Walls

Foundations for retaining walls shall be designed as per the foundation section of this report.

Free-standing retaining walls with level, properly draining backfill, may be designed to resist an equivalent fluid pressure of 60 pounds per cubic foot for the on-site clayey SILT soils.

An active earth pressure of 30 pounds per cubic foot may be used for imported granular fill provided the width of the granular material

extends at least 1/2 times the wall height behind the wall stem. For restrained walls, the active pressure shall be increased by 50 percent.

Drainage for retaining wall backfill shall be accomplished by providing 4-inch diameter weepholes spaced 8-feet on-center (horizontally as well as vertically) or by using a minimum 4-inch diameter perforated PVC footing drain pipe. A 2-foot thick layer of crushed gravel, which is wrapped with geotextile filter fabric, shall be placed above the pipe; the crushed gravel shall be continuous from weephole to weephole, or in the case of a footing drainpipe, laid throughout the full length of the pipe. Geotextile fabric shall be SUPAC 4NP, or similar.

The backfill for the retaining wall shall be properly compacted in accordance with the Site Preparation and Grading section to this report.

The above active earth pressures do not include surcharge loads such as sloping backfill, footings located within a 45 degree plane projected upwards from the heel of the footing, and/or from hydrostatic pressures. If such conditions occur, the active pressure shall be increased accordingly.

Slab-on Grade

The on-site soils were found to have high to very high expansion potential from air-dry to saturated conditions and low expansion potential from field moisture to saturation. In order to minimize the possible adverse effects from expansive soils, it is recommended that slabs-on-grade be designed with a minimum of 24 inches of non-expansive soil (preferably granular) beneath the slab.

It is recommended that floor slabs with moisture sensitive floor covering be protected with a moisture barrier.

Site grading should be designed to minimize ponding of water adjacent to slab and footing areas.

Slopes

Cut and fill slopes may be made at 1-1/2 horizontal to 1 vertical. Cut slopes into the moderately hard BASALTIC ROCK may be made at 1 horizontal to 2 vertical.

Exposed slopes shall be covered as soon as practical after construction to minimize erosion.

Fill slopes shall be constructed by either overfilling and cutting back to compacted soil, or the slope shall be track rolled.

Pavement Design

For design of flexible pavements with traffic loading of passenger cars and light trucks, a pavement section of 2 inches asphaltic concrete, 6 inches of compacted base course gravel and 6 inches of compacted subgrade may be used.

Where heavier vehicles (over 10,000 pound GVW) are anticipated, the pavement section should be increased to 2 inches asphaltic concrete, 6 inches compacted base course gravel, 6 inches select borrow and 6 inches of compacted subgrade.

All material quality and compaction requirements for the pavement section shall be in accordance with the County of Maui, Department of Public Works, "Standards Specifications for Public Works Construction", dated September 1986.

Site Preparation and Grading

It is recommended that the site be prepared in the following manner:

1. All vegetation, weeds, brush, roots, stumps, rubbish, debris, soft soil and other deleterious material shall be removed and disposed of off-site.
2. In areas to receive fill, at finished subgrade in cut and slab-on-grade areas, and at the bottom of footing excavations in soil materials, the exposed surface shall then be scarified to

a depth of 6 inches, moisture conditioned to near optimum moisture and then compacted to the degree of compaction specified below. If soft or loose spots are encountered, the loose/soft areas shall be removed to firm material and the resulting depression shall be filled with properly compacted fill.

3. Fill material shall consist of on-site or imported material which is free of organics and debris and is non-expansive. The on-site soil should not be used as fill or backfill in the upper 24 inches below any concrete slab-on-grade. For material that contains fines (in whole or in part), the fines shall have a plasticity index of less than 15.

In the upper 3 feet from finished grade under structures and pavement areas, the fill material shall be less than three inches in greatest dimension. Below 3 feet from finished grade, the fill material shall be less than 6 inches in greatest dimension.

In non-structural areas (areas 5 feet beyond the edges of any building and/or structural footing), rocks up to 8 inches in diameter may be used to within 3 feet of finished subgrade provided the interstices between the particles are filled with sufficient fines to produce a well graded, dense mass.

4. In the upper 3 feet from finished grade, fill and backfill material shall be placed in lifts not exceeding 8 inches in loose thickness. Below 3 feet from finished grade, fill and backfill may be placed in 12-inch loose lifts provided the compaction equipment is capable of compacting the layer to the minimum degree required below. Prior to placing the fill and backfill, the material shall be aerated or moistened to near optimum moisture content (ASTM D 1557-78 test procedure).

Where fill is placed on existing ground that is steeper than 5 horizontal to 1 vertical, the existing ground surface shall be benched into firm soil as the fill is placed.

5. In the upper 3 feet from finished subgrade, each layer of structural fill and backfill shall be thoroughly compacted to at least 95 percent of the maximum dry density as determined by the ASTM D 1557-78 test procedure. In non-structural areas and below 3 feet from finished grade in structural areas, the minimum degree of compaction shall be 90 percent.
6. During construction, drainage shall be provided to minimize ponding of water adjacent to or on foundation and pavement areas. Ponded areas shall be drained immediately or waters pumped out without damaging adjacent structures and property. If water accumulation softens the subgrade materials, the

affected soils shall be removed and replaced with properly compacted fill.

It is particularly important to see that all fill and backfill soils are properly compacted in order to maintain the recommended design parameters provided in this report. It is recommended that a representative from Soils International be present during the site preparation.

#### Field Percolation Tests

Ten (10) percolation test were performed at depths of 4'-5" to 9'-0" below the existing grade at the locations shown on the Plot Plan, Plate 2. The tests were performed in 4.5 inch diameter borings drilled with continuous flight augers.

The percolation tests were performed in accordance with the Robert A. Taft Sanitary Engineering Center percolation test procedure. In general, this consisted of drilling the test hole, filling the bottom with 2 inches of coarse sand and then saturating the hole with water (overnight for clayey soils). The test was conducted by placing water in the bottom of the hole and then measuring the drop in water level with time. The results of the measurements are used to determine the percolation rate. The data presented in this report has been converted to the time required for the water level to fall 1".

Initially, six percolation tests (P-1 thru P-6) were performed at depths of 4'-5" to 5'-0". Due to the poor percolation rate of these upper soils at P-1 thru P-6, four additional percolation holes (deeper than the first six holes) were drilled (P-7 thru P-10) to depths of 7'-0" to 9'-0". A summary of the percolation test results is as follows:

<u>Test No.</u>	<u>Depth of Hole</u>	<u>Percolation Rate</u>
P-1	4'-10"	80 min/1"
P-2	4'-11"	120 min/1"
P-3	5'-0"	48 min/1"
P-4	4'-5"	480 min/1"
P-5	5'-0"	160 min/1"
P-6	4'-10"	480 min/1"
P-7	9'-0"	48 min/1"
P-8	8'-6"	40 min/1"
P-9	7'-0"	20 min/1"
P-10	9'-0"	24 min/1"

The results of P-1 thru P-6 indicate that the soils in the upper 7 feet are not suitable for any kind of sewage disposal. Although P-3 had a percolation rate of 48 minutes per 1 inch at a depth of 5 feet, this is believed to be an isolated zone and as stated above the percolation rate in the top 7 feet is poor.

The results of the percolation test indicate that deep leach fields

(absorption trenches) may be used for disposal of septic sewage effluent for trenches that are 7 feet below existing grade or deeper.

INSPECTION

During the progress of construction, so as to achieve the desired results, it is highly recommended that a representative from Soils International be present to observe the following operations:

1. Site preparation.
2. Placement of fill and backfill.
3. Footing excavations.

REMARKS

The conclusions and recommendations contained herein are based on the findings and observations made at the boring locations. If conditions are encountered during construction which appear to differ from those disclosed by the explorations, this office shall be notified so as to consider the need for modifications.

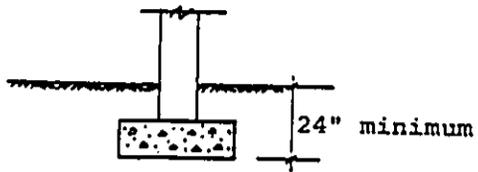
This report has been prepared for the exclusive use of Hale Mahaolu, Inc. and their respective design consultants. It shall not be used by or transferred to any other party or to another project without the consent and/or thorough review by this facility. Should the project be delayed beyond the period of one year from the date of

this report, the report shall be reviewed relative to possible changed conditions.

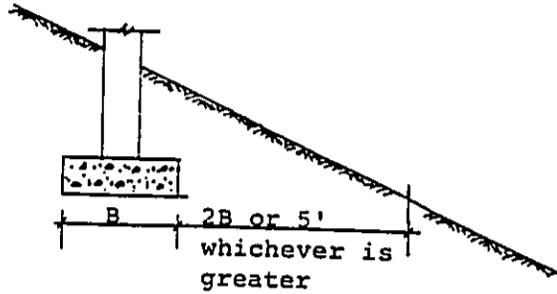
Samples obtained in this investigation will deteriorate with time and will be unsuitable for further laboratory tests within one (1) month from the date of this report. Unless otherwise advised, the samples will be discarded at that time.

The following are included and complete this report:

Foundation Design Details -----	Plate A
Vicinity Map -----	Plate 1
Plot Plan -----	Plate 2
Appendix	
Field Investigation	
Laboratory Testing	
Logs of Test Borings	
Results of Laboratory Tests	



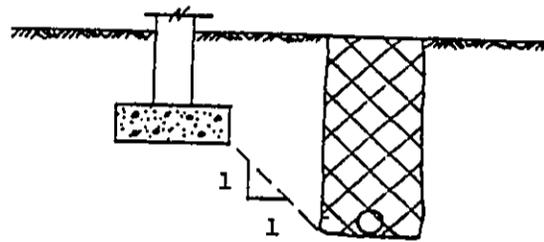
**SPREAD FOOTING**



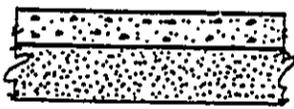
**FOOTING ON OR NEAR SLOPE**



**SLAB WITH THICKENED EDGE FOOTING**



**FOOTING NEAR UTILITY TRENCH**



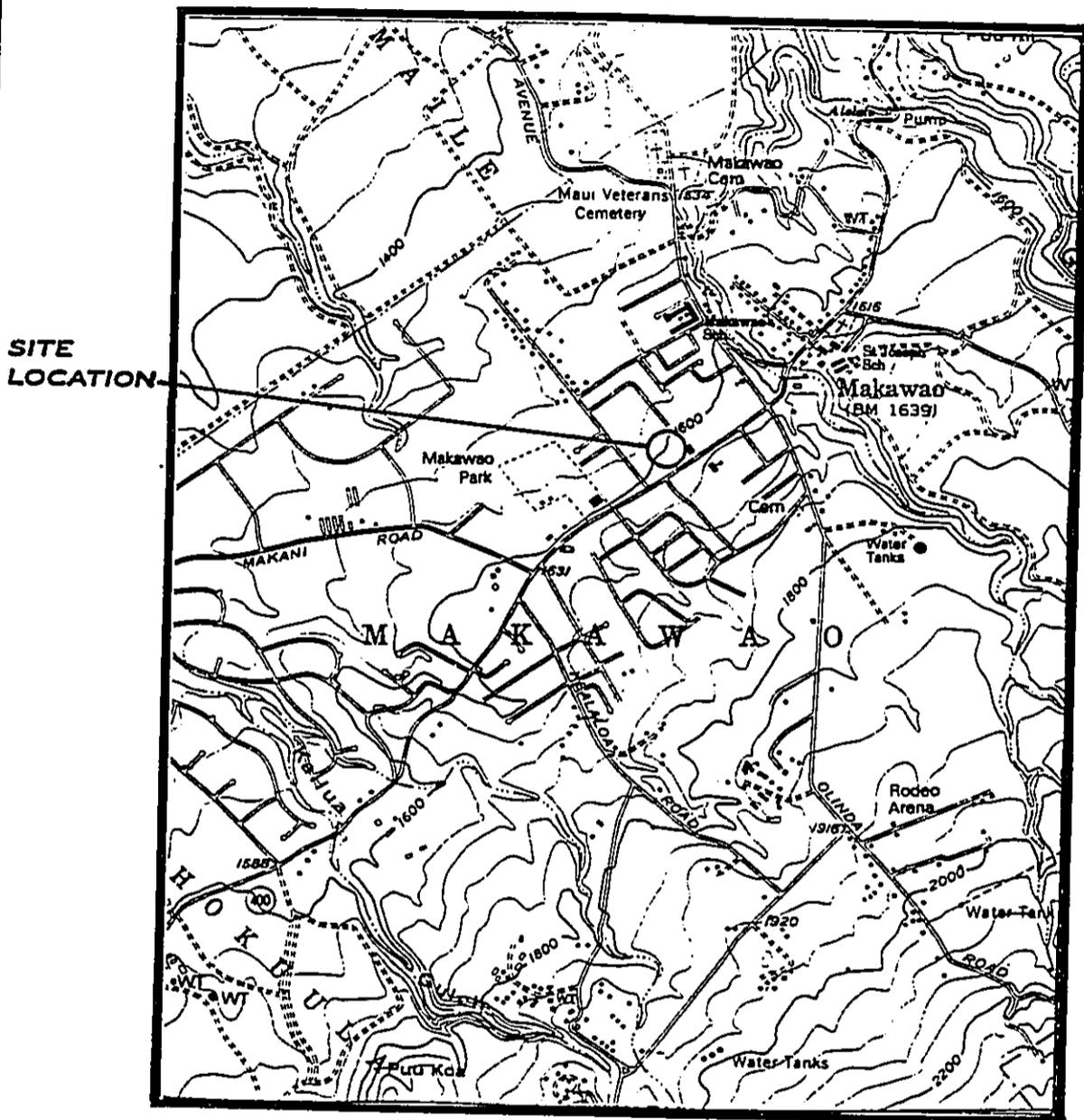
minimum 4" concrete; reinforcing by others  
 minimum 24" non-expansive fill; preferably granular

**SLAB-ON-GRADE**

**FOUNDATION DESIGN DETAILS**

INDEPENDENT LIVING COMMUNITY	
 <b>SOIL INTERNATIONAL</b> <small>A CORPORATION</small> <small>Consulting Foundation Engineers and Geologists</small> <small>2153 N. KING ST., HONOLULU, HI. 96819 (808) 841-7541</small>	PROJECT NO. <b>M-2081-F</b>
	DATE <b>11-1-92</b>
	SCALE <b>N.T.S</b>
	PLATE <b>A</b>

# VICINITY MAP



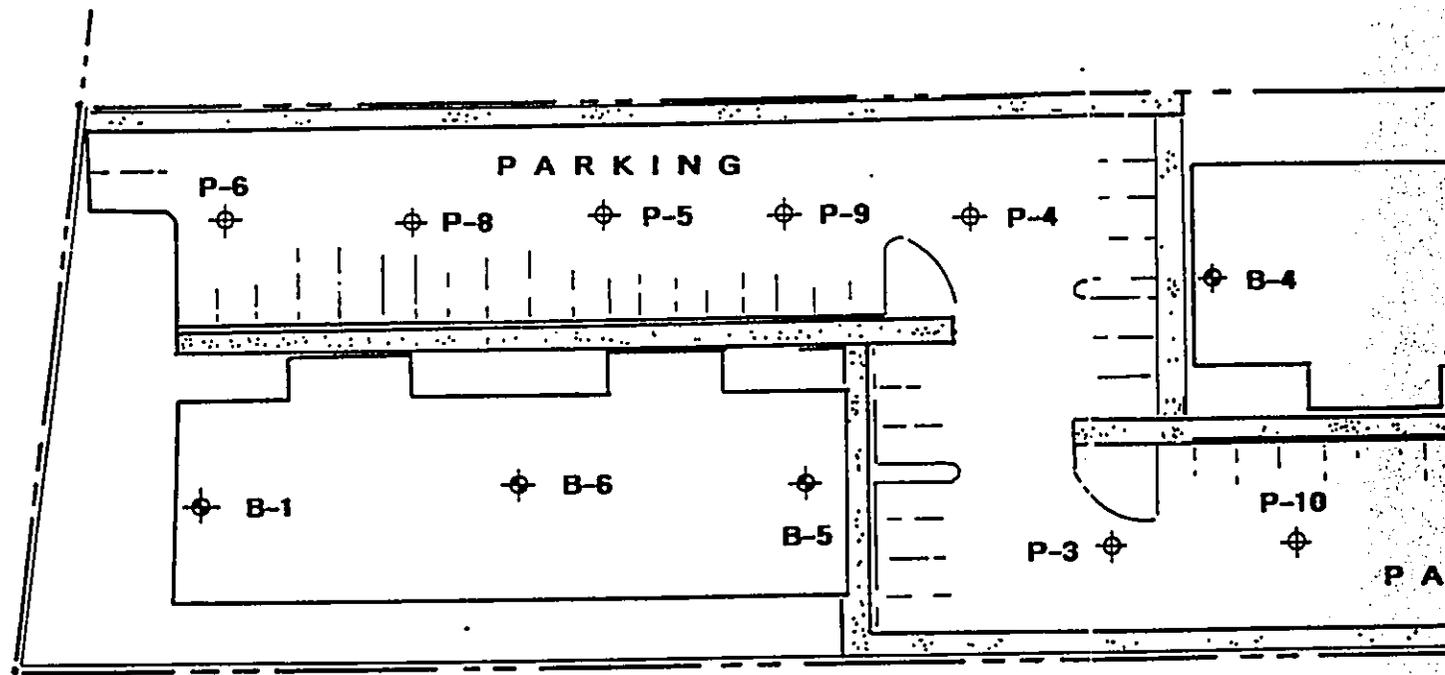
**REFERENCE:**  
 USGS TOPOGRAPHIC MAP  
 HAIKU QUADRANGLE  
 Dated: 1983

Project No. M-2081-F

INDEPENDENT LIVING COMMUNITY



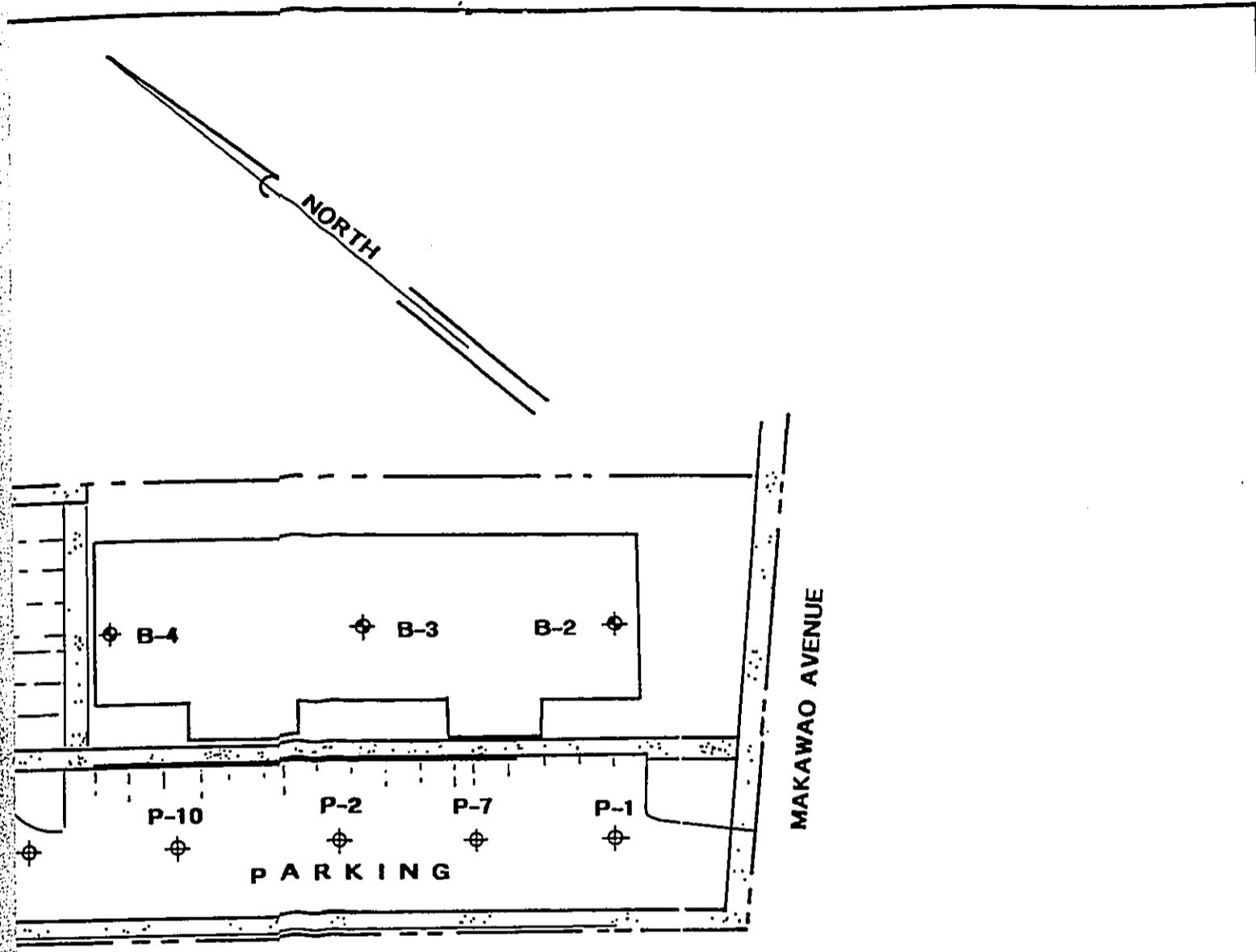
PROJECT NO.
DATE 11/09/92
SCALE 1" = 2000'
PLATE 1



P L O T P L A N

**LEGEND:**

- ⊕ - APPROX. BORING LOCATIONS
- ⊕ - APPROX. PERCOLATION TEST LOCATIONS



A N

**INDEPENDENT LIVING COMMUNITY**



<b>PROJECT NO.</b>	M-2081-F
<b>DATE</b>	
<b>SCALE</b>	1"=40'
<b>PLATE</b>	2

APPENDIX

FIELD INVESTIGATION AND LABORATORY TESTING

## FIELD INVESTIGATION

### General

The field investigation consisted of performing explorations at the locations shown on the Plot Plan. The method used for the exploratory work is shown on the respective exploration log. A description of the various method or methods used is presented below.

### Test Borings Using Truck-Mounted Drilling Equipment

Truck-mounted borings are drilled using a gas-powered drilling rig. The hole is advanced using continuous flight augers, wash boring and/or NX coring.

Auger drilling is used in soils where caving does not occur. The augers are 4-1/2 inch diameter continuous helical flight augers with the lead auger having a head equipped with changeable cutting teeth. Soil cuttings are brought to the surface by the continuous flights. After the bore hole is advanced to the required depth and cleaned of cuttings by additional rotation of the augers, the augers are retracted for soil sampling or in-situ testing.

In soils where caving of the bore hole occurs, the hole is advanced by wash boring or hollow-stem augering. Wash boring consists of advancing steel casing by rotary action and water pressure to flush the soil from the casing. The lead section of the casing is equipped with a carbide or diamond casing bit. After the casing has been advanced to the required depth, soil samples are obtained through the inside of the casing. Hollow-stem drilling consists of advancing the hole with 7-5/8 inch outside diameter and 4-1/4 inch inside

diameter augers. The leading drill bit is connected to drilling rods through the central portion of the auger. At the required sampling depth, the interior drill rods and lead bit are removed, and the soil sample is taken by driving a sampler through the "hollow" section of the augers.

Coring is used for hard formations such as rock, coral or boulders. The core barrel, consisting of a 5-foot long double tube, hardened steel barrel with either a carbide or diamond bit, is attached to drilling rods and set on the hard formation. The core barrel is advanced through the formation by rotation of the core barrel. Water is used to flush out the cuttings. Upon completion of the core run, the sample is removed from the core barrel and inspected. The total core recovery length and the sum of all intact pieces over 4-inch in length are measured. The length of core recovery divided by the length of the core run is the recovery ratio. The combined length of the 4-inch or longer pieces divided by the length of core run is the Rock Quality Designation (RQD). The values provide an indication of the quality of the formation.

#### Test Borings Using Portable Drilling Equipment

In areas inaccessible to truck-mounted equipment, portable drilling equipment is used to drill the test boring. The boring is advanced by either 1) continuous drive sampling or by 2) using a small gas-powered drill rig with continuous flight augers, wash boring or NX coring.

Soil samples are obtained with a tripod and cathead assembly using soil sampling methods described below.

Test Pits Using Excavators/Hopto

Test pits are excavated using a hopto or backhoe. Material excavated from the pit and the sides and bottom of the pit are visually inspected and a continuous log of the hole is kept.

Explorations Using Hand Tools

In inaccessible areas requiring only shallow explorations, borings and test pits are made using hand equipment. Borings are drilled using hand augers. Test pits are excavated using hand tools. Cuttings from the boring and/or pit are inspected and visually classified.

Soil Sampling

Relatively undisturbed samples of the underlying soils are obtained from borings by driving a sampling tube into the subsurface material using a 140-pound safety hammer falling from a height of 30 inches. Ring samples are obtained using a 3-inch outside diameter, 2.5 inch inside diameter steel sampling tube with an interior lining of one-inch long, thin brass rings. The tube is driven approximately 18 inches into the soil and a section of the central portion is placed in a close fitting waterproof container in order to retain field conditions until completion of the laboratory tests. Standard Penetration Test (SPT) values and disturbed soil samples are obtained with a 2-inch (outside diameter) split-barrel sampler instead of the 3-inch sampler. The number of blows required to drive the sampler into the ground is recorded at 6-inch intervals. The blow count for the last 12-inches is shown on the boring logs.

From test pit excavations, undisturbed samples are retained from cohesive type soil formations and disturbed bulk samples are retained from friable and cohesionless soil formations.

The soil samples are visually classified in the field using the Unified Soil Classification System. Samples are packed in moisture proof containers and transported to the laboratory for testing.

#### LABORATORY TESTING

##### General

Laboratory tests are performed on various soil samples to determine their engineering properties. Description of the various tests are listed below.

##### Unit Weight and Moisture Content

The in-place moisture content and unit weight of the samples are used to correlate similar soils at various depths. The sample is weighed, the volume determined, and a portion of the sample is placed in the oven. After oven-drying, the sample is again weighed to determine the moisture loss. The data is used to determine the wet-density, dry-density and in-place moisture content.

##### Direct Shear

Direct shear tests are performed to determine the strength characteristics of the representative soil samples. The test consists of placing the sample into a shear box, applying a normal load and then shearing the sample at a constant

rate of strain. The shearing resistance is recorded at various rates of strain. By varying the normal load, the angle of internal friction and cohesion can be determined.

#### Consolidation Test

Consolidation tests are performed to obtain data from which time rates of consolidation and amounts of settlement may be estimated. The test is performed by placing a specimen in a consolidation apparatus. Loads are applied in increments to the circular face of a one (1) inch high sample. Deformation or changes in thickness of the specimen are recorded at selected time intervals. Water is introduced to or allowed to drain from the sample through porous disks placed against the top and bottom faces of the specimen. The data is then used to plot a stress-volume strain curve which is used in estimating settlement.

#### Expansion Test - Ring Swell

Expansion tests are performed on clayey soils to determine the expansion potential of the sample. The test is performed using either a remolded or relatively undisturbed field sample. The sample is placed in an expansion apparatus with a one (1) psi surcharge. The sample is saturated and the change in vertical height is recorded. The initial moisture content is varied (field moisture or air-dried) to determine the variation in expansion potential with moisture changes. The data is used to determine the expansion potential of the soil.

Classification Tests

The soil samples are classified using the Unified Soil Classification System. Classification tests include sieve and hydrometer analysis to determine grain size distribution, and Atterberg Limits to determine the liquid limit, plastic limit and plasticity index.

California Bearing Ratio Test

California Bearing Ratio (CBR) tests are performed on materials to determine the bearing strength of the soil for determination of pavement sections. The sample is compacted into a 6-inch diameter mold in 5 equal layers. Each layer is compacted with a 10-pound hammer falling from a height of 18-inches, with each layer receiving 56 blows. The mold is then placed in a water bath for 4-days and the vertical swell is measured under a surcharge weight of 10 pounds. After the soaking period, the sample is placed in a CBR apparatus that has a 3-square inch penetrometer. The penetrometer is pressed vertically into the soil at constant strain and the loads required to press the penetrometer are recorded. A plot of the load-strain relationship is made to determine the CBR value.

Maximum Dry Density/Optimum Moisture Content

The maximum dry density and optimum moisture content of the material is determined in accordance with the ASTM D1557-78 test procedure. The sample is compacted into a mold in 5 equal layers using a 10 pound hammer falling from a height of 18 inches. The diameter of the mold is either 4-inches or 6-inches depending on the proportion of gravel in the sample. The sample is compacted

at various moisture contents to develop a compaction curve for the soil. The curve is usually bell-shaped with a peak indicating the maximum dry density and optimum moisture content.

#### Penetrometer Test

Penetrometer tests are performed on clayey soils to determine the consistency of the material and an approximate value of the unconfined compressive strength.

#### Torvane

Torvane tests are used to determine the approximate undrained shear strength of clayey soils. The torvane apparatus consists of a torque device with a small diameter plate that has vanes situated perpendicular to the plate. The vanes are pushed into the soil and torque is applied until failure occurs. The torque required to cause failure is converted to approximate undrained strength of the soil.

**LOG OF BORING NO. 1**

EQUIPMENT USED: SIMCO 2400 DRILL RIG

DATE: September 23, 1992

ELEVATION:

DEPTH OF BORING: 19.0'

DEPTH TO GROUNDWATER: NA

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS / FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)
0		MH	clayey SILT, few roots	FILL	7	brown	moist	mod. stiff		
1			few gravel; highly to completely weathered; no roots		19			very stiff	73.5	24.9
5			some gravel		43				74.4	41.2
					23	brown to gray			76.4	30.8
10					16	brown			78.6	31.4
15					6			mod. stiff	74.6	35.6
20			BASALT; highly weathered End of Boring		12/0"	gray		mod. hard rock		18.7

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PROJECT NO.: M-2081-F

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Aiea, Hawaii 96701

PLATE

3

# LOG OF BORING NO. 2

EQUIPMENT USED: SIMCO 2400 DRILL RIG

DATE: September 24, 1992

ELEVATION:

DEPTH OF BORING: 17.0'

DEPTH TO GROUNDWATER: NA

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)
0										
1		GP	GRAVEL, some sand			gray	moist	loose		
1		MH	clayey SILT, few gravel, few roots		21	brown		stiff	82.8	38.4
5					20			very stiff	76.2	38.9
10			some gravel		11					
10					22	dark gray brown		stiff to very stiff	77.1	40.6
15			BASALT ; highly weathered		16				77.1	31.1
15					34	gray		soft rock	106.4	11.5
20			END OF BORING							

Atterberg Limits at 2.5':

LL = 64

PL = 32

PI = 32

Expansion Test at 2.5':

13.6% from air-dried to saturation

0.5% from field moisture to saturation

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PLATE

4

**LOG OF BORING NO. 3**

EQUIPMENT USED: SIMCO 2400 DRILL RIG

DATE: September 24, 1992

ELEVATION:

DEPTH OF BORING: 18'-7"

DEPTH TO GROUNDWATER: NA

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)
0		GP	GRAVEL, some sand	FILL		gray	moist	loose		
1		MH	clayey SILT, few roots		9	brown		stiff	75.9	41.9
			some gravels (highly to completely weathered), no roots		20			very stiff		
					19	dark gray			78.9	38.1
5					9			stiff	79.0	34.1
					12				77.7	40.2
10										
15					9				78.4	40.4
			BASALT; highly weathered		20/1'	gray		soft rock		
20			End of Boring							

Atterberg Limits at 4.5':  
 LL = 54  
 PL = 36  
 PI = 18

Expansion Test at 4.5':  
 7.1% from air-dried to saturation  
 0.1% from field moisture to saturation

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PROJECT NO.: M-2081-F

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PLATE

5

**LOG OF BORING NO. 4**

EQUIPMENT USED: SIMCO 2400 DRILL RIG

DATE: September 24, 1992

ELEVATION:

DEPTH OF BORING: 15.0'

DEPTH TO GROUNDWATER: NA

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)
0										
1		GP	GRAVEL; some sand			gray	moist	loose		
1		MH	clayey SILT, few gravel (highly to compl. weathered) some gravel		14	brown		stiff	78.2	37.7
3					29			very stiff		
5					36	gray brown		stiff	78.8	35.3
10		GM	silty GRAVEL (highly to completely weathered)		21			mod. dense	73.7	36.6
15			BASALT; highly weathered, few silty areas		15				61.2	66.0
15			End of Boring		23	gray		soft rock	88.2	29.0

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PROJECT NO.: M-2081-F

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**PLATE**  
6

**LOG OF BORING NO. 5**

ELEVATION:

EQUIPMENT USED: SIMCO 2400 DRILL RIG

DEPTH OF BORING: 14.5'

DATE: September 25, 1992

DEPTH TO GROUNDWATER: NA

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)
0		MH	clayey SILT; few highly to completely weathered gravel	FILL		brown	moist	stiff		
1					10			very stiff	69.1	36.0
					19			stiff		
					24	dark gray brown			80.4	34.3
5					16				83.7	34.4
10					13			stiff	83.4	35.8
15			BASALT; highly weathered		18	gray		soft rock	83.8	22.4
			End of Boring		15/0"			mod. hard rock		

Atterberg Limits at 4.0':  
 LL = 60  
 PL = 35  
 PI = 25

PROJECT NAME: INDEPENDENT LIVING COMMUNITY

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PLATE

PROJECT NO.: M-2081-F

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7

**LOG OF BORING NO. 6**

EQUIPMENT USED: SIMCO 2400 DRILL RIG

DATE: September 25, 1992

ELEVATION:

DEPTH OF BORING: 15.0'

DEPTH TO GROUNDWATER: NA

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)
0										
1		MH	clayey SILT, some gravel (wh to wc)	FILL	16	brown	moist	mod. stiff	72.7	44.5
			with highly weathered gravel (wh)	26	gray brown to brown	very stiff				
5					10			stiff	74.1	42.0
10					13			mod. dense	74.7	25.8
15			BASALT; wh to wc; some silty seams		15	dark gray brown		soft rock	79.9	30.4
			End of Boring							
20										

PROJECT NAME: INDEPENDENT LIVING COMMUNITY

PROJECT NO.: M-2081-F

SOILS INTERNATIONAL

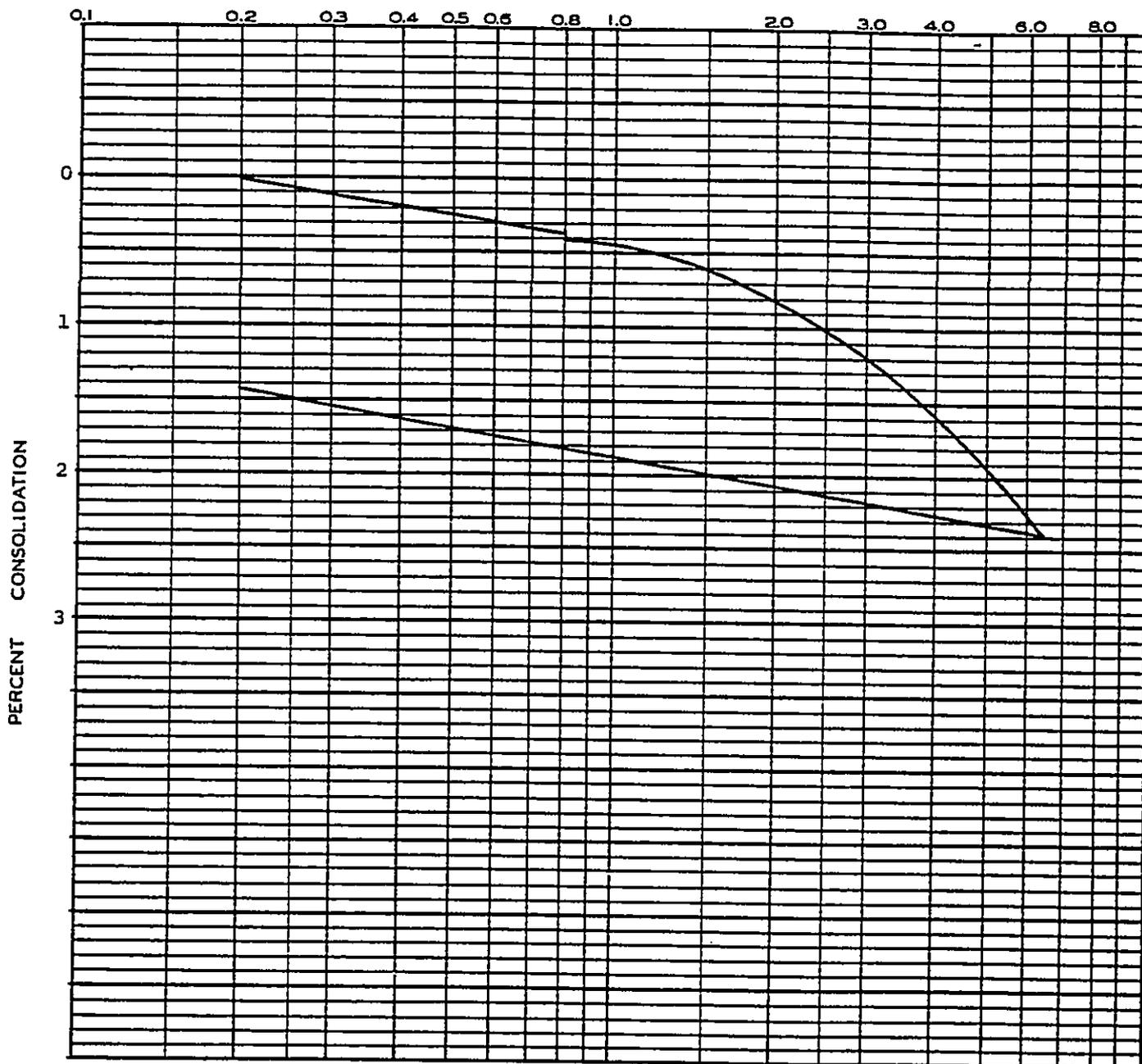
99-1255 Waiua Pl., Suite 4  
Aiea, Hawaii 96701

PLATE

8

**CONSOLIDATION TEST DATA**

PRESSURE IN KIPS PER SQUARE FOOT

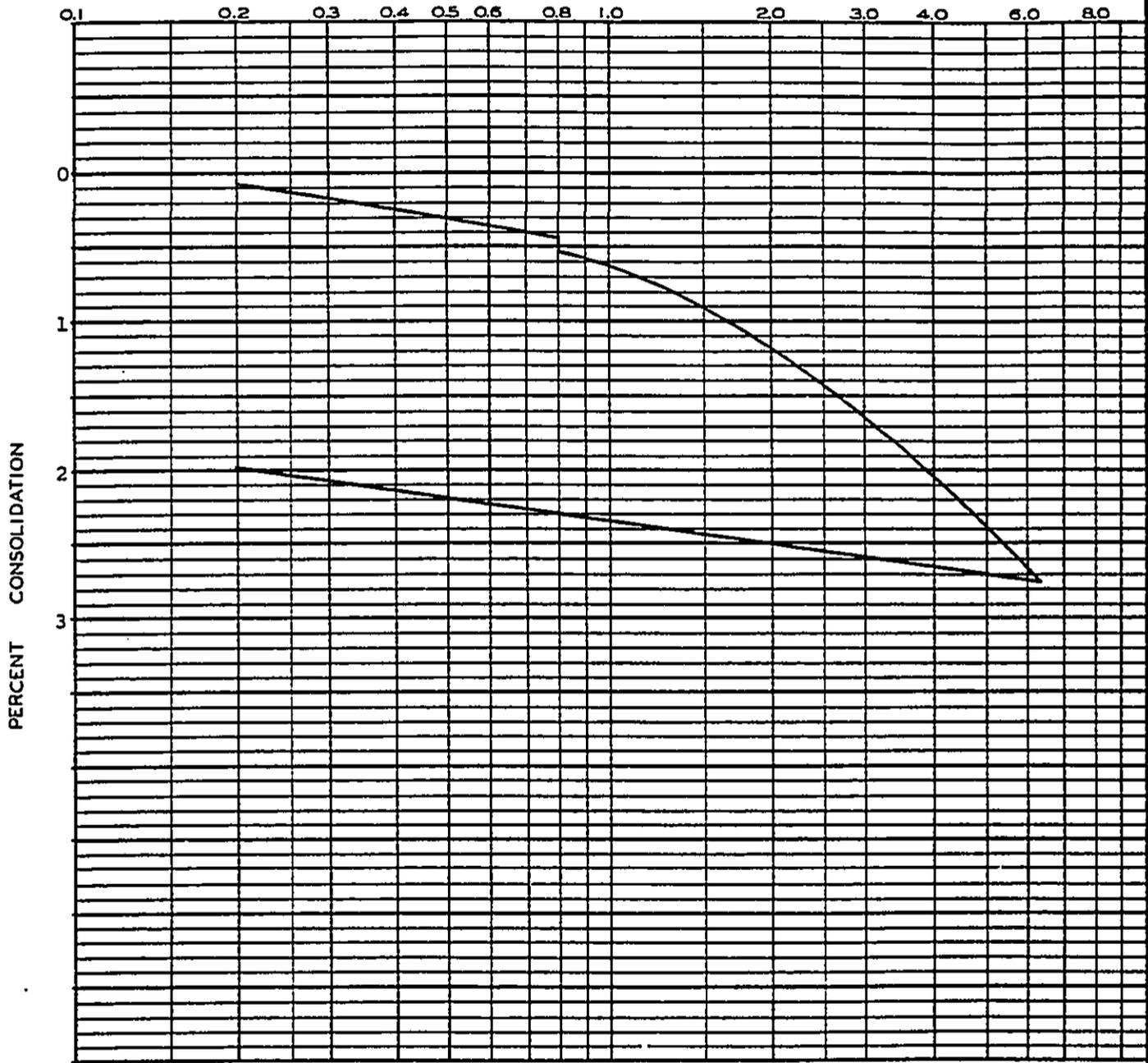


BORING / TEST PIT NO.: 1  
 DEPTH: 10.5'  
 WATER ADDED AT: 0.8 ksf

PROJECT: INDEPENDENT LIVING COMMUNITY	PROJECT NO. M-2081-F	SOILS INTERNATIONAL 99-1255 WAIUA PL. AIEA, HAWAII 96701	PLATE 9
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CONSOLIDATION TEST DATA

PRESSURE IN KIPS PER SQUARE FOOT



BORING / TEST PIT NO.: 1  
 DEPTH: 15.0'  
 WATER ADDED AT: 0.8 ksf

PROJECT:  
 INDEPENDENT LIVING COMMUNITY

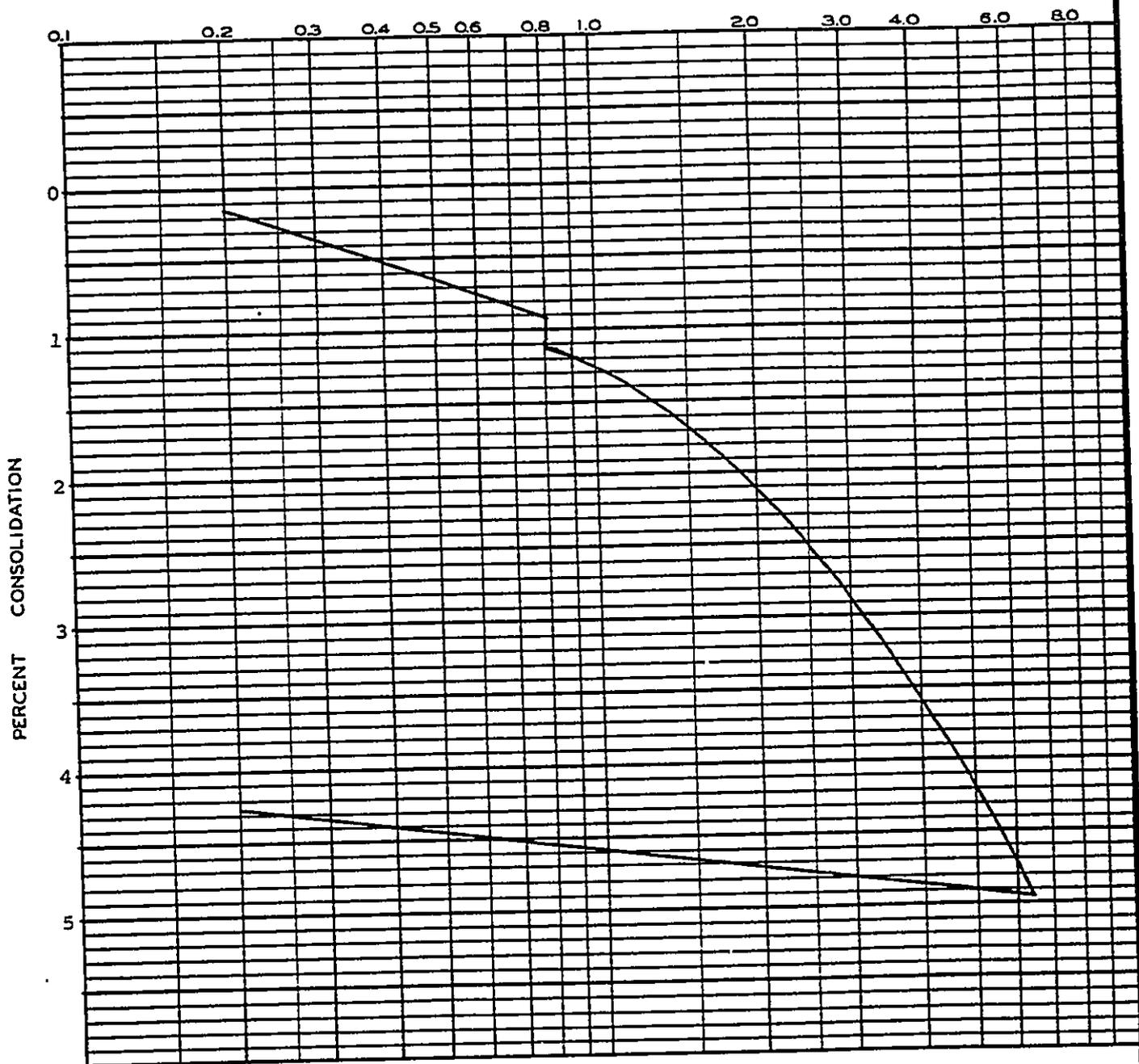
PROJECT NO.  
 M-2081-F

**SOILS INTERNATIONAL**  
 99-1255 WAIUA PL.  
 AIEA, HAWAII 96701

PLATE  
 10

**CONSOLIDATION TEST DATA**

PRESSURE IN KIPS PER SQUARE FOOT

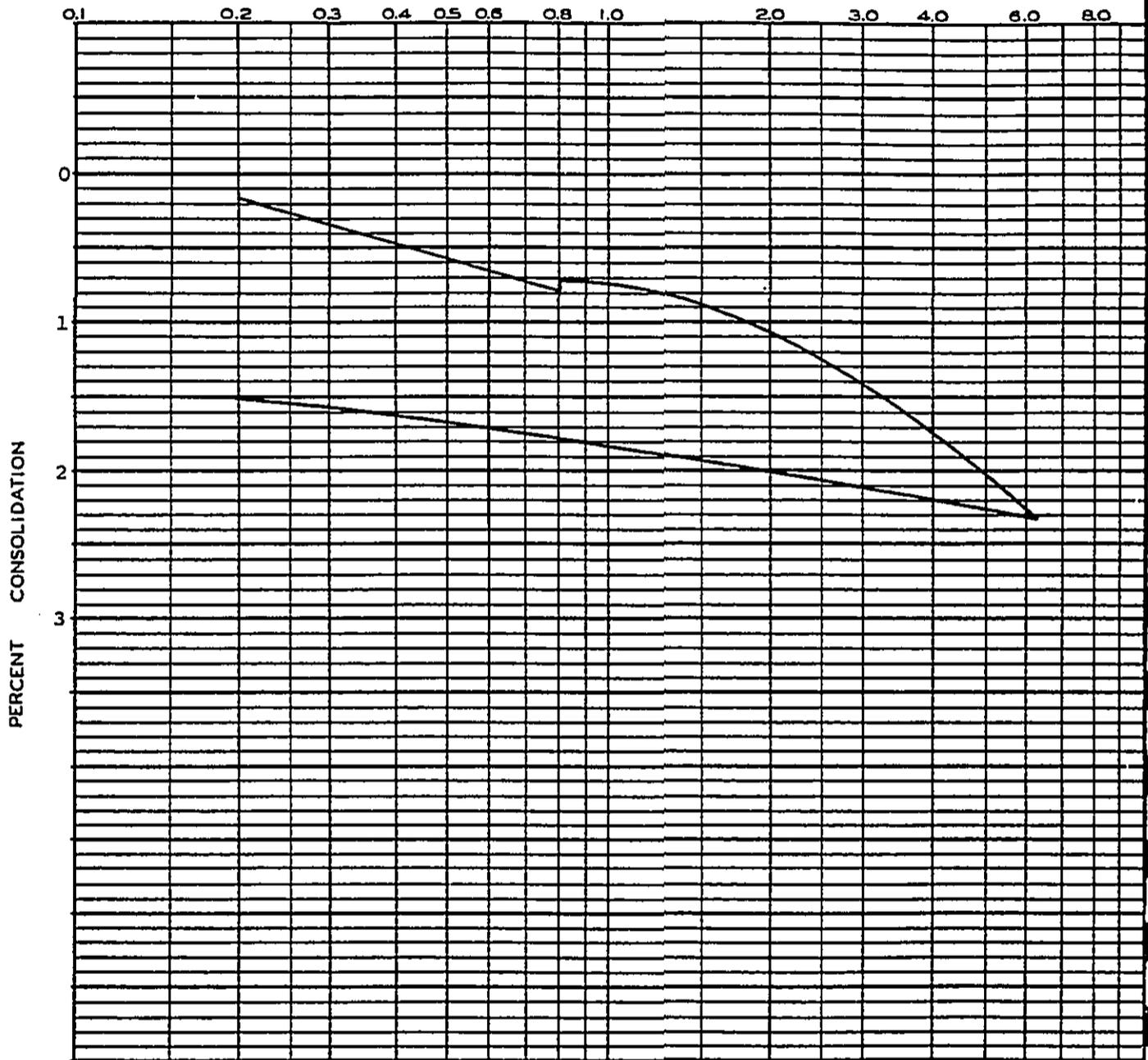


BORING / TEST PIT NO.: 2  
 DEPTH: 4.0'  
 WATER ADDED AT: 0.8 ksf

PROJECT: INDEPENDENT LIVING COMMUNITY	PROJECT NO. M-2081-F	SOILS INTERNATIONAL 99-1255 WAIUA PL. AIEA, HAWAII 96701	PLATE 11
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CONSOLIDATION TEST DATA

PRESSURE IN KIPS PER SQUARE FOOT



BORING / TEST PIT NO.: 5  
 DEPTH: 4.0'  
 WATER ADDED AT: 0.8 ksf

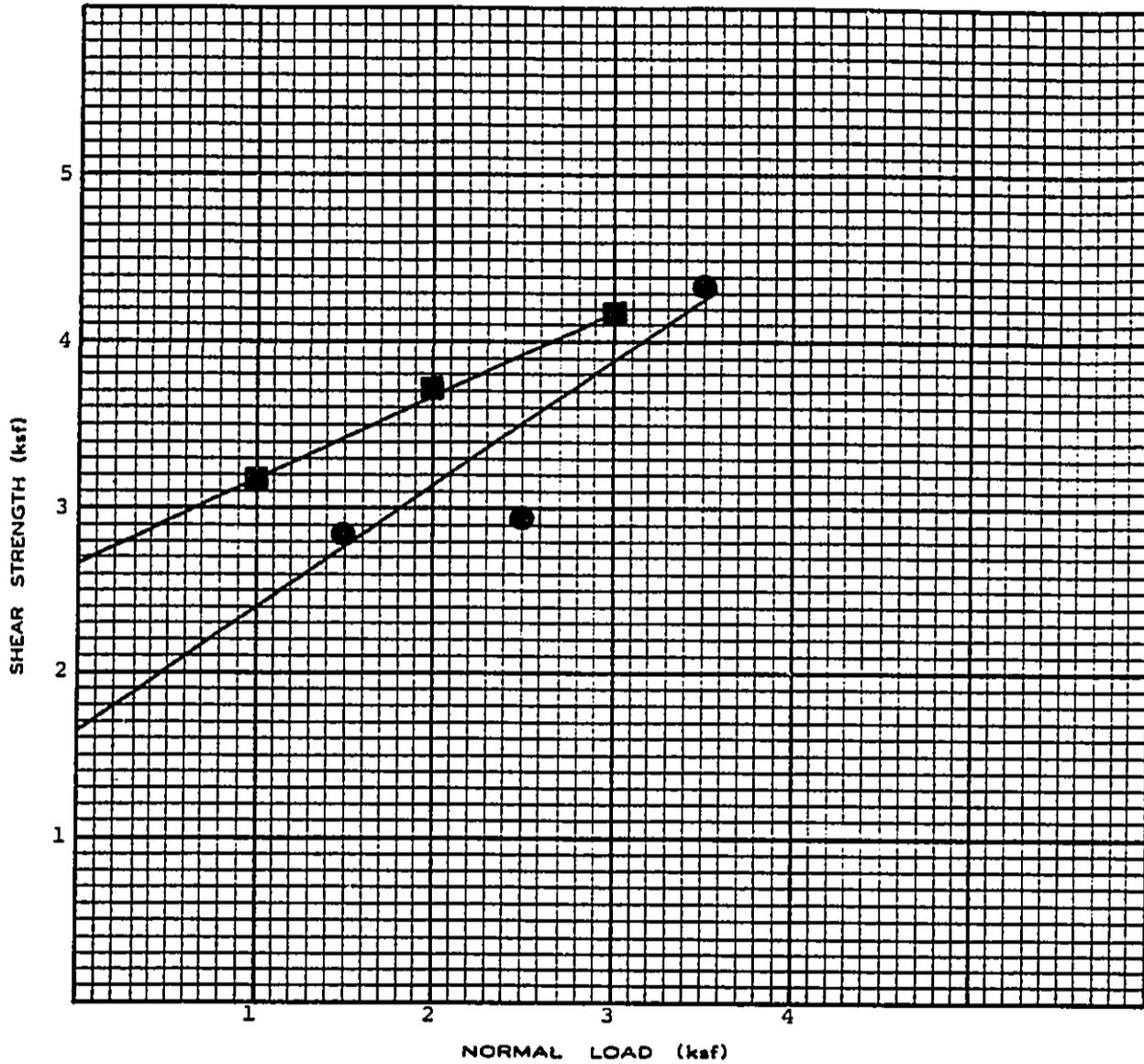
PROJECT:  
 INDEPENDENT LIVING COMMUNITY

PROJECT NO.  
 M-2081-F

SOILS INTERNATIONAL  
 99-1255 WAIUA PL.  
 AIEA, HAWAII 96701

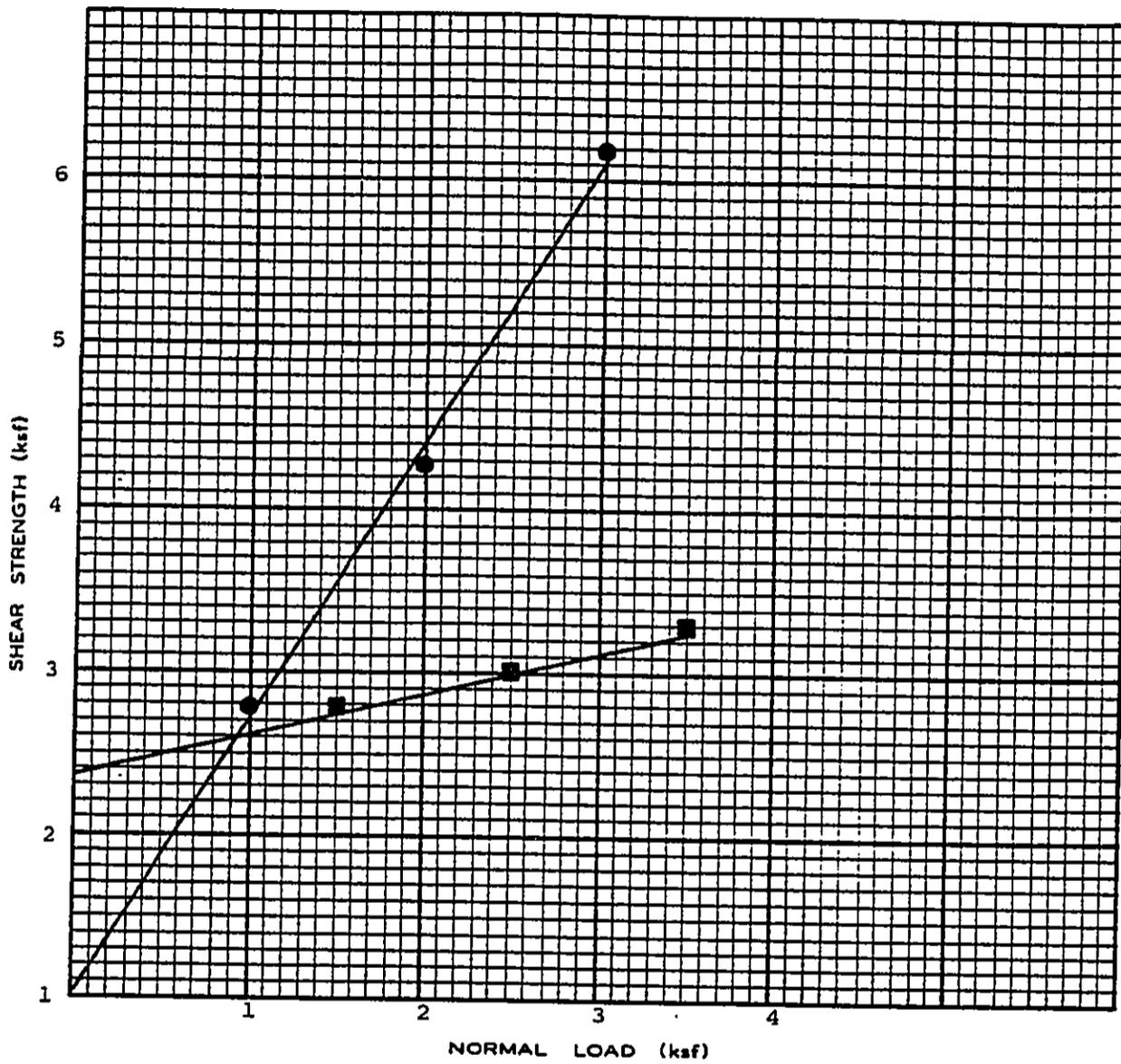
PLATE  
 12

## DIRECT SHEAR TEST



	LOCATION	DEPTH (ft.)	COHESION (psf)	ANGLE OF INTERNAL FRICTION	TEST CONDITIONS
●	Boring 1	10.5	1650	36.5°	Field Density-Peak Strength
■	Boring 5	4.0	2680	26.5°	Field Density-Peak Strength
PROJECT: INDEPENDENT LIVING COMMUNITY			PROJECT NO. M-2081-F		SOILS INTERNATIONAL 99-1255 WAIUA PLACE AIEA, HAWAII 96701
					<u>PLATE</u> 13

## DIRECT SHEAR TEST

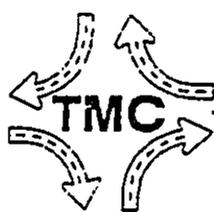


	LOCATION	DEPTH (ft.)	COHESION (psf)	ANGLE OF INTERNAL FRICTION	TEST CONDITIONS
●	Boring 2	4.0	1030	59°	Field Density-Peak Strength
■	Boring 3	10.5	2380	14°	Field Density-Peak Strength
PROJECT:		PROJECT NO.		SOILS INTERNATIONAL	
INDEPENDENT LIVING COMMUNITY		M-2081-F		99-1255 WAIUA PLACE	
				AIEA, HAWAII 96701	
				<u>PLATE</u>	
				14	

# ***Appendix C***

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## ***Traffic Assessment***



## THE TRAFFIC MANAGEMENT CONSULTANT

Randall S. Okaneku, P. E., Principal • 1188 Bishop Street • Suite 1907 • Honolulu, Hawaii 96813  
Telephone: (808) 536-0223 • Facsimile: (808) 537-2985

June 17, 1993  
Job. No. 9310

Hale Mahaolu, Inc.  
c/o Michael T. Munekiyo Consulting, Inc.  
1823 Wells Street, Suite 3  
Wailuku, Maui, Hawaii 96793  
Attention: Mr. Milton Arakawa

Gentlemen:

### Subject: Makawao Elderly Independent Living Community

The Traffic Management Consultant is pleased to present this preliminary traffic assessment for the proposed Makawao Elderly Independent Living Community. The purpose of this assessment is to determine the level significance of any traffic impacts resulting from the proposed project. The scope of this study includes: a description of the proposed project; an assessment of existing roadway and traffic conditions; and the development trip generation characteristics for the proposed project.

#### Project Description

The proposed project would consist of 40 one-bedroom elderly housing project. The affordable rental housing project is located Makawao, Maui, Hawaii. The 1.148 acre site is identified as Tax Map Key 2-4-24:3. The site is located at the northwest (makai) side of Makawao Avenue, between the Makawao Post Office and the Makawao Business Center. The project location is shown on Figure 1. The site plan is shown on Figure 2.

#### Existing Conditions

The existing site is being used as a temporary public parking lot. During the mid-morning, twenty-one (21) vehicles were parked in the gravel parking lot. Access is provided by an existing driveway on Makawao Avenue, along the west boundary of the site.

Makawao Avenue is a two way, two lane roadway that provides access to Pukalani and Makawao. To the east, Makawao Avenue intersects Baldwin Avenue, in the center of Makawao Town. To the west, Makawao Avenue intersects the Pukalani Bypass, which is under construction.

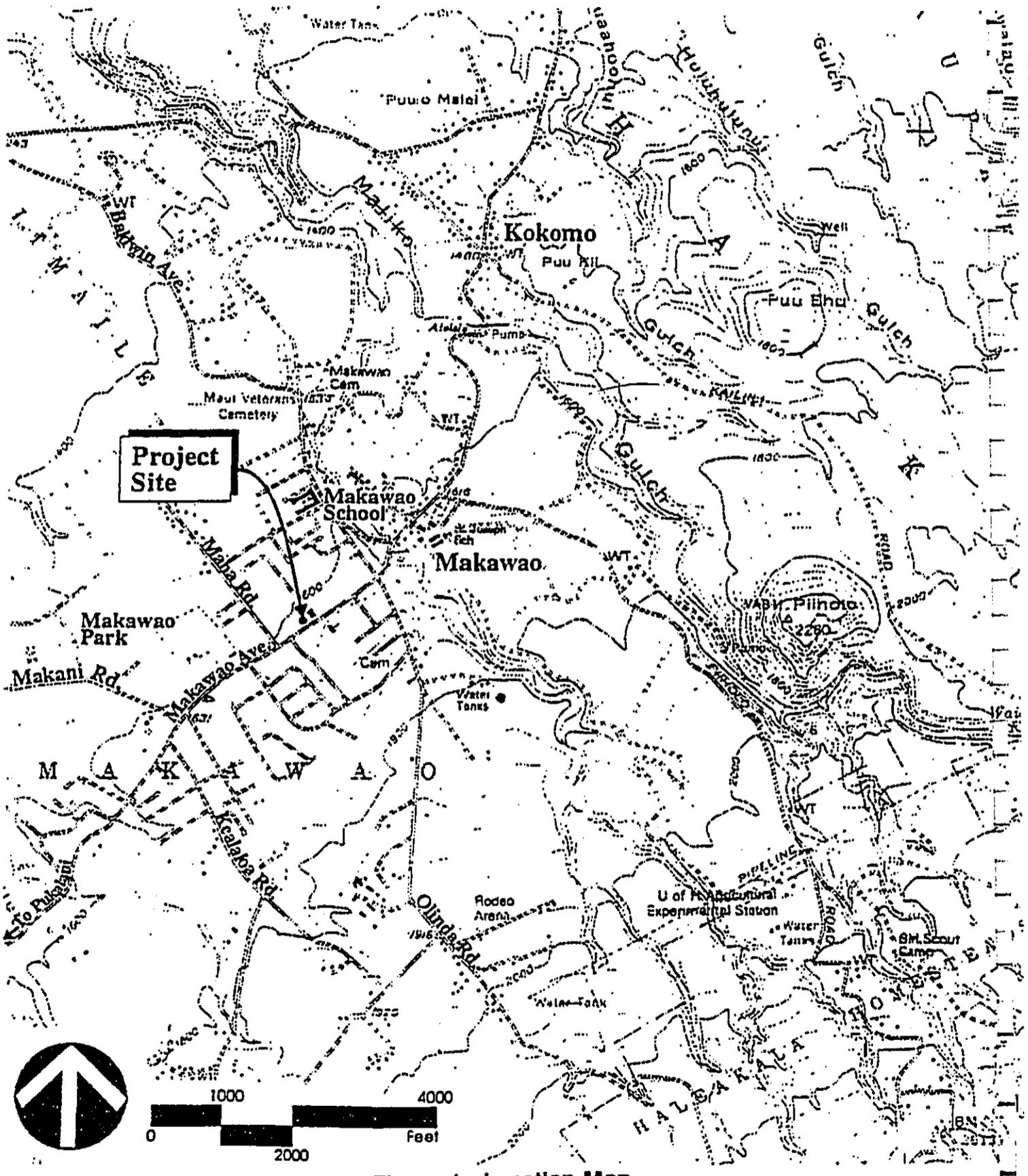


Figure 1 - Location Map



Traffic count data were obtained from the State Department of Transportation, taken from April 30 to May 1, 1991, to establish the existing condition. The existing AM peak hour volume on Makawao Avenue, in the vicinity of the project site, is 908 vehicles per hour (vph), total for both directions. During the PM peak hour, the traffic volume on Makawao Avenue is 1,019 vph, total for both directions. A more recent traffic survey is presented in "Final Report Traffic Impact Study Makawao Sugar Plantation", prepared by Parsons Brinckerhoff Quaded & Douglas, Inc. in January 1993. The December 1992 manual traffic count survey reports lower peak hour volumes than the DOT data; 798 vph during the AM peak hour and 876 vph during the PM peak hour. The morning peak hour data was affected by school being out of session. The afternoon peak hour was earlier than the peak time recorded by DOT.

#### Trip Generation

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation", 5th Edition, 1991. ITE trip rates are developed by correlating the vehicle trip generation data with various land use characteristics, such as vehicle trips per dwelling unit.

The trip generation characteristics are based upon the maximum trip rates reported by ITE. The trip generation characteristics are shown in Table 1.

Land Use = 40 Elderly Housing Dwelling Units		Trip Rates	Vehicle Trips	
Peak Hour of Adjacent Street Traffic	AM Peak Hour	Enter	0.13	5
		Exit	0.14	6
		Total	0.27	11
	PM Peak Hour	Enter	0.15	6
		Exit	0.10	4
		Total	0.25	10

During the AM peak hour, the project is expected to generate a total of 11 vph, 5 vph entering the site and 6 vph exiting the site. During the PM peak hour, the project is expected to generate a total of 10 vph, 6 vph entering the site and 4 vph exiting the site.

Findings

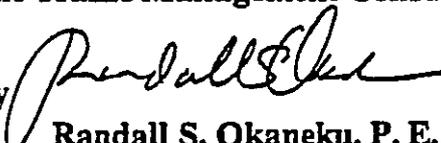
The proposed project would increase existing peak hour traffic volumes on Makawao Avenue by approximately 1% during both the AM and PM peak hours of traffic. The increases in peak hour traffic, generated by the proposed project, are not considered significant, according to recommended guidelines for traffic impact studies proposed by the Institute of Transportation Engineers (ITE).

The project driveway is expected to operate at satisfactory Levels of Service (LOS), i.e., LOS "C" or better, during the peak hours of traffic. An exclusive left turn lane on Makawao Avenue at the project access driveway is not warranted based upon traffic volumes, according to American Association of State Highway and Transportation Officials (AASHTO).

Since the existing site is being used as a parking lot by at least 21 vehicles during the morning, the net traffic impact between traffic generated by the proposed project and the traffic already accessing the existing public parking lot is negligible.

If you require clarification on any of the above material or have any questions, please do not hesitate to call me.

Very Truly Yours,  
The Traffic Management Consultant

By   
Randall S. Okaneku, P. E.  
Principal