Final Environmental Assessment

PROPOSED MARTIN SINGLE-FAMILY RESIDENCE AT LOT 46-A OF OLOWALU MAKAI-HIKINA SUBDIVISION (TMK: 4-8-003:046)

Approving Agency:

State of Hawai`i
Office of Conservation and Coastal Lands

Applicant:

Peter and Deborah Martin

June 2008

MUNEKIYO HIRAGA, INC.

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Executive Summary

Project Name:	Proposed Martin Single-Family Residence
Type of Document:	Final Environmental Assessment
Legal Authority:	Chapter 343, Hawai`i Revised Statutes
Agency Determination:	Finding of No Significant Impact (FONSI)
Applicable Environmental Assessment Review "Trigger":	Use of State Conservation District Lands
Location:	TMK: (2) 4-8-003:046 Olowalu Makai-Hikina Subdivision (Lot 46-A) Olowalu Maui Island
Applicant:	Peter and Deborah Martin 590-A Old Stable Road Paia, Hawai`i 96779
Approving Agency:	State of Hawai`i Office of Conservation and Coastal Lands P.O. Box 621 Honolulu, Hawai`i 96809
Consultant:	Munekiyo & Hiraga, Inc. 305 High Street, Suite 104 Wailuku, Hawai`i 96793 Contact: Kyle Ginoza Phone: (808) 244-2015
Project Summary:	Peter and Deborah Martin are proposing to construct a single-story, single-family residence on land that they own in the Olowalu Makai-Hikina Subdivision in Olowalu, Maui. Site work related to the construction of the proposed residence includes grading, driveway improvements, and the installation of water, sewer, and drainage systems. The subject property is located in the Special Management Area (SMA) of the County of Maui and is also within the "Conservation" district of the State of Hawai`i. The applicant is processing this Environmental Assessment (EA) in preparation for applying for a Conservation District Use

Permit (CDUP) with the State of Hawai`i, Department of Land and Natural Resources. A CDUP is required to construct a single-family residence in the "Conservation" district.

I. PROJECT OVERVIEW

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A. PROPERTY LOCATION, CURRENT LAND USE, AND OWNERSHIP

Peter and Deborah Martin propose to develop a single-family residential home on an approximately 0.800-acre parcel, identified by Tax Map Key (TMK) (2) 4-8-003:046 in Olowalu, Maui. See **Figure 1** and **Figure 2**. The parcel is also identified as Lot 46-A of the Olowalu Makai-Hikina Subdivision located in the vicinity of Olowalu town and Olowalu wharf. A copy of the final plat map for the subdivision is presented in **Appendix "A"**.

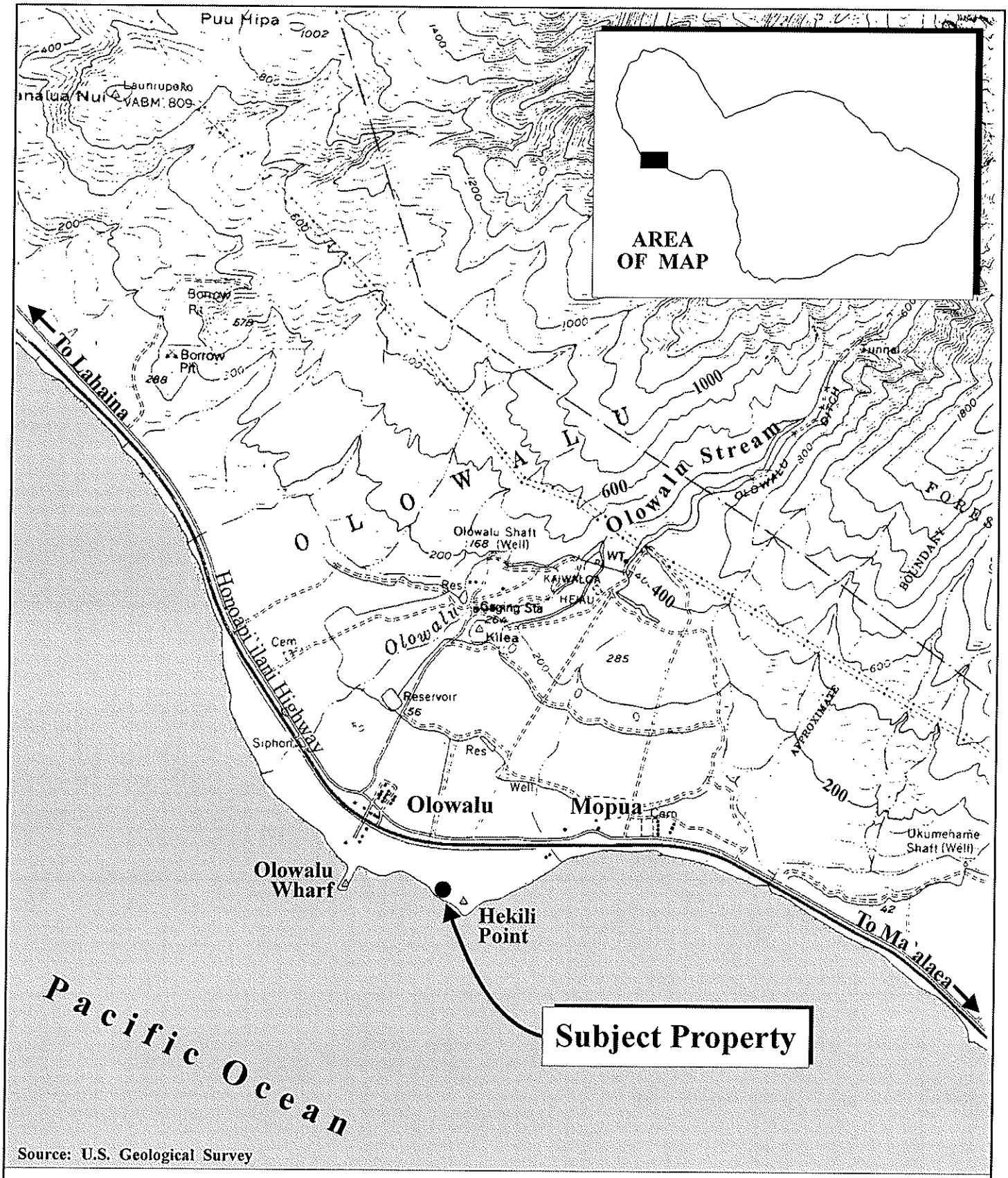
Land uses in proximity to the subject property include the former Pioneer Mill Plantation Manager's residence property to the west, the Olowalu General Store/Chez Paul Restaurant building to the northwest, a private strip of land along the coastline to the south, and Camp Olowalu (formerly known as Camp Pecusa) to the west. Access to the property is provided from Honoapi`ilani Highway via an access easement (locally referred to as Camp Pecusa Road) across Lot 84-A of the subdivision.

The subject parcel is currently vacant and undeveloped. See **Figure 3** and **Appendix "B"**. Years ago, the parcel contained a single-family residence, but the structure has since been demolished. The parcel is split zoned "Agricultural" and "Conservation" by the State Land Use Commission, "Agricultural", "Open Space", and "Park" by the West Maui Community Plan, and is designated "A-3, Apartment" by Maui County zoning. The parcel is located within the Special Management Area (SMA) of the County of Maui.

The subject property is currently owned by Peter and Deborah Martin.

B. PROJECT DESCRIPTION

Peter and Deborah Martin would like to develop an approximately 3,200 square feet , single-story, single-family residence at the subject property. See **Figure 4**, **Figure 5**, **Figure 6** and **Appendix "C"**. In addition, related site work includes grading and driveway improvements, and the installation of water, sewer, and drainage systems.



Source: U.S. Geological Survey

Figure 1 Proposed Martin Single-Family Residence

NOT TO SCALE

Regional Location Map

Prepared for: Peter and Deborah Martin

MUNEKIYO & HIRAGA, INC.

Martin\OlowaluLot 46\regional

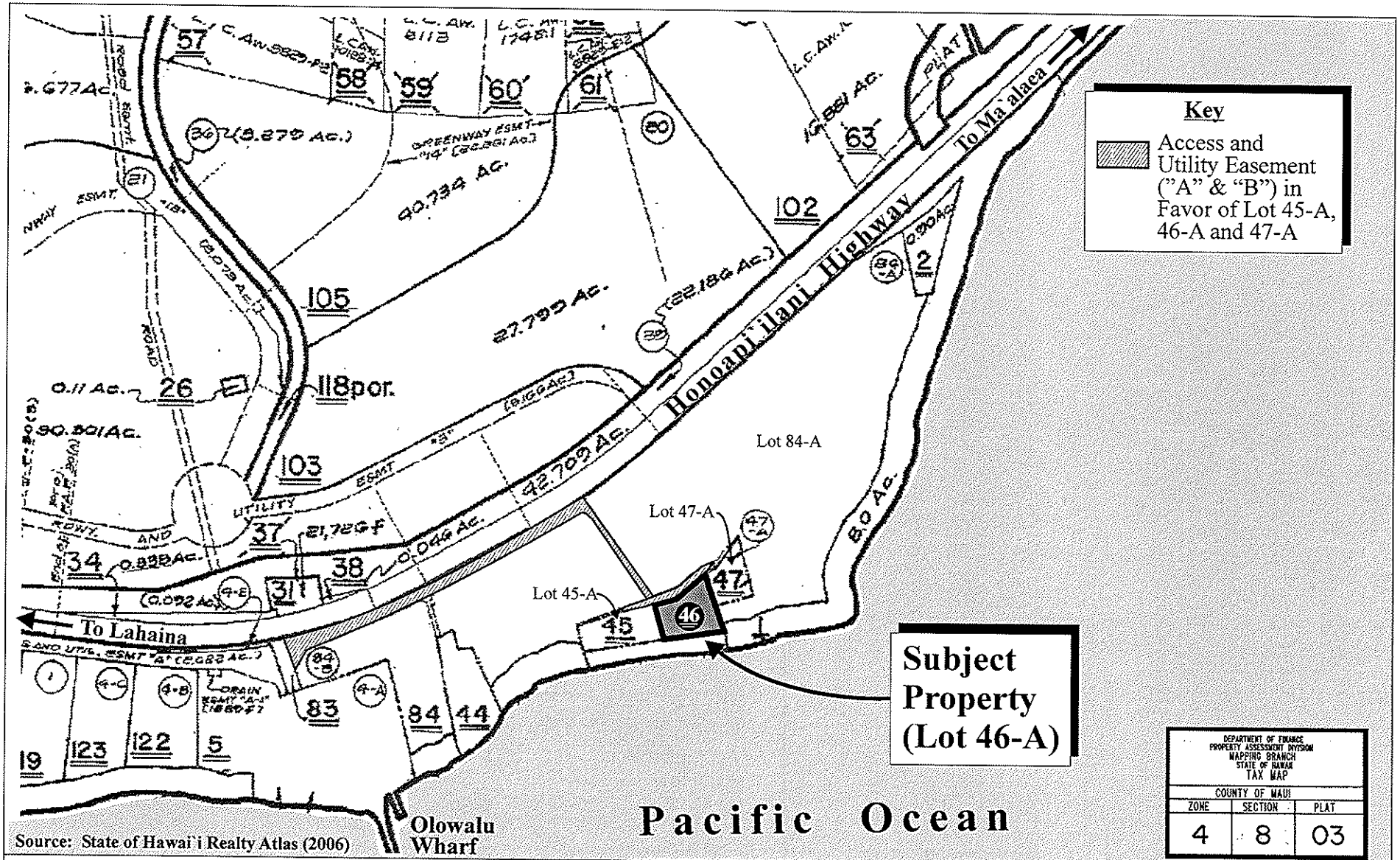


Figure 2

Proposed Martin Single-Family Residence

Site Location Map

NOT TO SCALE

Prepared for: Peter and Deborah Martin

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Martin\OlowaluLot46\SiteLocation

Northeastern (Mauka) View

Southwestern (Makai) View

Figure 3 Proposed Martin Single-Family Residence

Site Photos

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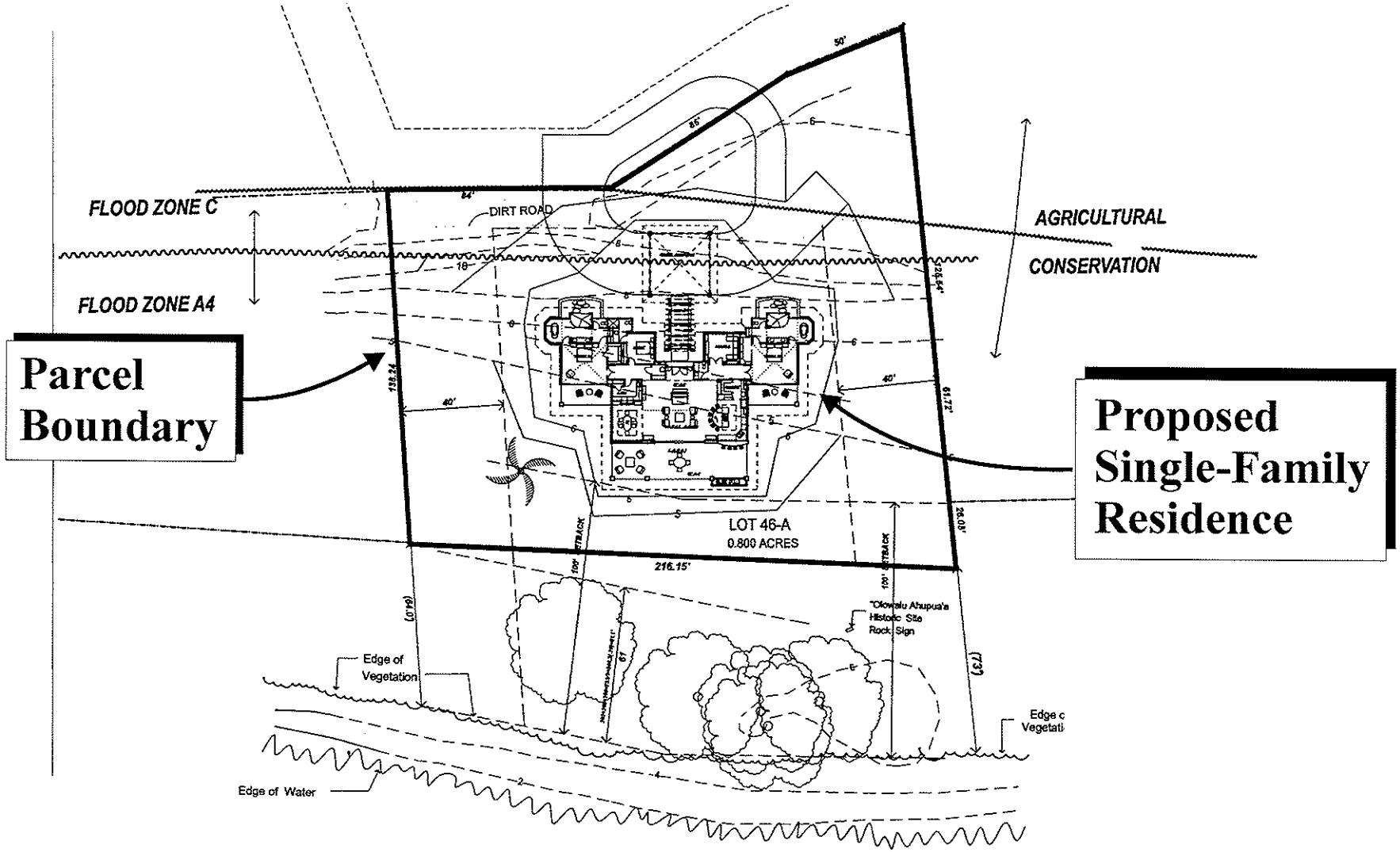
Martin\OlowaluLot 46\sitephotos



Source: Richard S. Young Architect

Figure 4

Proposed Martin Single-Family Residence

Site Plan

NOT TO SCALE

Prepared for: Peter and Deborah Martin

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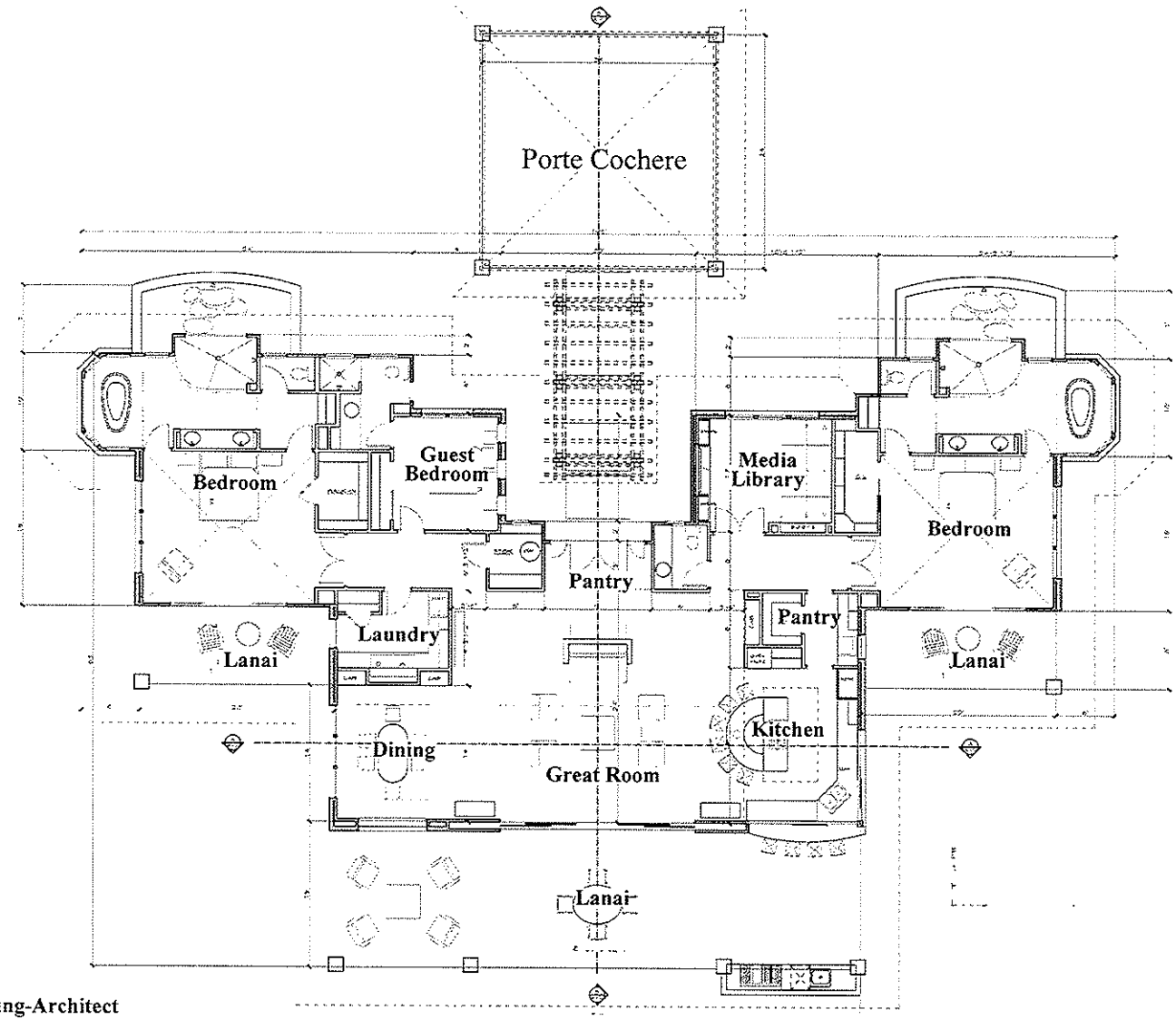
Martin\OlowaluLot46\SitePlan



Source: Richard S. Young-Architect

Figure 5

Proposed Martin Single-Family Residence

Floor Plan

NOT TO SCALE

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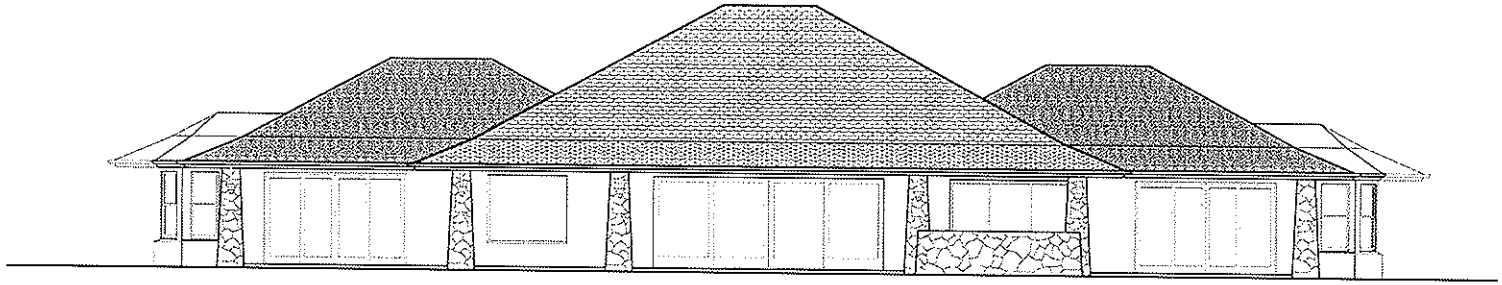
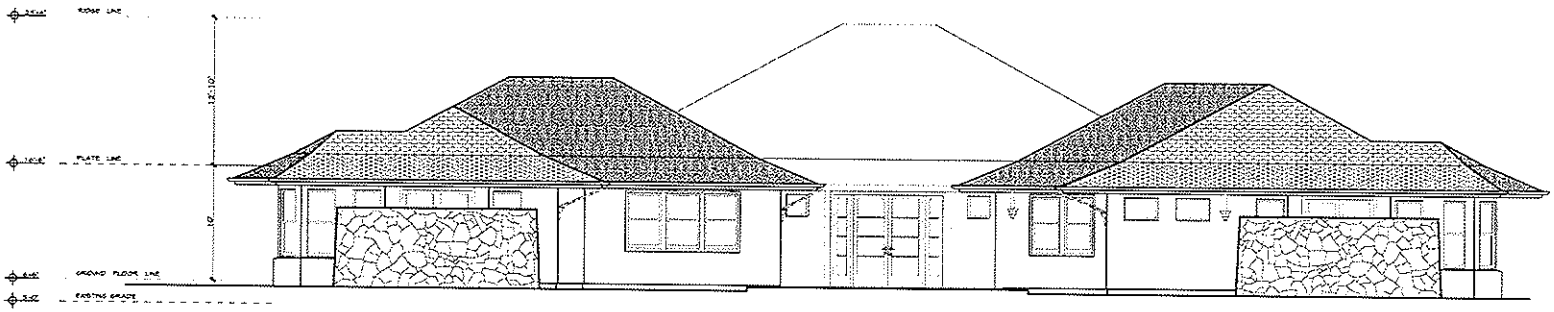
Martin\OlowaluLot46\Floor Plan

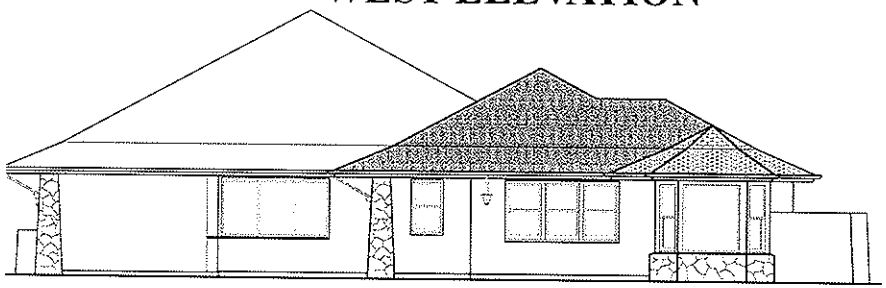
NORTH ELEVATION



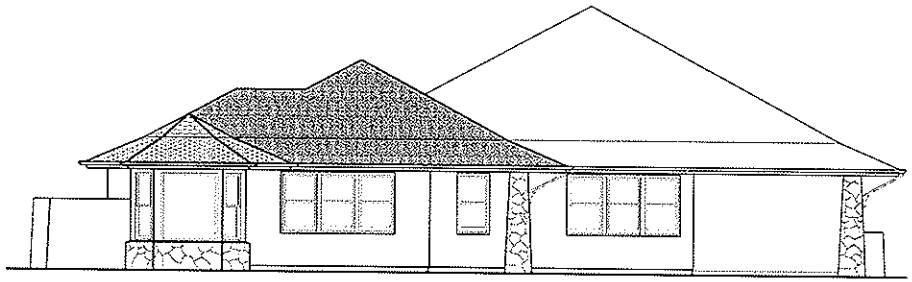
SOUTH ELEVATION



WEST ELEVATION



EAST ELEVATION



Source: Richard S. Young-Architect

Figure 6 Proposed Martin Single-Family Residence

Building Elevations

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Martin\OlowaluLot46\BuildingElevations

In order to construct their single-family residence, the Martins will require State and County approvals. Compliance with the County of Maui's SMA requirements will be necessary for the proposed project. The construction of a single-family dwelling is not classified as "development" under the SMA rules for the Maui Planning Commission. As such, it is anticipated that the proposed project will qualify as an exempt action according to SMA rules.

In addition, since the project site is located within the State "Conservation" district ("Limited" subzone), the applicants will be required to obtain a Conservation District Use Permit from the Department of Land and Natural Resources to allow the construction of the proposed single-family home. A single-family residence is an identified, permitted use within the "Limited" subzone of the "Conservation" district upon approval by the Board of Land and Natural Resources.

C. CHAPTER 343, HAWAI`I REVISED STATUTES REQUIREMENT

As mentioned, the subject property is located within the State Land Use "Conservation" district. The use of State Conservation District lands is a trigger for the preparation and processing of an environmental analysis pursuant to Chapter 343, Hawai`i Revised Statutes (HRS). Based on the scope of the proposed project, this environmental assessment (EA) is being prepared to analyze and evaluate environmental impacts related to the project. This EA is also intended to cover any use of State or County lands and funds, for purposes including, but not limited to, any roadway, infrastructure, utility system, or other improvement relating to the development of the project. This would include, but not be limited to, utility systems and improvements affecting Honoapi`ilani Highway and Camp Pecusa Road, as well as at other nearby off-site locations which may be required to service the proposed dwelling.

D. IMPLEMENTATION TIME FRAME

The development of the Martins' single-family home will commence after receipt of a Conservation District Use Permit and after the design and approval of the construction plans. It is anticipated that site construction may be initiated in 2009, with the construction of the home occurring over a one (1) year period until 2010.

II. DESCRIPTION OF THE EXISTING ENVIRONMENT AND POTENTIAL IMPACTS/MITIGATION MEASURES

II. DESCRIPTION OF THE EXISTING ENVIRONMENT AND POTENTIAL IMPACTS/MITIGATION MEASURES

A. PHYSICAL SETTING

1. Existing and Surrounding Land Use

a. Existing Conditions

The subject property, located in the vicinity of Olowalu Wharf and Camp Pecusa, is approximately 14.5 miles from Wailuku and 5.5 miles from Lahaina town.

In a regional context, Olowalu has historically been a plantation settlement. Prior to 1999 and the closure of Pioneer Mill, significant acreages of lands within the Olowalu area were cultivated in sugar cane. Land uses currently surrounding the subject property include two (2) acre agricultural lots associated with the Olowalu Makai (Komohana and Hikina) subdivisions, Chez Paul restaurant, Olowalu General Store, Camp Olowalu (formerly known as Camp Pecusa), and Olowalu Village with various existing single-family residences reminiscent of the plantation era in the Olowalu area. Olowalu Wharf (consisting of a pier and breakwater), formerly used for the loading and unloading of sugar into barges, is located along the shoreline to the west of the subject property.

b. Potential Impacts and Mitigation Measures

The proposed project involves the construction of a single-story, single-family residence which will occupy a footprint of approximately 3,200 square feet. Site work related to the construction of the proposed residence will include grading, driveway, and landscaping improvements in addition to installation of water, sewer, and drainage systems. The proposed project is considered to be compatible with the existing and surrounding land uses.

2. Climate

a. Existing Conditions

Like most areas of Hawai`i, Olowalu's climate is relatively uniform year round. This stability is attributed to its tropical latitude, its position relative to storm tracts and the Pacific anticyclone, and the surrounding ocean. Variations in climate among different regions, then, are largely left to local terrain.

Wind patterns affecting the islands are typically out of the northeast which occur 90 percent of the time during the summer, and 50 percent of the time in the winter.

Recorded temperatures in Lahaina, located approximately 5.5 miles to the north of Olowalu, range from an average high temperature in the high 80's (degrees Fahrenheit) to an average low temperature in the low 60's. Rainfall in the Olowalu area ranges between 15 to 20 inches per year.

b. Potential Impacts and Mitigation Measures

The scope of the proposed project is limited to the construction of a single-family residence. As such, there will be no impacts generated by the project which would be expected to have an adverse effect on local climatic and meteorological conditions.

3. Topography

a. Existing Conditions

Most of the Olowalu area surrounding the subject property was formerly utilized for sugar cultivation and is now fallow. The topography of this area reflects the general topographical patterns of the West Maui region. Near the shoreline, the topography is generally flat to slightly sloping. Proceeding mauka, the land slopes gently higher to the foothills of the West Maui mountains. Elevations in the Olowalu area generally range from sea level to approximately 400 feet above sea level. The topography of the subject

property is generally flat to slightly sloping in a southerly direction towards the ocean at about a one (1) percent gradient.

b. Potential Impacts and Mitigation Measures

As noted previously, minor grading work will be undertaken prior to the initiation of construction activities. All grading work will comply with applicable requirements of Chapter 20.08, Soil Erosion and Sedimentation of the Maui County Code. The proposed project will not present any significant adverse impacts on the existing topography and landform of the surrounding area.

4. Soils and Agricultural Productivity Characteristics

a. Existing Conditions

Underlying the subject property are soils from the Pulehu-Ewa-Jaucas association. See **Figure 7**. This series consist of well-drained soils on alluvial fans and stream terraces and in basins. These soils were developed in alluvium washed from basic igneous rock. The soil types specific to the subject property consist of Pulehu silt loam, 0 to 3 percent slopes (PpA), and Jaucus Sand, 0 to 15 percent slopes (JaC). See **Figure 8**.

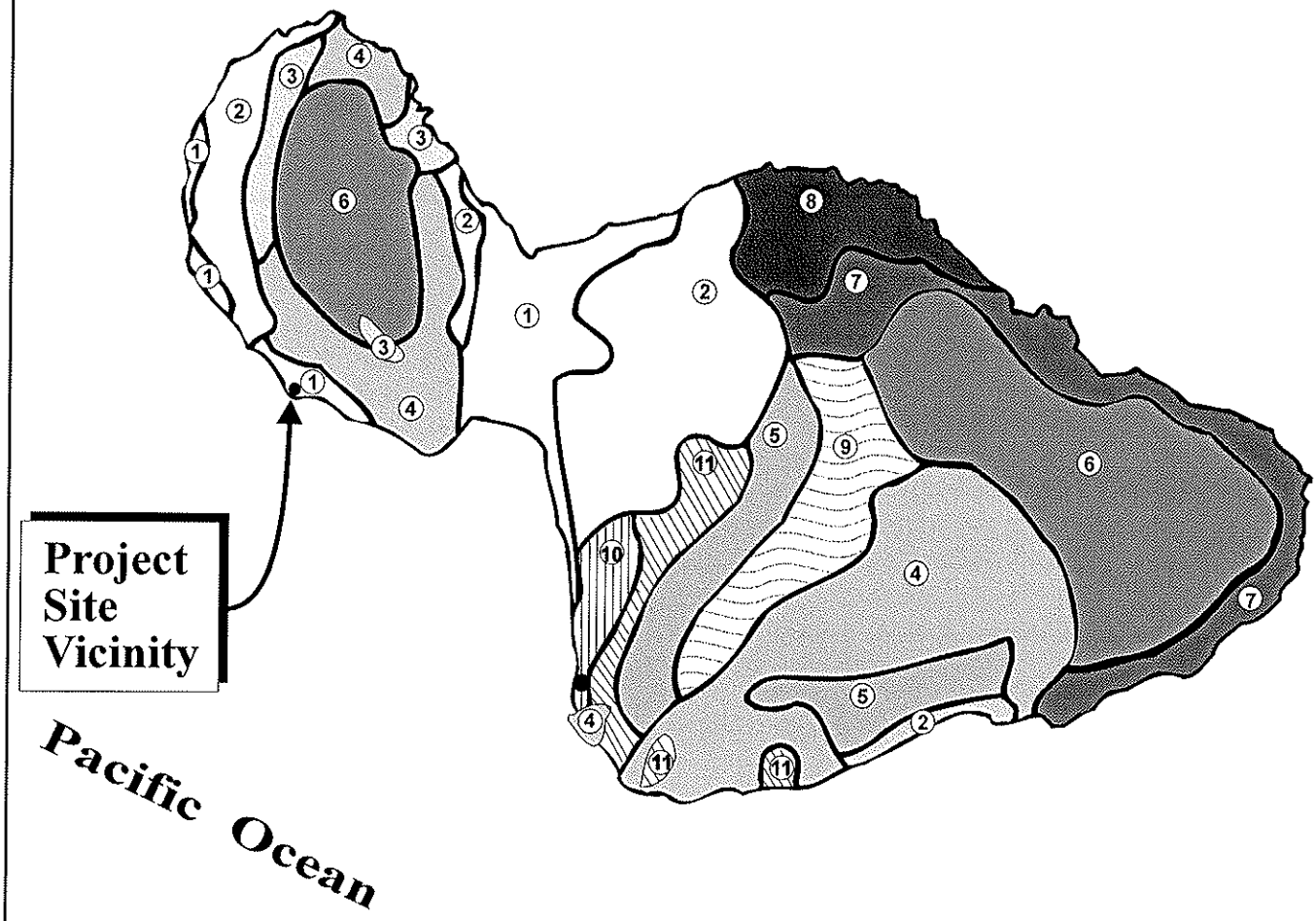
PpA is a well-drained soil commonly found on alluvial fans and stream terraces and in basins. Permeability is moderate, runoff is slow, and the erosion hazard is no more than slight.

JaC is an excessively drained, calcareous soil that occurs as narrow strips on coastal plains adjacent to the ocean. It is characterized by rapid permeability, very slow to slow runoff, slight water erosion hazard, and severe wind erosion in places where vegetation has been removed.

A portion of the subject property is designated for agricultural use by both the State Land Use Commission and the West Maui Community Plan. Lands in the Olowalu area were formerly used to support the growing of sugarcane

LEGEND

- ① Pulehu-Ewa-Jaucas association
- ② Waiakoa-Keahua-Molokai association
- ③ Honolua-Olelo association
- ④ Rock land-Rough mountainous land association
- ⑤ Puu Pa-Kula-Pane association
- ⑥ Hydrandepts-Tropaquods association
- ⑦ Hana-Makaalae-Kailua association
- ⑧ Pauwela-Haiku association
- ⑨ Laumaia-Kaipoipoi-Olinda association
- ⑩ Keawakapu-Makena association
- ⑪ Kamaole-Oanapuka association



Base Map Source: U.S.D.A., Soil Conservation Service

Figure 7 Proposed Martin Single-Family Residence

Soil Association Map

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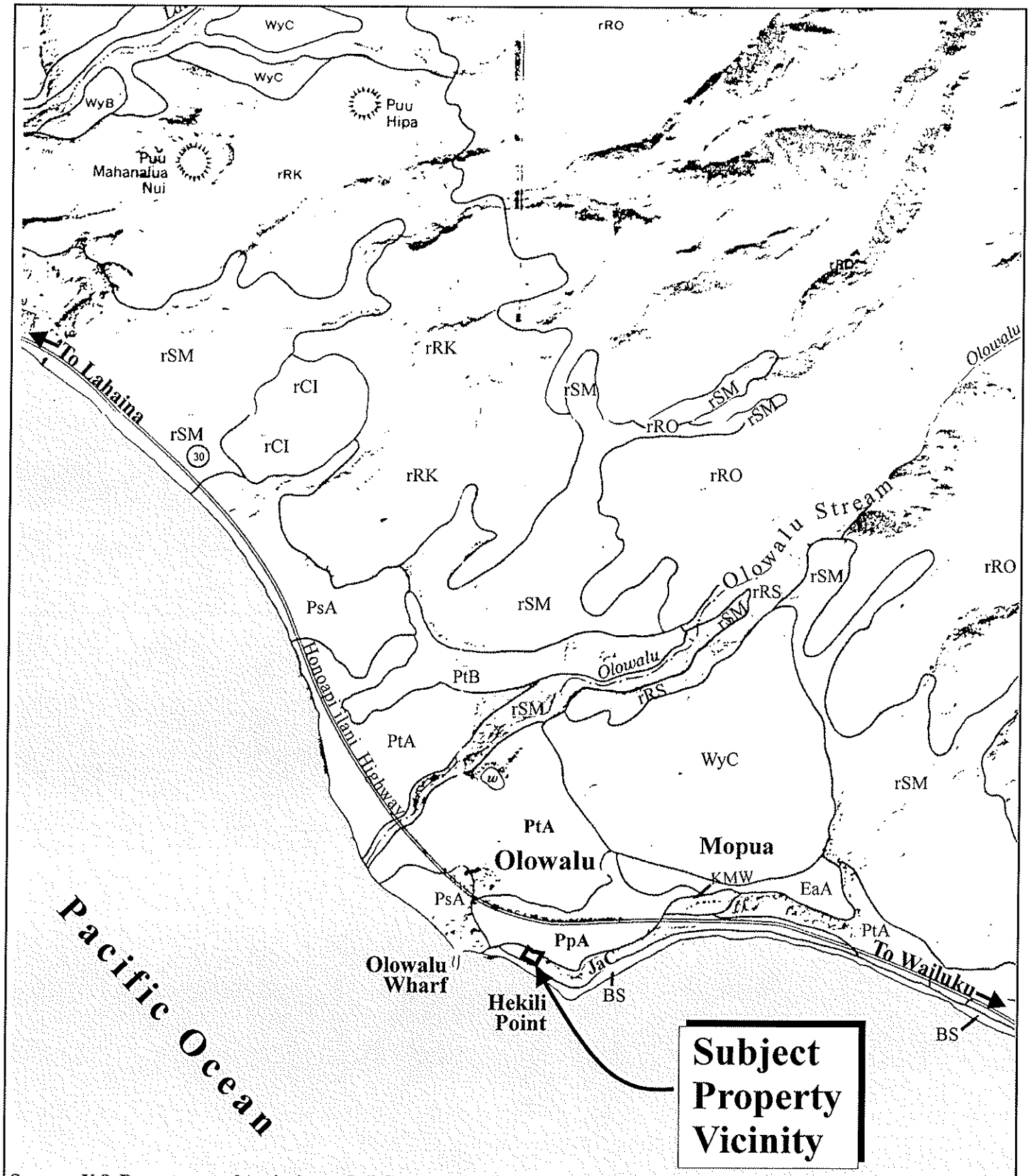
Martin\OlowaluLot46\Soils



Source: U.S. Department of Agriculture, Soil Conservation Service

Figure 8 Proposed Martin Single-Family Residence

Soil Classification Map

0 500 1000 2000 Feet

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Prepared for: Peter and Deborah Martin

Martin\OlowaluLot46\SOILCLAS

during much of the 19th and 20th centuries. At present, however, the subject property lies vacant and underutilized.

In 1977, the State Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawai`i (ALISH). The classification system is based primarily, though not exclusively, upon the soil characteristics of the lands. The three (3) classes of ALISH lands are: "Prime", "Unique", and "Other Important" agricultural lands, with all remaining lands termed "Unclassified". When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season, and moisture supply necessary to produce sustained crop yields economically. "Unique" agricultural lands possess a combination of soil quality, growing season, and moisture supply to produce sustained high yields of a specific crop. "Other Important" agricultural lands include those that have not been rated as "Prime" or "Unique".

Analysis of the ALISH map for the Olowalu area indicates that the subject property comprises of lands that have been defined as both "Prime" and "Unclassified" agricultural lands. See **Figure 9**.

The University of Hawai`i, Land Study Bureau (LSB) developed the Overall Productivity Rating, in association with the Detailed Land Classification for the Island of Maui, which classifies soils according to five (5) levels, with "A" representing the class of highest productivity soils and "E" representing the lowest. These letters are followed by numbers which further classify the soil types by conveying such information as texture, drainage, and stoniness.

The subject property is located on lands designated as "A71i" by the LSB. These lands are characterized as non-stony, well-drained lands that are well-suited for machine tillability. Lands designated "A71i" are suitable for sugarcane production and grazing.

b. <u>Potential Impacts and Mitigation Measures</u>

The scope of the proposed project is limited to the construction of a single-family residence and related improvements. The subject property (approximately 0.800 acre) represents 0.0003 percent of the roughly 245,000

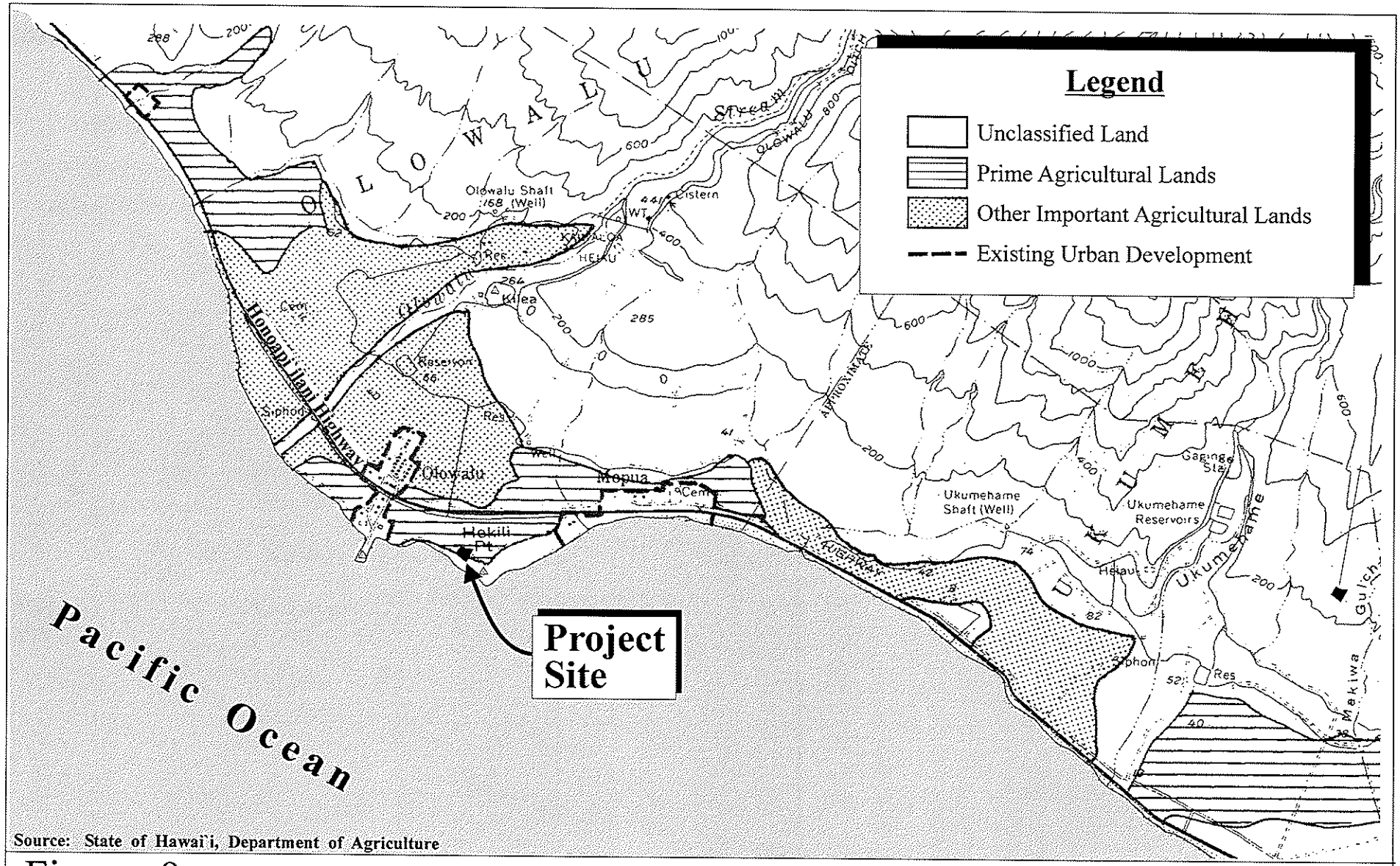

Figure 9

Proposed Martin Single-Family Residence

Agricultural Lands of Importance to the State of Hawai`i

0 1000 Feet
500 2000

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Martin\OlowaluLot46\ALISH

acres of State Agricultural district lands on the island of Maui. The proposed project is not anticipated to have a significant adverse effect on the inventory of lands available for agricultural cultivation, nor is it expected to affect the inventory of land for diversified agricultural use. Minor grading activities will be undertaken prior to the initiation of construction for the proposed project. Best Management Practices will be implemented both prior to and during grading and construction to minimize opportunities for soil erosion at the site. Upon completion of construction, landscaping will be installed which will stabilize the ground on a permanent basis. With implementation of the foregoing mitigation measures, the proposed project is not anticipated to present significant adverse impacts on soil conditions at the subject property. Moreover, the soil types found on the property do not present any limitations to the constructability of the proposed single-family residence.

5. Flood and Tsunami Hazards

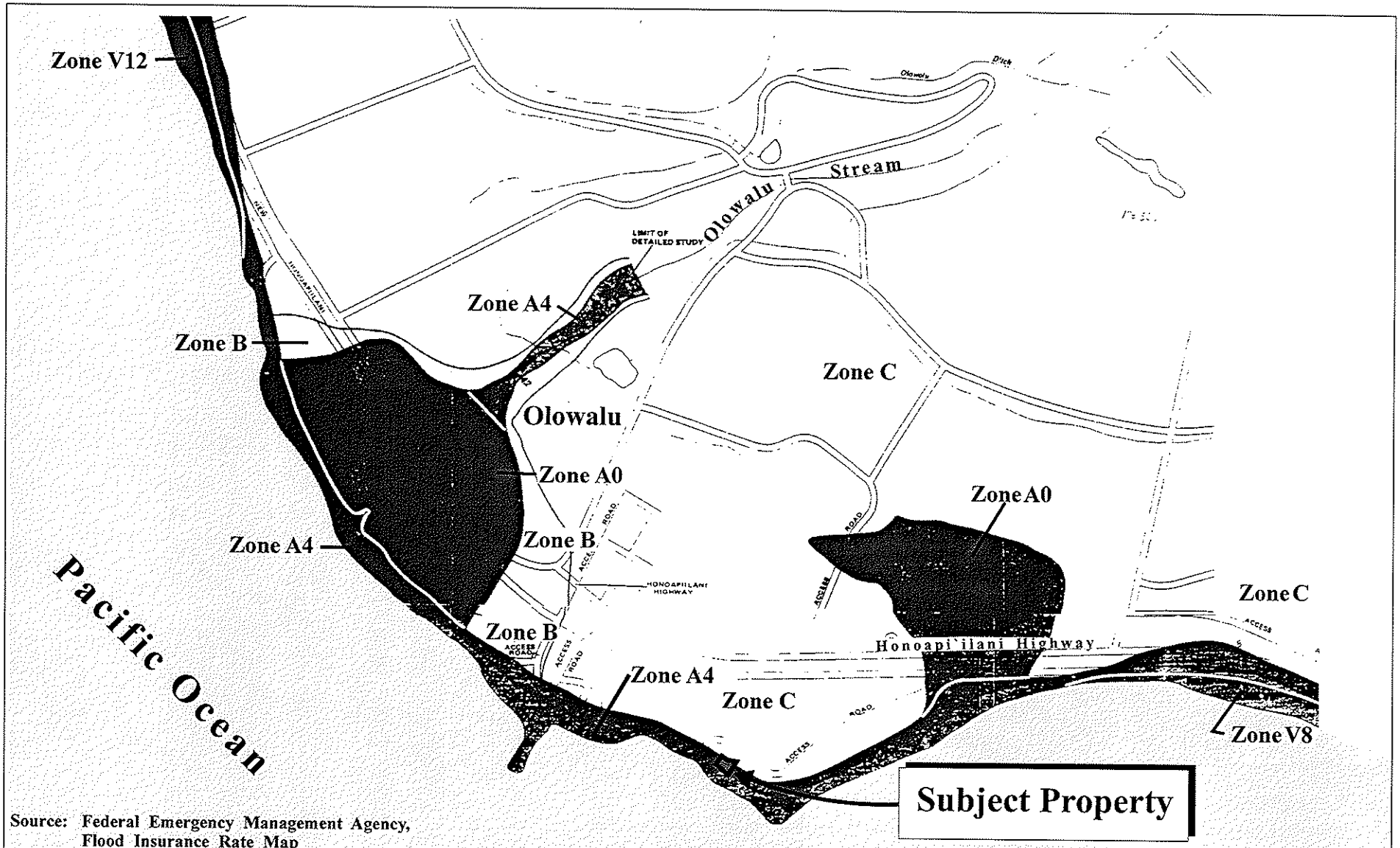
a. Existing Conditions

The subject property is principally located within Flood Zone "A4". Zone "A4" is an area of the 100-year flood with a base flood elevation of five (5) feet. The small remaining balance of the property is located in Zone "C", an area of minimal flooding. See **Figure 10**.

According to the State Civil Defense Agency maps, in the Olowalu region, the tsunami evacuation area extends from the shoreline to Honoapi`ilani Highway. The subject property is situated within a defined tsunami evacuation area.

b. Potential Impacts and Mitigation Measures

Flood Hazard Area Development Permits, as applicable, will be obtained prior to the initiation of construction activities.



Source: Federal Emergency Management Agency, Flood Insurance Rate Map

Figure 10 Proposed Martin Single-Family Residence

Flood Insurance Rate Map

NOT TO SCALE

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6. Flora and Fauna

a. Existing Conditions

A botanical survey of the Olowalu area (including the subject property) was conducted by Char & Associates (March 1999) in conjunction with a previous subdivision of the Olowalu lands by Olowalu Elua Associates LLC in 2000. Prior to 1999, between 85 to 90 percent of the surrounding Olowalu area was formerly under sugar cane cultivation, or was used to support sugar cane related activities (plantation village, manager's residence, wharf facilities, etc.). The steeper kiawe and buffelgrass-covered slopes on the higher slopes of the Olowalu area were used for grazing cattle at one time. Uncultivated areas of Olowalu are characterized by introduced species, such as kiawe, buffelgrass, 'opiuma, koa haole, and lantana, which are the dominant components of the vegetation (Char & Associates, 1999).

Of a total of 115 plant species inventoried within the Olowalu study area, 94 (82 percent) are introduced or alien species; 5 (4 percent) are originally of Polynesian introduction; and 16 (14 percent) are native. Of the natives, 13 are indigenous, that is, they are native to the Hawaiian Islands and also elsewhere, and 3 are endemic, that is, they are native only to the Hawaiian Islands. The 3 endemic species are the nehe (Lipochaeta lavarum), wiliwili (Erythrina sandwicensis), and pua kala (Argemone glauca). None of the plants inventoried on the site are threatened and endangered species or species of concern (U.S. Fish and Wildlife Service, 1997). All of the plants can be found in similar dry, lowland habitats throughout the main Hawaiian Islands. A botanical survey for the Ma'alaea to Lahaina 69 kilovolt transmission line (Char, 1993) included portions of Olowalu and recorded similar findings.

Coastal vegetation in the Olowalu area occurs as a narrow band along the seaward front of the lands between the ocean and the Honoapi`ilani Highway. Formerly cultivated sugar cane (saccharum officinarum) fields are typically located mauka of this coastal vegetation zone.

In proximity to the subject property, the beaches consist of rounded, waterworn basalt and bleached coral rubble. In places, a few pockets of grayish-colored, fine sand are found along the black and white colored cobble

beaches. The coastal vegetation on this type of substrate consists of low, scattered mats of pohuehue or beach morning glory (Ipomoea pes-caprae) with clumps of buffelgrass (Cenchrus ciliaris), a few small wind-pruned trees of kiawe (Prosopis pallida) and 'opiuma (Pithecellobium dulce), and small mixed patches of swollen fingergrass (Chloris barbata), 'uhaloa (Waltheria indica), koa haole (Leucaena leucocephala), and sourbush (Pluchea carolinensis). Where the Olowalu Stream nears the ocean to the northwest of the project site, there is a berm of basalt boulders and coral rubble. A small pond surrounded by scattered patches of Australian saltbush (Atriplex semibaccata) and a few shrubs of hau (Hibiscus tiliaceus) and sourbush are found here.

Fauna present within the Olowalu area include a host of introduced species, including the Japanese White-eye (Zosterops japonicus), Zebra-dove (Geopelia striata), spotted dove (Streptopelia chinensis), and common Myna (Acridotheres tristis). According to the U. S. Fish and Wildlife Service, the Hawaiian hoary bat (Lasiurus cinereus semotus) was also sighted near Mopua in 1989. Other mammals common to this area include rats, mice, and mongoose.

b. Potential Impacts and Mitigation Measures

There are no known habitats of rare, endangered, or threatened species of flora or fauna located within the subject property. No significant adverse impacts on flora and fauna in the area are expected to be generated through implementation of the proposed project. The applicant will utilize, where feasible and available, native Hawaiian and drought resistant species when landscaping the subject property.

7. Archaeological Resources

a. Existing Conditions

The subject property is located in the Olowalu ahupua`a. Olowalu was an important agricultural area in pre-contact times. As long as water was available, the hot climate was ideal for producing taro.

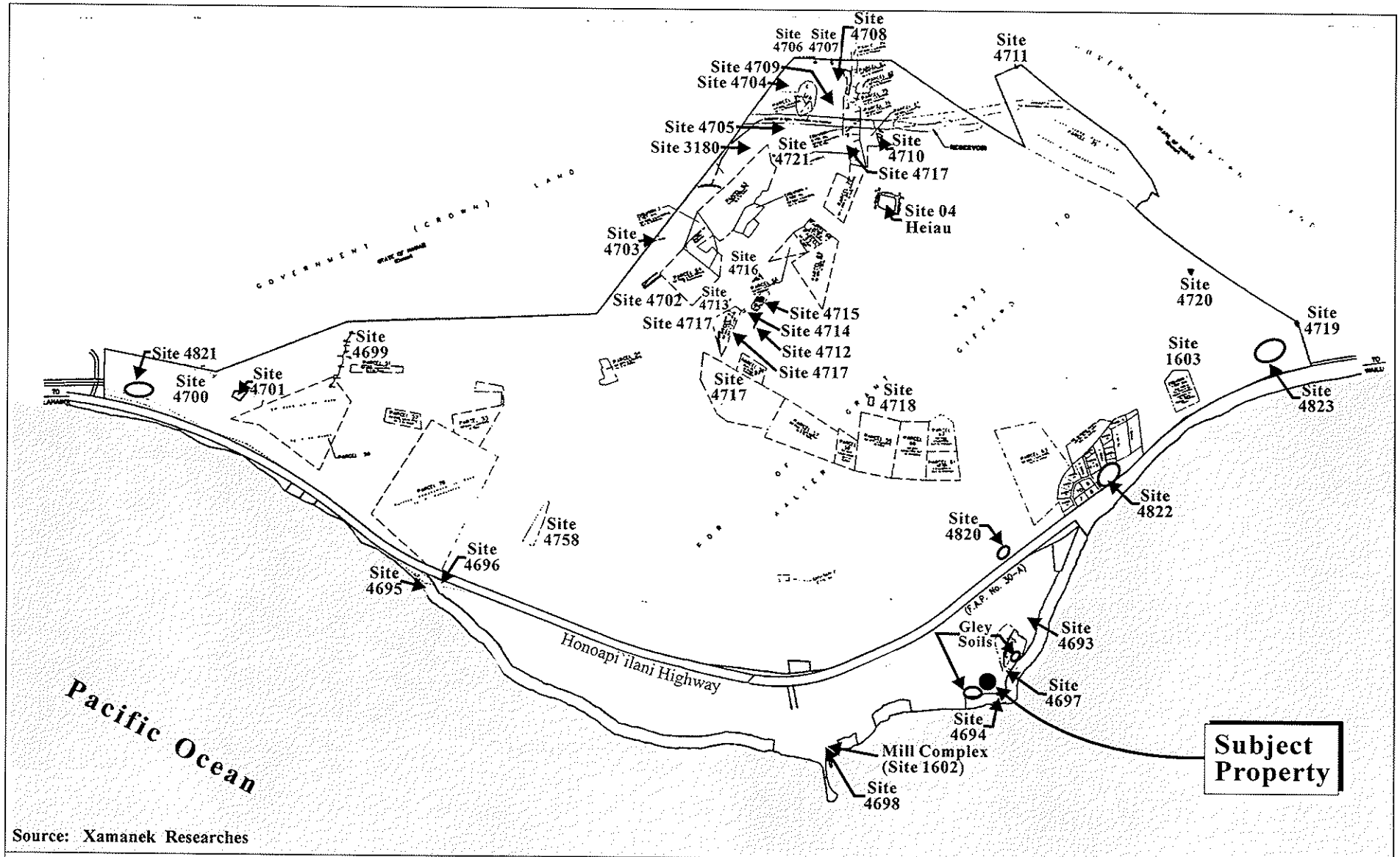
In the post-contact period, the Olowalu area was notable for the infamous Olowalu Massacre which took place in 1790. This involved a cultural misunderstanding which resulted in tragic consequences.

As foreign influence became more pervasive following the unification of the Hawaiian Islands under Kamehameha, Lahaina became the center for West Maui because of favorable conditions for sailing craft. An 1832 missionary census showed the population of Lahaina at 4,028, Olowalu at 832, and Ukumehame at 573.

Following the Great Mahele in 1848, there were 46 individual Land Commission awards granted in the ahupua'a of Olowalu. The majority are in the upper reaches of the property, along Olowalu Stream. The distribution of land awards and a review of late 1800's and early 1900's plantation maps suggest that the stream was channeled in a general, straighter north-south direction sometime after the Great Mahele. This was probably done to control flooding of agricultural fields.

The Olowalu Sugar Company is said to have been an enterprise of King Kamehameha V, who reigned from 1863 to 1872. He began the operation sometime during his reign. It was incorporated as the Olowalu Sugar Company in May 1881 and eventually was sold to Pioneer Mill Company, Ltd. in 1931. The Olowalu Mill was probably constructed in the 1870's located adjacent to the wharf. A two-foot gauge railroad was built parallel to the old government road. The plantation manager's house, located approximately 100 meters to the northwest of the Mill, was built around 1920. There are also three (3) other houses between the Mill and the highway, which may have been built around the same time.

Archaeological inventory surveys of Olowalu lands on both the mauka and makai (including the subject property) sides of Honoapi`ilani Highway were conducted by Xamanek Researches in 1999 and 2000. The archaeological reports were included in the environmental assessment for the Olowalu Makai Subdivision, published in May 2000. A copy of the archaeological inventory survey report for the makai area is incorporated herein for reference purpose. See **Appendix "D"**. A map identifying the significant archaeological sites in the Olowalu area is presented in **Figure 11**. The



Source: Xamanek Researches

Figure 11

Proposed Martin Single-Family Residence
Location of Archaeological Sites

NOT TO SCALE

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survey did not identify any significant surface or subsurface archaeological resources within the boundaries of the subject property.

The archaeological inventory survey reports for the mauka and makai areas were approved by the State Historic Preservation Division (SHPD) on February 25, 2000 and April 12, 2000, respectively. The Archaeological Mitigation and Preservation Plan was approved by SHPD on June 4, 2001. Refer to **Appendix "D-1"**.

b. Potential Impacts and Mitigation Measures

There have been no surface or subsurface archaeological resources identified within the subject property. As such, it is anticipated that the proposed project will not impact any historic resources. In accordance with Section 6E-43.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR) and the Office of Hawaiian Affairs (OHA) will be contacted.

8. Cultural Assessment

a. Existing Conditions

The project site is located within the Olowalu Ahupua`a in the Lahaina District of the island of Maui. The Olowalu area is perhaps best known for its fertile agricultural areas which encompass the largely agricultural landscape. Along the coast, fishing, diving, and shoreline gathering activities supplemented agricultural cultivation and provided additional resources to the inhabitants of the ahupua`a. Many of the fishing, diving, and shoreline gathering activities still occur in the present day.

During pre-contact times, there were primarily two (2) types of agriculture in the ahupua`a: wetland and dryland. Both types of agriculture were dependent largely on geography and access to a sustainable water source. Olowalu, located downstream of a river valley, contained ideal conditions for wetland kalo (taro) cultivation, which incorporated pond fields and irrigation

canals. In areas where water was not as abundant, sugar cane, banana, and sweet potato were grown. Agriculture in this area of the island was believed to have started early in the Expansion Period (1200-1400 A.D.).

In modern times, the agrarian society of Olowalu continued with the advent of large-scale sugar cane cultivation. Although organized sugar production commenced on Maui in the early 1800's, such sugar production in West Maui did not occur until years later. A map of Olowalu Sugar Plantation in 1881 showed the expanding presence of sugar in the West Maui area. Lands in Olowalu eventually became a part of the former Pioneer Mill lands until the 1990's. Upon the closure of Pioneer Mill in the 1990's, much of the former sugar lands, including the project site, have laid fallow.

b. Potential Impacts and Mitigation Measures

A Cultural Impact Assessment was completed for the project site in January 2008 by Scientific Consultant Services, Inc. See **Appendix "E"**. The assessment report was based on a variety of sources, including agency consultation, resident interviews, and archival research. Some of the entities consulted include the Office of Hawaiian Affairs, Cultural Resource Coordinator, Maui; the Office of Hawaiian Affairs, Oahu; the Maui Planning Department, Cultural Resources Planner; the Central Maui Civic Club; and the State Historic Preservation Division, Cultural Historian. These entities did not note any significant cultural resources which would be impacted by the proposed project.

Informant interviews were conducted with Wally Fujii, Addie Rodrigues, and Hinano Rodrigues, who are long-time residents of the Olowalu area. These informants noted that the vicinity is known for shoreline fishing, net fishing, spear diving, lamalama (torch fishing), and shoreline gathering activities. Local residents have been utilizing these ocean resources as food sources over many generations. They noted that shoreline access for these activities is culturally important and should be maintained. Outside of these ocean activities, the informants did not know of any cultural activities which have occurred or do occur in the vicinity of the project site.

Further, archival review of the project site and surrounding vicinity did not indicate adverse cultural impacts arising from the proposed action.

According to government land records, the subject property was used as a house lot at least until 1881, after which it became a part of the Olowalu Sugar Plantation and eventually Pioneer Mill sugar lands until the 1990's.

The subject property is not considered to be a shoreline property and is not currently used as a public beach access route. Public beach access is accommodated through a government beach reserve from the south and via the Olowalu Landing from the west. As a result, the subject project will not impact coastal zone access and recreational opportunities. Access to the existing strip of land along the shoreline fronting the property will remain unaffected by the subject project. Based on the foregoing, cultural practices and resources are not anticipated to be adversely impacted by the proposed project.

9. Air Quality

a. Existing Conditions

There are no point sources of airborne emissions within close proximity of the subject property. Smoke and dust from sugar cane harvesting and cultivation operations formerly caused an intermittent impact to the region's air quality. However, since Pioneer Mill Company, Inc. ceased its sugar growing operations, this temporary air quality impact also ceased.

Although minimal, airborne pollutants are largely attributable to vehicular exhaust from traffic along the region's roadways, as well as dust from unplanted or recently plowed fields. However, sources are intermittent and prevailing winds quickly disperse particulates generated by these temporary sources.

b. Potential Impacts and Mitigation Measures

The scope of the proposed project is limited to construction of a single-family residence. As such, there are no anticipated air quality impacts associated with the proposed project.

There may be a temporary impact on air quality attributable to construction activities associated with the proposed single-family residence. These would,

however, be limited, given the small size and scope of the development. Best Management Practices (BMPs), such as dust control measures, including regular watering and sprinkling, will be implemented to mitigate impacts associated with construction activities.

10. Noise

a. Existing Conditions

Traffic noise from vehicles traveling along Honoapi`ilani Highway is the primary source of intermittent noise at the subject property. Ambient noise conditions are generally attributable to natural conditions such as ocean waves, wind, and rain.

b. Potential Impacts and Mitigation Measures

There are no long-term impacts to ambient noise levels associated with the proposed project. Similar to air quality, ambient noise conditions may be temporarily impacted by construction activities. Heavy construction equipment, such as bulldozers, front-end loaders, and material transport vehicles, will likely be the dominant sources of noise during the construction period.

11. Scenic and Open Space Resources

a. Existing Conditions

The shoreline in the vicinity of the subject property offers views and vistas of the Pacific Ocean, as well as the islands of Lana`i and Kahoolawe. The Kihei-Makena coastline and the islet of Molokini are also visible from this locale. The subject property is separated from the shoreline by an existing, private strip of coastal land. Refer to **Figure 2**. The width of the coastal land varies with shoreline accretion and erosion, but generally is approximately 70 feet in width. View planes of the Pacific Ocean from the subject property are currently blocked by the vegetation that exists within the private coastal land. The West Maui Mountains and Olowalu Valley can be seen to the northeast of the subject property.

b. Potential Impacts and Mitigation Measures

The proposed project, limited in scope to a single-story, single-family residence, is not anticipated to affect the long-term aesthetic and visual character of the surrounding Olowalu area. Given the existing vegetative cover characteristics of the area mauka of the subject property, it is anticipated that the proposed single-family structure will not affect views from Honoapi`ilani Highway.

12. Shoreline Access

a. Existing Conditions

The subject property is not considered to be a shoreline property. As mentioned, a private strip of land is located between the property and the ocean. The shoreline along the strip of land consists of rounded, waterworn basalt, and bleaded coral rubble. Lateral shoreline access opportunities to the coastline are available along the shoreline area on the makai side of the subject property. Access to the beach area is available through both the eastern and western ends where the beach area meets a government beach reserve, and through the access to the Olowalu Landing to the west of the subject property.

b. Potential Impacts and Mitigation Measures

The proposed project, involving construction of a single-story, single-family residence on Lot 46-A of the Olowalu Makai-Hikina Subdivision, will not impact access and recreational opportunities which exist along the coastline.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Population

a. Existing Conditions

The resident population of the West Maui Community Plan region has demonstrated a substantial increase over the last two decades. Population gains were especially evident in the 1970's as the rapidly developing visitor industry attracted many new residents. The population of the Lahaina District

increased from 14,574 in 1990 to 17,967 in 2000. Projections of the resident population in the Lahaina District for the years 2010, 2020, and 2030 are 21,577, 25,096, and 28,903, respectively (County of Maui, June 2006).

Growth at the County level exhibits a similar pattern. The County's resident population increased from 101,709 in 1990 to 128,968 in 2000. Projections for the resident County population in 2010, 2020, and 2030 are 151,300, 174,450, and 199,550, respectively (County of Maui, June 2006).

b. Potential Impacts and Mitigation Measures

The proposed project will not have an adverse impact upon population parameters.

2. Economy

a. Existing Conditions

The economy of Maui is heavily dependent upon the visitor industry. The dependency on the visitor industry is especially evident in West Maui, which is one of the State's major resort destination areas. The Ka`anapali Resort includes a number of hotels, including the Maui Marriott Resort (720 rooms), Hyatt Regency Maui (816 rooms), the Westin Maui (761 rooms), and the Sheraton Maui (510 rooms). In addition, the development of the North Beach Subdivision comprises over 1,600 visitor accommodation units to the north of the Ka`anapali Resort.

West Maui's visitor orientation is reflected in the character of Lahaina town, which serves as a center for visitor-related retail outlets, as well as visitor-related activities.

In terms of the agriculture industry, Pioneer Mill Company, Inc. ceased sugar cane cultivation on its lands in 1999. Of its 6,700 acres, approximately 500 acres are currently utilized for the growing of coffee. Other crops, such as seed corn, are being planned. Additionally, Maui Land and Pineapple Company's pineapple fields in the Honolua region are an important component of the region's agricultural base.

b. Potential Impacts and Mitigation Measures

The proposed project, in the short term, will provide tangible economic benefits to the West Maui region in the form of construction employment. On a long-term basis, benefits will accrue through the generation of real property tax revenues.

C. PUBLIC SERVICES

1. Solid Waste Disposal

a. Existing Conditions

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by County crews is disposed at the County's Central Maui Landfill, located four miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies.

To facilitate solid waste collection services for the West Maui region, a refuse transfer station has been established at the former County Olowalu Landfill site which is located to the north of the subject property.

b. Potential Impacts and Mitigation Measures

All solid waste generated by the proposed project will be disposed of at the Central Maui Landfill in Puunene by County collection crews or a private refuse collection company, as applicable.

2. Medical Facilities

a. Existing Conditions

The only major medical facility on the island is Maui Memorial Medical Center, located approximately 16 miles from Olowalu, midway between Wailuku and Kahului. The 231-bed facility provides general, acute, and emergency care services.

Regular hours are offered by private medical practices in Lahaina, which include the Maui Medical Group, Lahaina Physicians, West Maui Healthcare Center, and Kaiser Permanente Lahaina Clinic.

b. Potential Impacts and Mitigation Measures

Medical services will not be adversely impacted by the proposed project. The project will not extend existing service area limits.

3. Police and Fire Protection

a. Existing Conditions

The subject property is within the Lahaina Police Station service area, which services all of the Lahaina district. The Lahaina Station is located in the Lahaina Civic Center complex at Wahikuli, approximately 7.5 miles from the subject property.

Fire prevention, suppression, and protection services for the Lahaina District are provided by the Lahaina Fire Station, also located in the Lahaina Civic Center, and the Napili Fire Station, located in Napili. The Lahaina Fire Station includes an engine and a ladder company. The Napili Fire Station consists of an engine company.

b. Potential Impacts and Mitigation Measures

Police and fire protection services will not be adversely impacted by the proposed project. The project will not extend existing service area limits for the Police Department and the Department of Fire and Public Safety.

4. Educational Facilities

a. Existing Conditions

The West Maui area is served by four public schools operated by the State of Hawai`i, Department of Education: Lahainaluna High School, Lahaina Intermediate School, King Kamehameha III Elementary School, and Princess Nahi`ena`ena Elementary School. All of the public schools are located within the Lahaina town area.

b. **Potential Impacts and Mitigation Measures**

The subject project will not adversely affect educational services and facilities.

5. **Recreational Facilities**

a. **Existing Conditions**

West Maui is served by numerous recreational facilities offering diverse opportunities for the region's residents. There are seventeen (17) County parks and three (3) State beach parks in West Maui. Approximately one-third of the County parks are situated along the shoreline.

In addition, Ka`anapali and Kapalua Resorts operate world-class golf courses which are available for public use.

The governmental beach reserve, which runs south of the subject property, provides public access to the recreational opportunities (including swimming, fishing, snorkeling, and diving) available along the Olowalu shoreline.

b. **Potential Impacts and Mitigation Measures**

The subject project will not adversely affect recreational services and facilities. Public access opportunities to the beach area in the vicinity of the subject property will remain unaffected with implementation of the proposed project.

D. INFRASTRUCTURE

1. **Roadways**

a. **Existing Conditions**

The only major roadway facility providing vehicular access to and from the Olowalu area is Honoapi'ilani Highway, a State-owned and maintained highway linking West Maui with the central valley of the island. This highway through Olowalu primarily serves as access for vehicles traveling to and from the Lahaina, Ka`anapali, and Kapalua resort areas. Access to the

highway is provided at the Olowalu General Store intersection via a 50-foot wide State-owned right-of-way and an access road across Lot 84-A of the subdivision which connects to the Camp Olowalu access road. Refer to **Figure 2**.

In the vicinity of the subject property, Honoapi`ilani Highway is a two-lane rural highway generally aligned in an east to west direction following the coastline. The highway has a posted speed limit of 35 miles per hour (mph) in the vicinity of the subject property and increases to 45 mph outside of this area. The highway has 12-foot-wide lanes with paved shoulders varying in widths from about 6 to 10 feet.

Further along Honoapi`ilani Highway at the Olowalu General Store and Chez Paul Restaurant intersection, storage lanes are provided for various turning movements. The Olowalu General Store serves as a convenience stop. During the weekdays, Olowalu General Store is open from 6:00 a.m. to 6:30 p.m. The Chez Paul restaurant serves only dinner and is open on a daily basis from 6:30 p.m.

A former cane haul road runs along the mauka (inland) side of the highway. This cane haul road is generally routed near the highway but diverts inland behind the Olowalu General Store and Chez Paul Restaurant area. The cane haul road formerly served as an access road for the Pioneer Mill property/cane land. Several private homes are located mauka of the store, access to which is provided by an unpaved road (Olowalu Village Road) that extends mauka from the cane haul road.

b. <u>Potential Impacts and Mitigation Measures</u>

As the scope of the proposed project is limited to a single-family residence, there are no significant impacts expected to traffic flow conditions along Honoapi`ilani Highway in the vicinity of the access road.

2. Water

a. Existing Conditions

The County of Maui Department of Water Supply presently does not service the Olowalu area. Water supply for the limited number of residential and commercial uses (including the subject property) in the Olowalu area is provided by Olowalu Water Company, LLC (OWC). OWC is a public water system (ID# 209) and provides both potable and non-potable irrigation water for residents and agricultural users within the 700-acre region known as Olowalu. The OWC received a Certificate of Public Convenience and Necessity (CPCN) from the State of Hawai'i Public Utilities Commission to provide potable water service in August 2000. In November 2003, the OWC amended the CPCN to add the sales of irrigation water.

b. Potential Impacts and Mitigation Measures

A Preliminary Engineering and Drainage Report has been prepared for the project by R. T. Tanaka Engineers, Inc. See **Appendix "F"**. There is no County water system in the vicinity of the subject property. As such, water requirements for the proposed single-family residence will be provided by a private water system in the area owned and operated by Olowalu Water Company, LLC. The applicant anticipates using 1,000 gallons per day (gpd) in domestic water usage (200 gpd drinking and 800 gpd non-drinking). Due to the scope of the project, only minimal additional demand on the existing privately owned groundwater supply system is anticipated to result from the proposed project.

3. Wastewater

a. Existing Conditions

There are no County operated wastewater disposal facilities in the Olowalu area, including the subject property. Individual wastewater disposal needs in the Olowalu area are currently addressed either by cesspools, septic tanks, or individual wastewater treatment systems.

b. Potential Impacts and Mitigation Measures

An individual wastewater treatment system will be installed to handle the wastewater treatment requirements for the proposed single-family residence. The individual wastewater treatment system, consisting of a septic tank and onsite leaching field, will be designed to comply with all applicable Federal Environmental Protection Agency (EPA) and State Department of Health requirements. As such, there will be no impacts to County-owned wastewater facilities resulting from the proposed project.

Based on the Department of Health guidelines, the proposed three (3) bedroom residence must have a septic tank of at least 900 gallons capacity. The absorption area (leaching field) is based upon a flow of 200 gallons per bedroom per day and depends on the percolation rate (minutes per one inch) of the existing soil. Hence, the soil percolation rate must be determined before completion of the design of the individual wastewater system.

4. Drainage

a. Existing Conditions

Other than existing culverts which convey drainage beneath Honoapi`ilani Highway, the Olowalu area contains no other drainage improvements. Runoff generally sheet flows from the northeast to the southwest collecting in various swales and gullies. The Olowalu area, including the subject property, contains no engineered drainage systems.

b. Potential Impacts and Mitigation Measures

Drainage from the subject property currently flows in a southerly direction towards the ocean. Existing rates of surface run-off are expected to increase under "with-project" conditions due to increases in the amount of impervious surfaces on the subject property, such as concrete slabs and pavement. Implementation of the proposed project is expected to increase the 10-year storm run-off rate and 50-year run-off volume from 0.9 cfs to 1.7 cfs (a 0.8 cfs increase) and 2,143 cf to 2,928 cf (a 785 cf increase), respectively.

To accommodate the increase in surface run-off, a subsurface drainage system is proposed which will consist of two (2) open-cut grassed lined basins or subsurface perforated pipes with rock envelope, depending on available space. The drainage basin will mitigate one hundred percent of the projected increase in surface run-off resulting from the proposed project attributed to a 50-year, 1 hour storm. As such, the proposed project is not anticipated to present any significant drainage-related impacts on adjacent or downstream properties in the vicinity of the subject property. Furthermore, a Best Management Practices (BMPs) program will be implemented both prior to and during construction to prevent drainage flows from entering the ocean.

5. Electrical, Telephone, and CATV Considerations

a. Existing Conditions

Electrical power and telephone service are provided to the Olowalu area by Maui Electric Company, Ltd. (MECO) and Hawaiian Telcom, respectively, via overhead lines along Honoapi`ilani Highway. MECO's 69 kilovolt overhead transmission lines from the Ma`alaea Generator Station to the Lahaina-Kapalua area extend along lands mauka of Honoapi`ilani Highway. Oceanic Time Warner does not currently provide cable service to the Olowalu area, including the subject property.

b. Potential Impacts and Mitigation Measures

Coordination with MECO and Hawaiian Telcom will be undertaken during the engineering plans preparation phase of work to ensure all electrical and telephone service requirements for the proposed project are adequately addressed. Electrical and telephone distribution systems may be extended to serve the proposed project. Aside from the likely slight extension of distribution system, no impact to electrical, telephone, and cable systems is anticipated to result from the proposed project.

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICTS

Chapter 205, Hawai`i Revised Statutes, relating to the Land Use Commission, establishes four (4) major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural", and "Conservation". The subject property encompasses lands classified as both "Agricultural" and "Conservation". See **Figure 12**. Specifically, the subject parcel is largely situated in the "Conservation" District, including the entire footprint of the single-family residence. Refer to **Figure 4**.

Lands within the State Conservation District are under the jurisdiction of the Department of Land and Natural Resources. Title 13, Hawai`i Administrative Rules (HAR), establishes rules and procedures which regulate land use in the Conservation District. Title 13 also establishes subzones within the Conservation District. These subzones are designated "Protective" (P), "Limited" (L), "Resource" (R), "General" (G), and "Special" (S). The project is located on lands designated in the "Limited" subzone of the Conservation District.

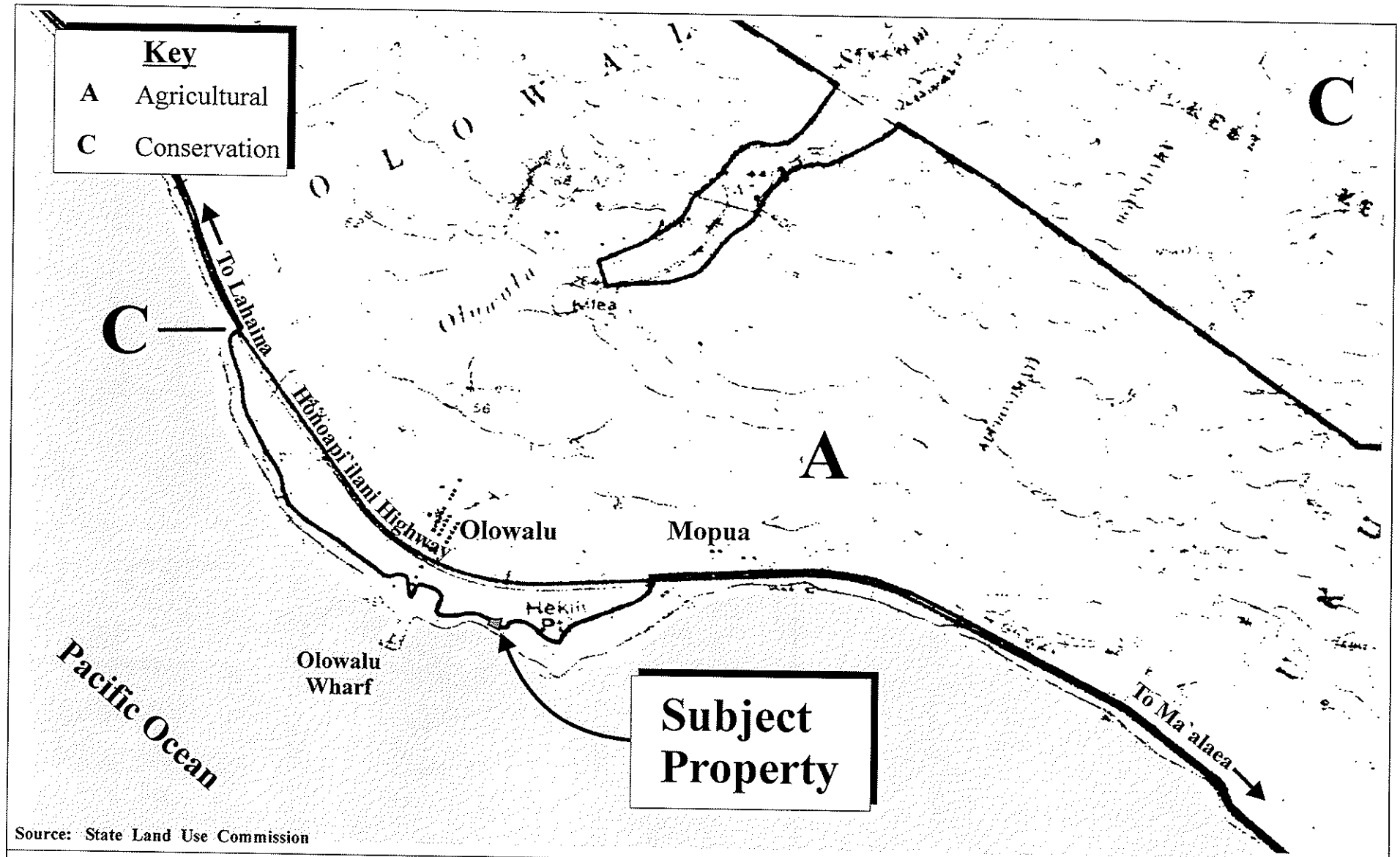
B. CONSERVATION DISTRICT USE ANALYSIS

The subject project, which is an identified use within the "Limited" subzone of the Conservation District, requires a Conservation District Use Permit from the Board of Land and Natural Resources (BLNR). Accordingly, a Conservation District Use Application (CDUA) for the project will be prepared in accordance with HAR, Title 13.

Thus, with regard to the subject property's consistency with the purposes of the Conservation District, the following criteria are addressed below.

1. The proposed land use is consistent with the purpose of the Conservation District:

The proposed project is consistent with the purposes of the Conservation District. The subject property is not located near a watershed area and will not, therefore,



Source: State Land Use Commission

Figure 12

Proposed Martin Single-Family Residence

State Land Use Designations

NOT TO SCALE

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impact watersheds or water sources. Coastal access, areas of shoreline recreational value, and scenic resources will be preserved via an existing, private strip of coastal land. In addition, drainage and erosion control measures will be implemented to minimize impacts to adjacent and downstream properties.

2. **The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur:**

The proposed project is the development of a single-story, single-family home within the "Limited" subzone of the Conservation District. A single-family residence is a permissible use within the "Limited" subzone of the Conservation District. Further, the subject property is located in a floodplain and will conform to applicable County and State regulations regarding the National Flood Insurance Program, which are requirements for the development of a single-family residence in the "Limited" subzone. As a result, the proposed land use is consistent with the objectives of the "Limited" subzone.

3. **The proposed land use complies with provisions and guidelines contained in Chapter 205A, HRS, entitled "Coastal Zone Management", where applicable:**

The subject project complies with provisions and guidelines in Chapter 205A, HRS. An application for a Special Management Area (SMA) assessment review for the subject project will be prepared and submitted to the County of Maui, Department of Planning for processing. Issuance of SMA approval for the project is anticipated to occur at least 45 days prior to the 180-day expiration deadline on the CDUA.

4. **The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area:**

As mentioned, the subject property is not located near watersheds or water sources and is not anticipated to impact such features in the area. Best Management Practices, such as drainage and erosion control measures, will be implemented to ensure that potential adverse impacts to existing natural resources in the area are appropriately mitigated. Consequently, the proposed land use is not anticipated to cause substantial adverse impact to local natural resources within the surrounding area, community, or region.

5. **The proposed land use, including buildings, structures, and facilities shall be compatible with the locality and surrounding areas, appropriate to physical conditions and capabilities of the specific parcel or parcels:**

The single-family residence will be developed to be compatible with the rural, plantation-based theme of the Olowalu Makai-Hikina Subdivision. A single, single-family, single-story residential dwelling will be constructed to blend in with the existing pastoral landscape. As required, the dwelling will be designed to conform to the provisions of the National Flood Insurance Program to minimize flood-related impacts.

6. **The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable:**

The subject property borders a 70-foot wide private coastal strip of land which maintains access to the coastline. The proposed project will be professionally landscaped to blend in with the existing rustic nature of the area. As a result, physical and environmental aspects of the land will be preserved.

7. **Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District:**

The subject project does not involve the subdivision of land nor do the applicants intend on subdividing the parcel in the future.

8. **The proposed land use will not be materially detrimental to public health, safety, and welfare:**

No impacts to public health, safety, and welfare are anticipated to result from the proposed project. Best Management Practices will be utilized to ensure that potential impacts to neighboring properties are appropriately mitigated.

C. 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 general plan shall indicate desired population and physical development patterns for each island and region within the county; shall*

address the unique problems and needs of each island and region; shall explain the opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns, and characteristics of future developments".

The subject project is in keeping with the following General Plan objectives and policies:

Objective (Land Use):

To use the land within the County for the social and economic benefit of all the County's residents.

Policy

- Encourage land use methods that will provide a continuous balanced inventory of housing types in all price ranges.

Objective (Environment)

To preserve and protect the County's unique and fragile environmental resources.

Policies

- Preserve for present and future generations the opportunity to experience the natural beauty of the islands.
- Preserve scenic vistas and natural features.
- To use the County's land-based physical and ocean-related coastal resources in a manner consistent with sound environmental planning practice.
- Evaluate all land based development relative to its impact on the County's land and ocean ecological resources.

Objective (Housing and Urban Design)

To provide a choice of attractive, sanitary, and affordable homes for all our residents.

Policy

- Encourage the construction of housing in a variety of price ranges and geographic locations.

Objective (Urban Design)

To see that all developments are well designed and are in harmony with their surroundings.

Policy

- Require that appropriate principles of urban design be observed in the planning of all new developments.

Objective (Water)

To provide an adequate supply of potable and irrigation water to meet the needs of Maui County's residents.

Policies

- To make more efficient use of our ground, surface, and recycled water sources.

- Promote water conservation practices to make the most efficient use of existing water sources.

Objective (Energy)

To make Maui County more self-sufficient in its need for non-renewable energy and more efficient in its use of energy.

Policy

- Encourage the incorporation of energy-saving building design concepts and devices in all new private and public developments by providing energy efficient urban design guidelines and amendments to the Maui County Uniform Building Code.

Peter and Deborah Martin are pursuing the proposed project to be able to enjoy the natural beauty of the coastal area of Olowalu. The residence will be constructed so as to minimize impacts to surrounding properties through architecturally sound design to ensure that the structure is in harmony with its surroundings. Further, the use of appropriate Best Management Practices (BMPs), such as landscaping to reduce soil erosion, will also serve to curb other impacts to neighboring properties. Therefore, the proposed project is in conformance with the Maui County General Plan.

D. WEST MAUI COMMUNITY PLAN

Within Maui County, there are nine (9) Community Plan regions. From a General Plan implementation standpoint, each region is governed by a Community Plan which sets forth desired land use patterns, as well as goals, objectives, policies, and implementing actions for a number of functional areas including infrastructure-related parameters. The subject property is located within the West Maui Community Plan region.

The subject property is located within the West Maui Community Plan region and is currently designated "Agricultural", "Open Space", and "Park". See **Figure 13**.

Applicable goals, objectives, and policies of the West Maui Community Plan with regard to the proposed project are cited below.

Land Use

Goal

An attractive, well-planned community with a mixture of compatible land uses in appropriate areas to accommodate the future needs of residents and visitors in a manner that provides for the stable social and economic well-being of residents and the preservation and enhancement of the region's open space areas and natural environmental resources.

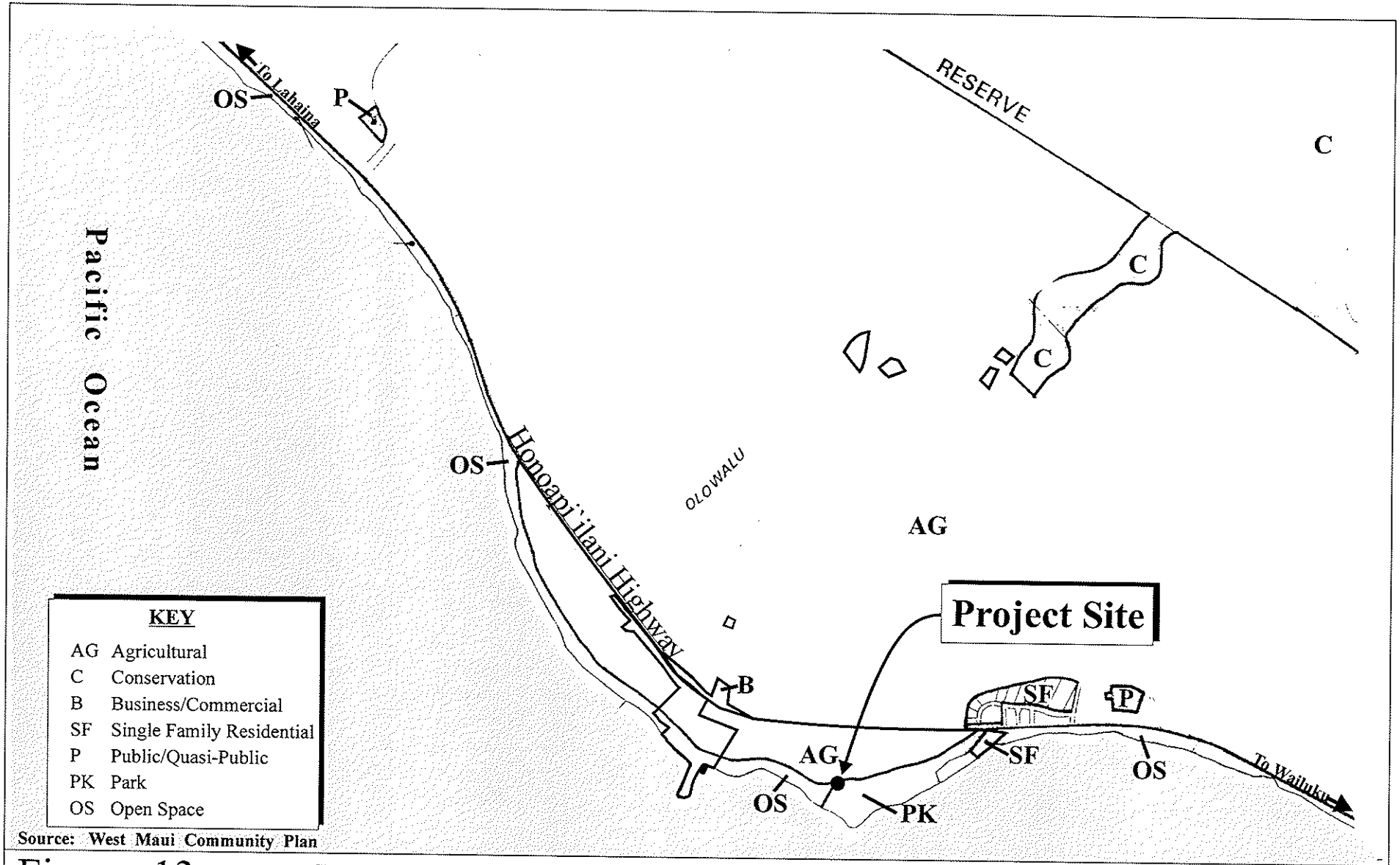
Objectives and Policies for the West Maui Region in General

- Protect and enhance the quality of the marine environment.
- Preserve and enhance the mountain and coastal scenic vistas and the open space areas of the region.

Environment

Goal

A clean and attractive physical, natural, and marine environment in which man-made developments on or alterations to the natural and marine environment are based on sound environmental and ecological practices, and important scenic and open space resources are



Source: West Maui Community Plan

Figure 13 Proposed Martin Single-Family Residence

West Maui Community Plan Map

NOT TO SCALE

Prepared for: Peter and Deborah Martin

MUNEKIYO & HIRAGA, INC.

Martin\OlowaluLot46\CPLUD

preserved and protected for public use and enjoyment.

Objectives and Policies

- Protect all waters and wetland resources. Such resources provide open space and habitat for plant and animal life in the aquatic environment. They are also important for flood control and natural landscape.

- Preserve agricultural lands and open space with particular emphasis on natural coastal areas along major highways.

- Protect the quality of nearshore and offshore waters. Monitor outfall systems, streams and drainage ways and maintain water quality standards. Continue to investigate, and implement appropriate measures to mitigate, excessive growth and proliferation of algae in nearshore and offshore waters.

- Encourage soil erosion prevention measures and the installation of siltation basins to minimize downstream sedimentation and degradation of nearshore and offshore water quality.

- Promote the planting of trees and other landscape planting to enhance streetscapes and the built environment.

- Promote drainage and stormwater management practices that prevent flooding and protect coastal water quality.

Cultural Resources

Goal

To preserve, protect, and restore those cultural resources and sites that best represent and exemplify the Lahaina region's pre-contact, Hawaiian Monarchy, missionary, and plantation history.

Objectives and Policies

- Preserve and protect significant archaeological, historical, and cultural resources that are unique in the State of Hawai`i and Island of Maui.

- Ensure that new projects or developments address potential impacts on archaeological, historical, and cultural resources and identify all cultural resources located within the project area as part of initial project studies. Further require that all proposed activity adequately mitigate potential adverse impacts on cultural resources.

- Ensure that site identification and interpretation is not damaging to any historical or archaeological sites.

Housing

Goal

A sufficient supply and choice of attractive, sanitary, and affordable housing accommodations for a broad cross section of residents.

Objective and Policy

- Promote efficient housing designs in order to reduce residential home energy consumption.

Urban Design

Goal

An attractive and functionally integrated urban environment that enhances neighborhood character, promotes quality design at the resort destinations of Ka`anapali and Kapalua, defines a unified landscape planting and beautification theme along major public roads and highways, watercourses, and at major public facilities, and recognizes the historic importance and traditions of the region.

Objectives and Policies

- Save and incorporate healthy mature trees in the landscape planting plans of subdivisions, roads, or any other construction or development.

- Incorporate drought-tolerant plant species in future landscape planting.

- Emphasize contrasting earth-tone color schemes for buildings and avoid bright or garish colors.

Infrastructure

Goal

Timely and environmentally sound planning, development, and maintenance of infrastructure systems which serve to protect and preserve the safety and health of the region's residents, commuters, and visitors through the provision of clean water, effective waste disposal, and efficient transportation systems which meets the needs of the community.

(1) **Water and Utilities**

Objectives and Policies

- Promote water conservation and education programs.
- Encourage the installation of underground electrical, telephone, and cable television lines.

(2) **Drainage**

Objective and Policy

- Insure that new developments will not result in adverse flooding conditions for downstream properties by requiring onsite retention facilities for stormwater run-off generated by the development.

(3) **Energy**

Objective and Policy

- Support energy efficient technologies in conjunction with new urban development and encourage energy efficient building design and site development practices.

The proposed project is consistent with the goals, objectives, and policies of the West Maui Community Plan. As mentioned, it is peculiar that a relatively small, 0.800-acre parcel would be split-designated "Agricultural", "Open Space", and "Park". The three (3) community plan designations for the subject property create difficulty in establishing consistency with State Land Use and Maui County zoning designations. However, as the subject property is located within the State Land Use "Conservation" district, the Board of Land and Natural Resources will determine appropriate uses which are consistent with the area.

The proposed project will consist of a single-story, single-family residence in an area that is rustic in nature. Necessary infrastructure services will be provided by largely private systems which serve the Olowalu area. The private coastal land will be preserved and the subject property will be appropriately landscaped to assimilate with the character of the region. Additionally, Best Management Practices (BMPs), such as soil erosion control measures, will be implemented to minimize shoreline impacts. A conservation ethic will be employed by the applicants with respect to energy and water usage to ensure that impacts to proximate properties are minimized.

E. COUNTY ZONING

The subject property is currently zoned "A-3, Apartment" by the County of Maui. See **Figure 14**. Although there is presently no "A-3" zoning category reflected in the Maui County Code (MCC) Title 19, Chapter 19.12 specifically addresses Apartment zoned lands in terms of permitted uses and performance standards. The permitted uses in the Apartment district are provided in MCC 19.12.020. The permitted uses include a range of apartment uses, as well as any use permitted in a residential zoning district. Therefore, a single-family residence is allowed in "Apartment" zoned lands. Consequently, the proposed project is in conformance with the underlying zoning designation.

F. SPECIAL MANAGEMENT AREA OBJECTIVES AND POLICIES

Pursuant to Chapter 205A, Hawai`i Revised Statutes, and the Rules and Regulations of the Planning Commission of the County of Maui, actions located within the SMA are evaluated with respect to SMA objectives, policies, and guidelines. As mentioned in Chapter I, the subject property is located within the County SMA. See **Figure 15**. However, the construction of a single-family dwelling is not classified as "development" under the SMA Rules for the Maui Planning Commission. As such, it is anticipated that the proposed project will qualify as an exempt action according to the SMA rules.

Nonetheless, for analysis purposes, this section addresses the proposed project's relationship to applicable coastal zone management considerations, as set forth in Chapter 205A and the Rules and Regulations of the Maui Planning Commission.

(1) Recreational Resources

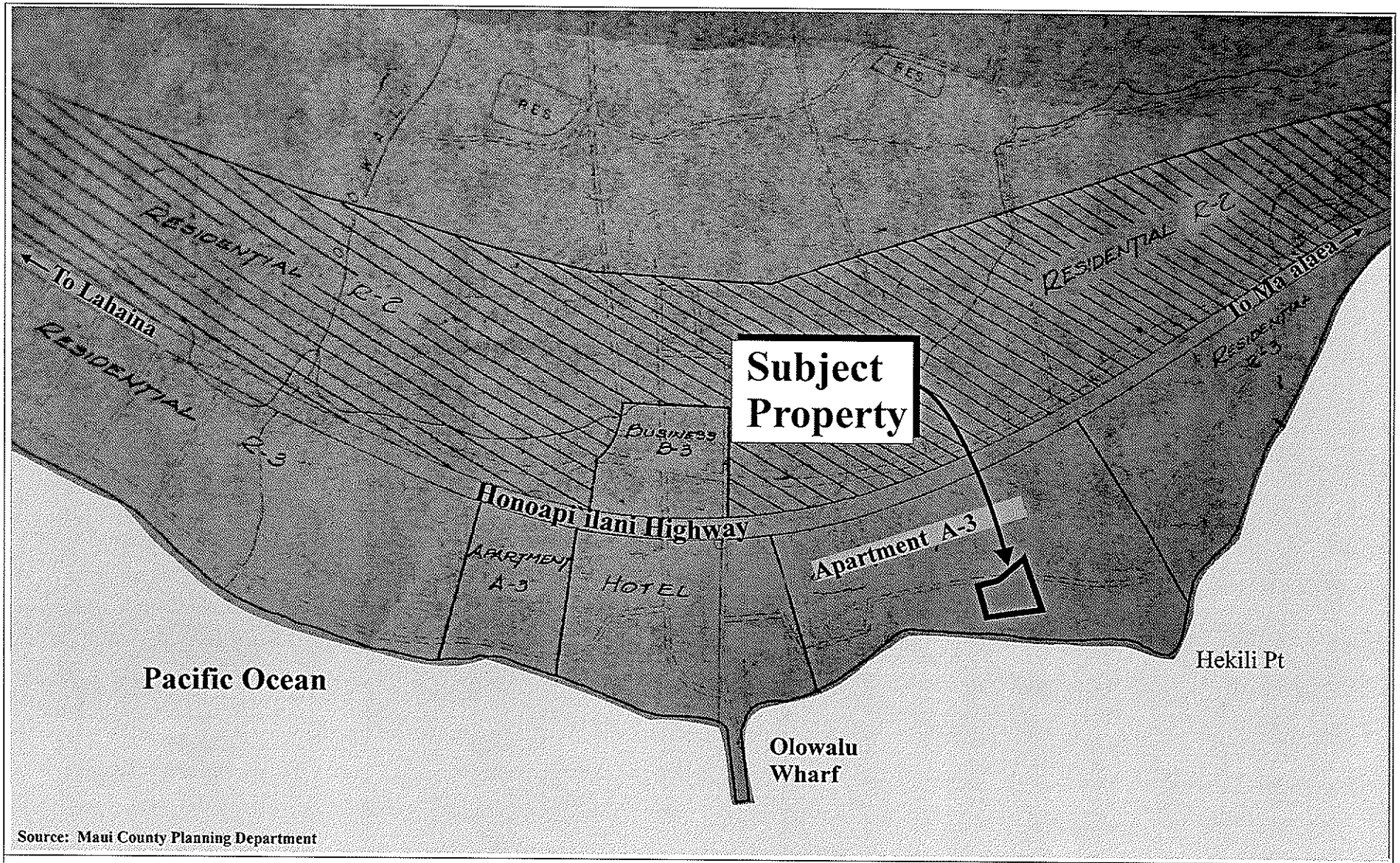
Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

(A) Improve coordination and funding of coastal recreational planning and management; and

(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:



Source: Maui County Planning Department

Figure 14

Proposed Martin Single-Family Residence

Maui County Zoning Map

NOT TO SCALE

Prepared for: Peter and Deborah Martin

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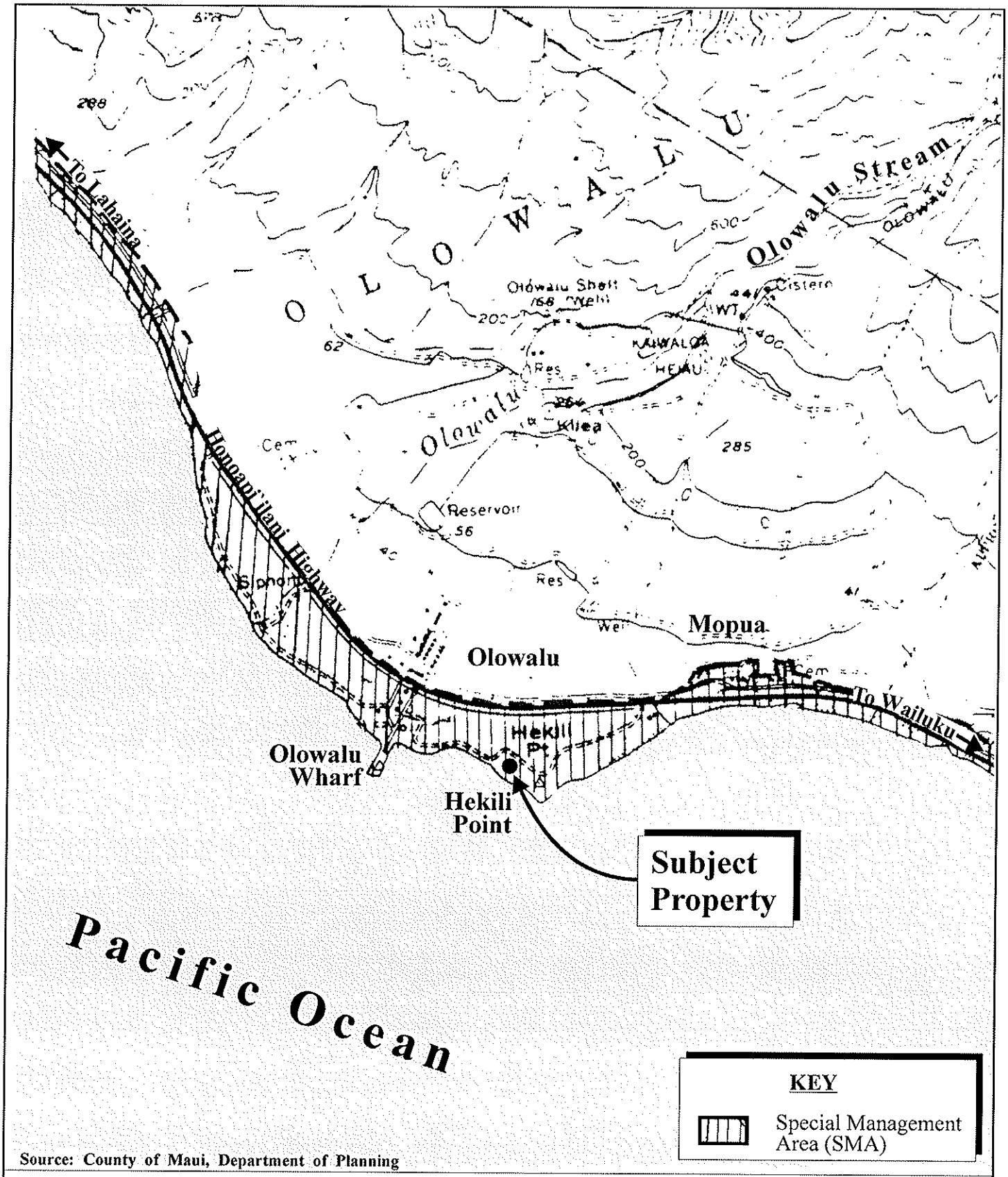
Martin\OlowaluLot46\Zoning



Source: County of Maui, Department of Planning

Figure 15 Proposed Martin Single-Family Residence

NOT TO SCALE

Special Management Area Boundary Map

Prepared for: Peter and Deborah Martin

MUNEKIYO & HIRAGA, INC.

Martin\OlowaluLot46\SMAboundary

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.

Response: The subject project will maintain coastal zone access and recreational opportunities. The existing, private strip of coastal land will remain unaffected by the subject project.

(2) **Historic resources**

Objective:

Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(A) Identify and analyze significant archaeological resources;

(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and

(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: An archaeological inventory survey previously completed for the Olowalu area included the subject property. No significant surface or subsurface resources were identified within the subject property. As such, no impacts to historic resources are anticipated as a result of the proposed project. In accordance with Section 6E-43.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR) and the Office of Hawaiian Affairs (OHA) will be contacted.

(3) **Scenic and open space resources**

Objective:

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

Policies:

(A) Identify valued scenic resources in the coastal zone management area;

(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

(D) Encourage those developments which are not coastal dependent to locate in inland areas.

Response: The subject project involving construction of a single-story, single-family residence will not adversely impact scenic or open space resources, nor will it alter the existing topographic character of the surrounding area.

(4) Coastal ecosystems

Objective:

Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Improve the technical basis for natural resource management;

(B) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(C) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

(D) Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

Response: Best Management Practices (BMPs) will be utilized to prevent runoff generated during construction from entering the ocean. The proposed drainage system will handle all post-development drainage to ensure that no adjacent or downstream properties are impacted by the project. As such, no impacts to coastal ecosystems are, therefore, anticipated to result from the subject project.

(5) Economic uses

Objective:

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

Policies:

(A) Concentrate coastal dependent development in appropriate areas;

(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

Response: The subject project will provide beneficial impacts to the local economy through the provision of construction employment and the generation of real property tax revenues. In the long term, the subject project will not adversely affect the region's economic stability.

(6) Coastal hazards

Objective:

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

Policies:

(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;

(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program;

(D) Prevent coastal flooding from inland projects; and

(E) Develop a coastal point and nonpoint source pollution control program.

Response: The sensitivity of the subject property to coastal hazards will not increase as a result of the proposed project. Further, the proposed project will be developed in compliance with requirements of the Federal Flood Insurance Program.

(7) **Managing development**

Objective:

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

Policies:

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

(B) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and

(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: All aspects of the subject project will be conducted in accordance with applicable State and County requirements. Opportunity for review of the subject project is offered through the HRS, Chapter 343 Environmental Assessment (EA) review process, the SMA permitting process, and the Conservation District Use Permit process.

(8) Public participation

Objective:

Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;

(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and

(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: EA proceedings are applicable to the subject project. Opportunities for public awareness, education, and participation in coastal management are provided through the EA review and approval processes.

(9) Beach protection

Objective:

Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The subject property is approximately 70 feet from the ocean, separated by a private strip of coastal land which runs along the shoreline fronting the subdivision. No impacts to beach processes are anticipated from the subject project. Access and recreational opportunities along the shoreline will remain unaffected by the proposed project.

(10) Marine Resources

Objective:

Implement the State's ocean resources management plan.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(C) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

(D) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(E) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(F) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: Increases in surface drainage flows across the subject property will be mitigated by the proposed drainage system improvements for the project. No impacts to marine resources along the Olowalu coastline are, therefore, anticipated to result from the subject project.

In addition to the foregoing objectives and policies, SMA permit review criteria pursuant to Act 224 (2005) provides that:

No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:

(1) Directly illuminates the shoreline and ocean waters; or

(2) Is directed to travel across property boundaries toward the shoreline and ocean waters.

In addressing light pollution issues, all lighting for the proposed single-family residence will be shielded and of the directional down lighting variety to mitigate light pollution and to prevent lighting traveling across property boundaries toward the shoreline and ocean.

IV. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

IV. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed project will result in unavoidable construction-related impacts which include noise-generated impacts occurring from the proposed improvements. In addition, there may be temporary air quality impacts associated with dust generated from site work and exhaust emissions discharged by construction equipment. These impacts will be mitigated by erosion control measures and best management practices designed to minimize dust and erosion. Construction of the proposed project will be carried out in compliance with State Department of Health Community Noise Control standards.

Accordingly, the subject project is not anticipated to create any significant, long-term adverse environmental impacts.

V. ALTERNATIVES ANALYSIS

V. ALTERNATIVES ANALYSIS

A. NO ACTION OR NO BUILD ALTERNATIVE

The subject property is vacant and undeveloped at the present time. The no action or no build alternative would involve the continuation of the underutilized and unmaintained nature of the property. Accordingly, the no action alternative was not considered.

B. DEFERRED ACTION ALTERNATIVE

A "deferred action" alternative would have similar consequences as the "no action" alternative in that the land use objectives of the proposed project would be delayed and would not be immediately realized.

This alternative could result in potentially higher development costs due to increases in labor and material costs or changes to infrastructure or the existing physical or socio-economic environment (i.e. opportunity costs). Based on the preceding, the "deferred action" alternative was not considered.

C. ARCHITECTURAL DESIGN CONSIDERATIONS

The proposed site layout and design for the residence was deemed most efficient in terms of the property's topographic conditions, spatial relationship to coastal lands, and general rectangular configuration. The single-story format was deemed fitting to the locale as it provides for a low-rise structure which blends with the plantation-era structures in the nearby vicinity. Moreover, the floor plan which utilizes a building footprint of approximately 3,200 square feet, is considered appropriate in terms of scale, building setback, and living function considerations. The applicants also explored the possibility of developing the proposed residence in a post and pier configuration. However, the applicants prefer not to deal with going up and down stairs due to health reasons. In addition, the applicants felt that a residence nestled lower to the ground would better blend into the surrounding landscape. Thus, in terms of general design, the proposed alternative was considered to be appropriate for Lot 46-A.

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Major resource commitments include the land on which the project will be developed, as well as fuel, labor, funding, and material resources. Impacts relating to the use of these resources should be weighed against the expected positive socio-economic benefits to be derived from the project versus the consequences of taking no action.

The commitment of resources required for the development of the single-family residence includes building materials and labor, both of which are non-renewable and irretrievable. In addition, the proposed project is not anticipated to require commitment of government services or facilities. In general, the proposed action is not anticipated to place significant additional requirements upon public services and infrastructure. There are no other significant irreversible commitment of resources associated with the proposed project.

VII. FINDINGS AND CONCLUSIONS

VII. FINDINGS AND CONCLUSIONS

The "Significance Criteria", Section 12 of the Administrative Rules, Title 11, Chapter 200, "Environmental Impact Statement Rules", were reviewed and analyzed to determine whether the proposed project has significant impacts on the environment. The following criteria and analysis are provided:

1. **Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.**

   The proposed project does not result in any adverse environmental impacts. There are no known rare, endangered, or threatened species of flora or fauna located within the subject property. There are no known wetlands located within the subject property. An archaeological inventory survey previously prepared for the area did not identify any significant surface or subsurface archaeological or cultural resources within the subject property. In accordance with Section 6E-43.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR) and the Office of Hawaiian Affairs (OHA) will be contacted. No impacts to cultural or historic resources are, therefore, anticipated to result from the proposed project.

2. **Curtails the range of beneficial uses of the environment.**

   The use of the subject property for the proposed single-family residence will not curtail the range of beneficial uses of the environment.

3. **Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.**

   The State's Environmental Policy and Guidelines are set forth in Chapter 344, Hawai`i Revised Statutes and were reviewed in connection with the proposed project. The proposed project is in consonance with the guidelines.

4. **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.**

The proposed project will have a beneficial impact on the West Maui economy through the creation of employment positions related to construction and the generation of real property tax revenues. The economic and social welfare of the community will not be negatively affected by the proposed project.

5. **Substantially affects public health.**

No adverse impacts to the public's health and welfare are anticipated to result from the proposed project. As noted previously, BMPs will be employed during construction work to mitigate any environmental impacts.

6. **Involves substantial secondary impacts, such as population changes or effects on public facilities.**

The proposed project, which involves the construction of a single-story, single-family residence, will not significantly affect the island's population base. The subject project will not significantly impact existing traffic flows along Honoapi`ilani Highway.

The proposed project will not adversely impact public services such as police, fire, and medical services. Impacts upon educational, recreational, and solid waste parameters are also not expected to result from the construction of the single-family residence.

7. **Involves a substantial degradation of environmental quality.**

During the construction phase of the project, there will be short-term air quality and noise impacts generated. No long-term degradation of environmental quality is anticipated from the proposed project.

8. **Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.**

The proposed project, limited in scope to the construction of a single-story, single-family residence and related improvements, does not represent a commitment to larger actions. There are no cumulative impacts associated with the subject project which would result in considerable effects on the environment.

9. **Substantially affects a rare, threatened, or endangered species, or its habitat.**

There are no known significant habitats or rare, endangered, or threatened species of flora and fauna that will be adversely affected by the proposed project.

10. **Detrimentally affects air or water quality or ambient noise levels.**

Construction activities for the proposed project will result in short-term air quality and ambient noise impacts. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind blown emissions during construction. It is anticipated that construction will be limited to daylight working hours only. Water quality is not anticipated to be affected with implementation of BMPs. There will be no impact on adjacent or downstream properties from drainage flows related to the proposed project.

11. **In the long-term, the proposed project is not anticipated to have a significant impact on air, noise, and water quality.**

12. **Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters**.

The subject property is located within Flood Zone "C" and "A4". Zone "A4", an area of the 100-year flood with a base flood elevation of five (5) feet, occupies the majority of the property. The remaining balance of the property is located in "Zone C", an area of minimal flooding.

The subject property is located within a tsunami evacuation zone. The project will comply with Chapter 19.62 of the Maui County Code (MCC), Flood Hazard Areas,

as applicable. The proposed project will not result in any significant impacts to coastal waters.

13. **Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.**

The subject property is separated from the Pacific Ocean by an existing, private strip of coastal land which runs along the shoreline. View planes of the Pacific Ocean from the subject property are currently blocked by the vegetation that exists within the coastal land. The proposed single-family residence is set back from the shoreline by approximately 100 feet. With the intervening vegetative cover, the proposed residence will not adversely affect makai views from the highway.

14. **Requires substantial energy consumption.**

The proposed project will involve a limited commitment of fuel for construction equipment, vehicles, and machinery during construction activities.

In addition, coordination with Maui Electric Company (MECO) will be undertaken during the electrical plans preparation phase of work to ensure all operational parameters are addressed for the proposed project.

Based on the foregoing findings, the Office of Conservation and Coastal Lands concludes that the analysis of the subject project results in a Finding of No Significant Impact (FONSI).

VIII. LIST OF PERMITS AND APPROVALS

VIII. LIST OF PERMITS AND APPROVALS

The following State and County permits and approvals will be required for the subject project.

State of Hawai`i

1. Conservation District Use Permit (CDUP) from the Board of Land and Natural Resources

County of Maui

1. Special Management Area (SMA) Exemption from the County of Maui, Department of Planning.

2. Applicable Grading and Construction Permits from County of Maui, Department of Public Works, Development Services and Administration.

3. Special Flood Hazard Area Development Permit, as applicable.

IX. AGENCIES/ ORGANIZATIONS CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT, COMMENTS RECEIVED, AND RESPONSES TO SUBSTANTIVE COMMENTS

IX. AGENCIES/ORGANIZATIONS CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT, COMMENTS RECEIVED TO SUBSTANTIVE COMMENTS

The following agencies were contacted prior to or during the preparation of the Draft Environmental Assessment. Comments received from these agencies, as well as responses to substantive comments, are included in this chapter.

1. Larry Yamamoto, State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, Hawai`i 96850-0001

2. Ranae Ganske-Cerizo, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawai`i 96793-2100

3. George Young
Chief, Regulatory Branch
U.S. Department of the Army
U.S. Army Engineer District, Honolulu
Regulatory Branch
Building 230
Fort Shafter, Hawai`i 96858-5440

4. Patrick Leonard
Field Supervisor
U. S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122
Box 50088
Honolulu, Hawai`i 96813

5. Russ K. Saito, State Comptroller
Department of Accounting and General Services
1151 Punchbowl Street, #426
Honolulu, Hawai`i 96813

6. Sandra Lee Kunimoto, Chair
Department of Agriculture
1428 South King Street
Honolulu, Hawai`i 96814-2512

7. Theodore E. Liu, Director
State of Hawai`i
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawai`i 96804

8. Patricia Hamamoto, Superintendent
State of Hawai`i
Department of Education
P.O. Box 2360
Honolulu, Hawai`i 96804

9. Ron Okumura
Complex Area Superintendent
(Lanai/Molokai/Hana/Lahaina)
Department of Education
54 High Street, 4th Floor
Wailuku, Hawai`i 96793

10. Micah Kane, Chairman
Department of Hawaiian Home Lands
P. O. Box 1879
Honolulu, Hawai`i 96805

11. Chiyome Fukino, M.D., Director
State of Hawai`i
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawai`i 96814

12. Alec Wong, P.E., Acting Chief
Clean Water Branch
State of Hawai`i
Department of Health
919 Ala Moana Blvd., Room 300
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13. Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawai`i
Department of Health
54 High Street
Wailuku, Hawai`i 96793

14. Laura Thielen, Chairperson
State of Hawai`i
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai`i 96813

15. Melanie Chinen, Administrator
State of Hawai`i
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawai`i 96707

16. Barry Fukunaga, Director
State of Hawai`i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai`i 96813
cc: Fred Cajigal

17. Laurence Lau, Interim Director
Office Of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawai`i 96813

18. Clyde Namu`o, Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai`i 96813

19. Mary Lou Kobayashi
State of Hawai`i
Office of Planning
P.O. Box 2359
Honolulu, Hawai`i 96804

20. Carl Kaupololo, Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawai`i 96732

21. Vanessa A. Medeiros, Director
County of Maui
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawai`i 96793

22. Tamara Horcajo, Director
County of Maui
Department of Parks and Recreation
700 Halia Nakoa Street, Unit 2
Wailuku, Hawai`i 96793

23. Jeffrey Hunt, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawai`i 96793

24. Thomas Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawai`i 96793

25. Milton Arakawa, Director
County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawai`i 96793

26. Cheryl Okuma
County of Maui
Department of Environmental Management
2200 Main Street, Suite 176
Wailuku, Hawai`i 96793

27. Donald Medeiros, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawai`i 96793

28. Jeffrey Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai`i 96793

29. **Hawaiian Telcom**
60 South Church Street
Wailuku, Hawai`i 96793

30. Neal Shinyama, Manager – Engineering
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawai`i 96733

31. Theo Morrison, Executive Director
Lahaina Bypass Now
505 Front Street, Suite 202
Lahaina, Hawai`i 96761

32. Keoki Freeland, Executive Director
Lahaina Restoration Foundation
120 Dickenson Street
Lahaina, Hawai`i 96761

33. Karee Karlucci, Executive Director
Lahaina Town Action Committee
648 Wharf Street, Suite 102
Lahaina, Hawai`i 96761

34. Joe Pluta, President
West Maui Improvement Foundation
P. O. Box 10338
Lahaina, Hawai`i 96761

35. Zeke Kalua, Executive Director
West Maui Taxpayers Association
P.O. Box 10338
Lahaina, Hawai`i 96761

United States Department of Agriculture

NRCS

OCT 29 2007

Natural Resources Conservation Service
P.O. Box 50004 Rm. 4-118
Honolulu, HI 96850
808-541-2600

October 25, 2007

Munekiyo & Hiraga, Inc
Attention: Kyle Ginoza, Project Manager
.305 High Street, Suite 104
Wailuku, Hawaii 96793

Subject: Chapter 343, Hawai'i Revised Statutes (HRS) Early Consultation Request for Proposed Martin Single-Family Residence at Lot 46-A(TMK(2)4-8-003:046), Olowalu Makai-Hikina Subdivision, Olowalu, Maui, Hawaii.

Dear Mr. Ginoza

We have reviewed the above mentioned document and have no comment at this time.

Thank you for the opportunity to comment.

Sincerely,

LAWRENCE T. YAMAMOTO
Director
Pacific Islands Area

Helping People Help the Land

An Equal Opportunity Provider and Employer

OCT 2 6 2007

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
210 Imi Kala St. Ste 209
Wailuku, HI 96793
808-244-3100

October 24, 2007

Mr. Kyle Ginoza
Munekiyo & Hiraga, Inc.
305 High St., Suite 104
Wailuku, HI 96793

Subject: Chapter 343, HRS Early Consultation Request for Proposed Martin Single-Family Residence at Lot 46-A, Olowalu Makai-Hikina Subdivision
TMK: 4-8-003: 046

Dear Mr. Ginoza:

We have no comments at this time.

Sincerely,

Ranae Ganske-Cerizo
District Conservationist

Helping People Help the Land

An Equal Opportunity Provider and Employer

4/9

NOV 2 6 2007

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
12200-2008-TA-0027
12200-2008-FA-0027

NOV 21 2007

Mr. Kyle Ginoza
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Subject: Martin Single-Family Residence, Olowalu Makai-Hikina Subdivision in Olowalu, Maui, Hawaii

Dear Mr. Ginoza:

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) October 23, 2007, receipt of your request for comments regarding proposed construction of a single-family residence on Lot 46-A of the Olowalu Makai-Hikina Subdivision in Olowalu, Maui (TMK (2)4-8-003:046). We are concerned that the proposed activities may adversely impact the coral reef ecosystem adjacent to the project site and may adversely affect threatened Newell's shearwater (*Puffinus auricularis newelli*) and endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*) (collectively referred to as seabirds). In order to reduce the potential for project-related water quality degradation, sedimentation of corals and other nearshore marine life, and contamination of the coastal environment, we recommend the implementation of the applicable measures identified in the enclosed list of Standard Best Management Practices (BMPs) for fish and wildlife. The construction area is a known seabird flight corridor. Any increase in the use of night-time lighting, particularly during each year's peak fallout period, could result in seabird disorientation, fallout, and injury or mortality. To minimize impacts to listed seabirds, we recommend the following measures be incorporated into the project:

- Lights mounted in the project footprint, throughout the construction period, and within the completed subdivision, will be shielded so the bulb is not visible at or above bulb height.

- Night work will cease during the peak fallout period of September 15 through December 15.

- Information dissemination about seabird fallout will be provided to all staff working on site prior to initiation of work.

- A cat kennel will be kept on site to temporarily hold a downed seabird.

- If a downed seabird is found, the Service (Megan Laut, 808-792-9400) will be contacted within 24 hours. If alive, the bird will be placed in the cat kennel and either Fern Duvall (Hawaii Department of Land and Natural Resources Biologist at 808-873-3502) or Kathleen Bailey (National Park Service Biologist at 808-572-4491) will be contacted immediately for further instruction on where to bring the bird.

If you would like additional information please contact Dawn Greenlee, Fish and Wildlife Biologist, Consultation and Technical Assistance Program (phone: 808-792-9400; fax: 808-792-9581).

Sincerely,

Patrick Leonard
Field Supervisor

Enclosure

Enclosure for PIFWO Log Numbers 12200-2008-TA-0027 and 12200-2008-FA-0027

US Fish and Wildlife Service
Recommended Standard Best Management Practices

The Fish and Wildlife Service recommends that the following measures be incorporated into projects to minimize the degradation of water quality and impacts to fish and wildlife resources:

a. Turbidity and siltation from project-related work shall be minimized and contained to within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions;

b. dredging/filling in the marine environment shall be scheduled to avoid coral spawning and recruitment periods;

c. dredging and filling in the marine/aquatic environment shall be designed to avoid or minimize the loss special aquatic site habitat (coral reefs, wetlands etc.) and the unavoidable loss of such habitat shall be compensated for;

d. all project-related materials and equipment (dredges, barges, backhoes etc) to be placed in the water shall be cleaned of pollutants prior to use;

e. no project-related materials (fill, revetment rock, pipe etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands etc.);

f. all debris removed from the marine/aquatic environment shall be disposed of at an approved upland or ocean dumping site;

g. no contamination (trash or debris disposal, alien species introductions etc.) of adjacent marine/aquatic environments (reef flats, channels, open ocean, stream channels, wetlands etc.) shall result from project-related activities;

h. fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project shall be developed. Absorbent pads and containment booms shall be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases;

i. any under-layer fills used in the project shall be protected from erosion with stones (or core-loc units) as soon after placement as practicable; and

j. any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with vegetation matting, hydroseeding etc.).

The Fish and Wildlife Service believes that incorporation of these measures into projects will greatly minimize the potential for project-related adverse impacts to fish and wildlife resources.

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KAREN KAMAHARA

MARK ALEXANDER ROY

January 30, 2008

Patrick Leonard, Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawai`i 96850

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Leonard:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your letter dated November 21, 2007 (reference 12200-2008-FA-0027), regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We offer the following comments, in response to your remarks:

1. The list of Standard Best Management Practices (BMPs) for fish and wildlife will be forwarded to the applicant's civil engineer for incorporation to prevent erosion, sedimentation, and other potential adverse impacts to aquatic fish and wildlife resources in the vicinity of the project site.

2. Lights mounted in the project footprint, throughout the construction period, and within the completed residence, will be shielded so the bulb is not visible at or above bulb height.

3. There will be no night construction associated with the development of the single-family residence during the period of September 15 through December 15.

4. Information dissemination about seabird fallout will be provided to all staff working onsite prior to initiation of work. The applicants and/or their contractor will coordinate with your office to ensure that appropriate content is included in the distribution materials.

5. A cat kennel will be kept onsite to temporarily hold a downed seabird.

6. If a downed seabird is found, the U.S. Fish and Wildlife Service (Megan Laut, 808-792-9400) will be contacted within 24 hours. If alive, the bird will be placed in the cat kennel and either Fern Duvall (Hawai`i Department of Land and Natural Resources Biologist at 808-873-3502) or Kathleen Bailey (National Park Service Biologist at 808-572-4491) will be contacted immediately for further instruction on where to bring the bird.

We appreciate the input we received from your office. A copy of the Draft Environmental Assessment will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
Kirk Tanaka, R.T. Tanaka Engineers, Inc.
F:\DATA\Martin\OlowaluLot46\USFWS.ecl.Resp.wpd

NOV 1 3 2007

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

BARBARA A. ANNIS
DEPUTY COMPTROLLER

(P)1263.7

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

NOV - 8 2007

Mr. Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Ginoza:

Subject: Chapter 343, Hawaii Revised Statutes, (HRS) Early Consultation Request for Proposed Martin Single-Family Residence at Lot 46-A (TMK (2)4-8-003:046), Olowalu Makai-Hikina Subdivision, Olowalu, Maui, Hawaii

Thank you for the opportunity to provide early consultation comments on the subject project. This proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Mr. Clarence Kubo of the Public Works Division at 586-0488.

Sincerely,

RUSS K. SAITO
State Comptroller

NOV 0 9 2007

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF THE SUPERINTENDENT

November 6, 2007

Mr. Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Dear Mr. Ginoza:

SUBJECT: Chapter 343, Hawai'i Revised Statutes (HRS) Early Consultation Request for Proposed Martin Single-Family Residence at Lot 456-A (TMK (2)4-8-003:046), Olowalu, Makai-Hikina Subdivision, Olowalu, Maui, Hawai'i

The Department of Education has no comment or concern to offer as early consultation about the proposed plans for the Martin Single-Family Residence. Should you have any questions, please call Heidi Meeker of the Facilities Development Branch at (808) 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

cc: Randolph Moore, Assistant Superintendent, OSFSS
Duane Kashiwai, Public Works Administrator, FDB
Ron Okamura, CAS, Hana/Lahaina/Lanai/Molokai Complex Areas

NOV 2 6 2007

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EPO-07-198

November 20, 2007

Mr. Kyle Ginoza
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Ginoza:

SUBJECT: Pre-Assessment Consultation for Proposed Martin Single-Family Residence at Lot 46-A Olowalu Makai-Hikina Subdivision, Olowalu, Maui, Hawaii
TMK: (2) 4-8-003: 046

Thank you for allowing us to review and comment on the subject application. The application was routed to the various branches of the Environmental Health Administration. We have the following Wastewater Branch and General comments.

Wastewater Branch

The project consists of constructing a single family residence of approximately 3,200 square feet.

The project is located in the Critical Wastewater Disposal Area (CWDA) where no new cesspools will be allowed.

Wastewater treatment and disposal need to be adequately addressed in the project's assessment. Use of an onsite treatment individual wastewater system is acceptable

All wastewater plans must meet Department's Rules, HAR Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. If you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294.

General

We strongly recommend that you review all of the Standard Comments on our website: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

If there are any questions about these comments please contact Jiacai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
WWB
EH-Maui

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KAILYNN KAWAHARA

MARK ALEXANDER ROY

January 30, 2008

Kelvin H. Sunada, Manager
Environmental Planning Office
State of Hawai`i
Department of Health
P. O. Box 3378
Honolulu, Hawai`i 96801-3378

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Sunada:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your letter (Reference EPO-07-198) dated November 20, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We acknowledge that the project will be serviced by an onsite individual wastewater system. The applicant's civil engineer will review Hawai`i Administrative Rules (HAR), Chapter 11-62, Department of Health, "Wastewater Systems" to ensure that all wastewater plans meet appropriate State wastewater system requirements. We note that the Department of Health reserves the right to review the detailed wastewater plans for conformance to applicable rules.

We will review the department's standard comments on the department website and the applicant will adhere to any comments specifically applicable to this project.

We appreciate the input we received from your office. A copy of the Draft Environmental Assessment will be provided for your review and comment.

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • planning@mhinconline.com

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
Kirk Tanaka, R.T. Tanaka Engineers, Inc.
F:\DATA\Martin\OlowaluLot46\DOH.ecl.Resp.wpd

NOV 0 7 2007

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to
EMD / CWB

11010PKP.07

November 5, 2007

Mr. Kyle Ginoza
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Ginoza:

Subject: Proposed Martin Single-Family Residence at Lot 46-A

The Department of Health, Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters

(HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

b. Hydrotesting water.

c. Construction dewatering effluent.

3. You must also submit a copy of the NOI to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the CWB that SHPD has or is in the process of evaluating your project. Please submit a copy of your request for review by SHPD or SHPD's determination letter for the project along with your NOI or NPDES permit application, as applicable.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 Water Quality Certification are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

KP:np

MUNEKIYO & HIRAGA, INC.

Michael T. Munekiyo
Gwen Ohashi Hiraga
Mitsuru "Mich" Hirano
Karlynn Kawahara

Mark Alexander Roy

January 30, 2008

Alec Wong, P.E., Chief
Clean Water Branch
State of Hawai`i
Department of Health
P. O. Box 3378
Honolulu, Hawai`i 96801-3378

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Wong:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your letter (reference 11010PKP.07) dated November 5, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

The applicant's civil engineer will review the branch's standard comments and will incorporate applicable recommendations into the construction plans. With regards to the specific comments you provided, please see below.

1. The applicant's civil engineer will evaluate potential impacts to State waters to determine whether or not specific sections of Hawai`i Administrative Rules (HAR), Chapter 11-54 are applicable. All discharges related to project construction or operation activities will comply with relevant State Water Quality Standards. Discharges will be kept at a minimum through the application of engineering Best Management Practices (BMPs).

2. The applicant's civil engineer will coordinate with the Clean Water Branch to address applicable National Pollutant Discharge Elimination System (NPDES) permit requirements for the project, including the possible submittal of a Notice of Intent (NOI) for general permit coverage.

3. The NOI will be submitted for review by the State Historic Preservation Division of the Department of Land and Natural Resources. The applicant will submit a copy of its request for review by SHPD or SHPD's determination letter for the project along with the NOI or NPDES permit application, as applicable.

4. All discharges related to project construction or operation activities will comply with the applicable State Water Quality Standards as specified in HAR, Chapter 11-54 and/or permitting requirements as specified in HAR, Chapter 11-55. Discharges will be kept to a minimum through the application of engineering BMPs.

We appreciate the input we received from your office. A copy of the Draft Environmental Assessment will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
Kirk Tanaka, R.T. Tanaka Engineers, Inc.
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NOV 1 3 2007

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M. D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M. D., M. P. H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

November 9, 2007

Mr. Kyle Ginoza
Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Mr. Ginoza:

Subject: **Early Consultation for Proposed Martin Single-Family Residence, Lot 46A, TMK: (2) 4-8-003:046**

Thank you for the opportunity to participate in the early consultation process for the proposed Martin Single-Family Residence. The following comments are offered:

All wastewater plans must conform to applicable provisions of the Hawaii Administrative Rules, Chapter 11-62, "Wastewater Systems". Plan review and approval of all new wastewater disposal systems is required prior to construction of the systems.

It is strongly recommended that the Standard Comments found at the Department's website: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html be reviewed, and any comments specifically applicable to this project should be adhered to.

Should you have any questions, please call me at 808 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN KAWAHARA

MARK ALEXANDER ROY

January 30, 2008

Herbert S. Matsubayashi
District Environmental Health Program Chief
State of Hawai`i
Department of Health
Maui District Health Office
54 High Street
Wailuku, Hawai`i 96793-2102

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Matsubayashi:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your letter dated November 9, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We acknowledge that the project will be serviced by an onsite individual wastewater system. The applicant's civil engineer will review Hawai`i Administrative Rules (HAR), Chapter 11-62, Department of Health, "Wastewater Systems" to ensure that all wastewater plans meet appropriate State wastewater system requirements. We note that the Department of Health reviews and approves plans for all new wastewater disposal systems prior to the construction of the systems.

In addition, the applicant will review the Department of Health's standard comments and will adhere to comments specifically applicable to this project.

We appreciate the input we received from your office. A copy of the Draft Environmental Assessment will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
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NOV 0 1 2007

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:DH

Correspondence: MA-08-86

Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku, Hawaii 96793

OCT 3 1 2007

Dear Mr. Ginoza,

SUBJECT: Regarding Subject Parcel TMK: (2) 4-8-003:046, Makai-Hikina Subdivision, Olowalu, Island of Maui

The Department of Land and Natural Resources' (DLNR), Office of Conservation and Coastal Lands (OCCL) is in receipt of your letter, dated, October 22, 2007, regarding the proposed construction of the Martin's Single Family Residence (SFR) information for Subject Parcel TMK: (2) 4-8-003:046.

The Office of Conservation and Coastal Lands notes that the subject parcel appears to be located in the State Land Use Conservation District, Limited subzone. The OCCL notes that Hawaii Administrative Rules (HAR), Chapter 13-5, Section 13-5-23, identifies land uses in the Limited subzone. Pursuant to Section 13-5-23, L-6, a Single Family Residence (SFR) is an identified land use. However, the SFR must reside in a floodplain or a coastal high hazard area that conforms to applicable County regulations regarding the National Flood Insurance Program, and also conform to single family residential standards. In addition, this area may be subject to coastal hazards such as flooding and erosion. Any SFR should be designed on post and pier, rather than slab on grade. Lastly, we inform you that the decision to approve or deny the application for the use in the Conservation District is at the discretion of the BLNR.

Should you have any questions, please contact Dawn Hegger of the Office of Conservation and Coastal Lands at 587-0380.

Aloha,

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

c: MDLO
Maui County Planning Department

MUNEKIYO & HIRAGA, INC.

Michael T. Munekiyo
Gwen Ohashi Hiraga
Mitsuru "Mich" Hirano
Karlynn Kawahara

Mark Alexander Roy

January 30, 2008

Samuel J. Lemmo, Administrator
State of Hawai`i
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawai`i 96809

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Lemmo:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your office's letter (reference MA-08-86) dated October 31, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We offer the following comments, in response to your remarks:

1. The proposed footprint of the residence is located within a flood plain and a tsunami evacation area. An analysis of the flood designation and potential mitigation measures against flooding and erosion will be included in the Draft Environmental Assessment (EA).

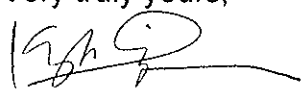
2. The residence and related improvements will be architecturally and structurally designed to conform to applicable County and single-family residential regulations and to the National Flood Insurance Program.

3. The applicant acknowledges that the decision to approve or deny the application to develop a single-family residence in the Conservation District is at the discretion of the Board of Land and Natural Resources (BLNR).

We appreciate the input we received from your office. A copy of the Draft EA will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
Richard S. Young, Architect
F:\DATA\Martin\OlowaluLot46\DLNR OCCL.ecl.Resp.wpd

NOV 2 7 2007

LINDA LINGLE
GOVERNOR

BARRY FUKUNAGA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.2679

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

November 20, 2007

Mr. Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Ginoza:

Subject: Proposed Martin Family Single-Family Residence
Olowalu, Maui
TMK: 4-8-003: 046

The proposal for a single new residential dwelling to be used by one family is anticipated not to have a significant traffic impact on the State highway. However, proper documentation, recordation, and driveway connection design of the access to the highway for the new residential use may need to be completed by the owner. It appears that access for the subject proposed residence could be a separate access or a shared access with other property owners in the same general location.

A copy of your October 22, 2007 letter has been forwarded to our Highways Division Planning Branch and Maui District Office for further coordination with other Highways offices involved with use of or access to a State highway. We recommend that you contact the Highways Maui District Office for further coordination and consultation regarding the access for the proposed residence. Copies of any land use and zoning applications, including any required environmental assessment for the proposed residence will need to be provided to the Highways Planning Branch in Honolulu and to the Highways Maui District Office in Kahului for their review and approvals.

We appreciate the courtesy of your early notice on the proposed new residence and connection to the State highway.

Very truly yours,

BARRY FUKUNAGA
Director of Transportation

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GLEN S. OSHIRO HIRAGA
MITSURU "MICH" HIRANO
KAREN KAWAHARA

MARK ALEXANDER ROY

January 30, 2008

Brennon Morioka, Interim Director
State of Hawai`i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai`i 96813-5097

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Morioka:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your office's letter (reference STP 8.2679) dated November 20, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We offer the following comments, in response to your remarks:

1. Currently, access to the property is provided from Honoapi`ilani Highway via an access easement (locally referred to as Camp Pecusa Road) across Lot 84-A of the subdivision. A more detailed description of the access and potential impacts and mitigation measures with respect to the local roadway system will be included in the Draft Environmental Assessment (EA).

   We acknowledge that proper documentation, recordation, and driveway connection design of the access to the highway for the new residential use may need to be completed by the applicant.

2. The applicant's civil engineer will coordinate and consult, as necessary, with the Highways Maui District Office regarding the access to the proposed single-family residence.

We appreciate the input we received from your office. Copies of the Draft EA will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
Kirk Tanaka, R.T. Tanaka Engineers, Inc.
F:\DATA\Martin\OlowaluLot46\DOT.ecl.Resp.wpd

NOV 1 6 2007

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD07/3308

November 13, 2007

Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

RE: Early Consultation Request for Proposed Martin Single-Family Residence at Lot 46-A (TMK (2) 4-8-003: 046, Olowalu Makai-Hikina Subdivision, Olowalu, Maui, Hawai'i

Dear Kyle Ginoza,

The Office of Hawaiian Affairs (OHA) is in receipt of your October 22, 2007 early consultation request for the proposed Martin Single-Family Residence, Olowalu Makai-Hikina Subdivision, Olowalu, Maui and offers the following comments:

The Draft Environmental Assessment (DEA) in accordance with Chapter 343 of the Hawai'i Revised Statues (HRS), should include a Cultural Impact Assessment (CIA). In accordance with the requirement of Act 50, Session Laws of Hawaii 2000, a CIA shall include information relating to the practices and beliefs of the Native Hawaiians who once inhabited this area and it is recommended that the community be involved in this assessment.

The proposed Martin Single-Family Residence at Lot 46-A consists of ground disturbing activities which include grading, driveway improvements and installation of water, sewer and drainage systems. The unearthing of cultural resources during sub-surface activities is a concern for our office. After a review of our available records, it appears no known archaeological sites are located in the project area.

OHA also asks that, in accordance with Section 6E-46.6, HRS and Chapter 13-300, Hawaii Administrative Rules, if the project moves forward, and if any significant cultural deposits or human skeletal remains are encountered, work shall stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) shall be contacted.

We look forward to reviewing and commenting on any permitting document and subsequent environmental documentation (Environmental Assessment, Cultural Impact Assessment) that is required for the approval of this proposed project.

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jason Jeremiah, Policy Advocate-Preservation, Native Rights, Land and Culture, at (808) 594-1816 or jasonj@oha.org.

Aloha,

Clyde W. Nāmu'o
Administrator

C: Thelma Shimaoka
Community Resource Coordinator
OHA Maui Office
140 Hoohana St., Ste. 206
Kahului, HI 96732

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MUJI" HIRANO
KAREN KAWAHARA

MARK ALEXANDER ROY

January 30, 2008

Clyde Namu`o, Administrator
State of Hawai`i
Office of Hawaiian Affairs
711 Kapi`olani Boulevard, Suite 500
Honolulu, Hawai`i 96813

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Namu`o:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your letter dated November 13, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We offer the following comments, in response to your remarks:

1. A Cultural Impact Assessment (CIA) was performed for the Olowalu Makai-Hikina Subdivision. The CIA contains information relating to the practices and beliefs of Native Hawaiians who once inhabited the area and informant interviews pursuant to Act 50, Sessions and Laws of Hawai`i 2000. The CIA will be included in the Draft Environmental Assessment (EA).

2. We note that there appears to be no known archaeological sites in the project area. An Archaeological Inventory Survey (AIS) was conducted for the Olowalu Makai-Hikina Subdivision. The AIS will be included in the Draft EA.

3. In accordance with Section 6E-43.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) and your office will be contacted. This language will be included in the Draft EA.

We appreciate the input we received from your office. A copy of the Draft EA will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
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NOV 2 6 2007

CHARMAINE TAVARES
Mayor

TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2 , Wailuku, Hawaii 96793

November 15, 2007

Munekiyo & Hiraga Inc
Attention: Kyle Ginoza, Project Manager
305 High Street Suite 104
Wailuku, HI 96793

Dear Mr. Kyle Ginoza

Subject: Proposed Martin Single Family Residence at lot 46-A TMK (2) 4-8-003:046 Olowalu Makai-Hikina Subdivision, Olowalu, Maui, HI

We have reviewed the proposed Martin Single Family Residence, and we have no comments or objections to the subject project.

Thank you for the opportunity to comment. Please contact me or Patrick Matsui, Chief of Planning and Development, at 270-7387 if there are any questions.

Sincerely,

TAMARA HORCAJO
Director, Parks & Recreation

xc: Patrick Matsui, Chief of Planning & Development

TH:PM:tk

OCT 2 9 2007

POLICE DEPARTMENT
COUNTY OF MAUI

CHARMAINE TAVARES
MAYOR

OUR REFERENCE
tj
YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

GARY A. YABUTA
DEPUTY CHIEF OF POLICE

October 24, 2007

Mr. Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Ginoza:

SUBJECT: Chapter 343, Hawaii Revised Statutes (HRS) Early Consultation Request for Proposed Martin Single-Family Residence at Lot 46-A (TMK (2) 4-8-003:046, Olowalu Makai-Hiknia Subdivision, Olowalu

Thank you for your letter of October 22, 2007, requesting comments on the above subject.

Please refer to a copy of the enclosed memorandum with our comments and/ or recommendations.

Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Acting Assistant Chief Charles M. Hirata
for: Thomas M. Phillips
Chief of Police

c: Jeffrey Hunt, Planning Department

TO : THOMAS PHILLIPS, CHIEF OF POLICE

VIA : GARY YABUTA, DEPUTY CHIEF OF POLICE

FROM : CHARLES M. HIRATA, ACTING ASSISTANT CHIEF

SUBJECT : OLOWALU MAKAI-HIKINA SUBDIVISION, OLOWALU

Sir,

The applicants for this project propose to construct a single-family residence on Lot 46-A of the above subdivision. An Environmental Assessment has not be completed as of yet and we would like to reserve comment until that process has been initiated.

Although we do not foresee any traffic impacts, we would like to know how the applicants will access Honoapiilani Highway. Undoubtedly this issue will also be raised by the State Department of Transportation.

Should a burglar alarm be installed in this residence, we would like the applicant to mitigate police response to false alarms by ensuring that alarm systems determine if an actual intrusion has taken place. This will minimize police response to false alarms in a remote part of the Lahaina Police District.

Respectfully,

Charles M. Hirata
Acting Assistant Chief
Maui Police Department
October 24, 2007

MUNEKIYO & HIRAGA, INC.

Michael T. Munekiyo
Gwen Ohashi Hiraga
Mitsuru "Mich" Hirano
Karlynn Kagahara

Mark Alexander Roy

January 30, 2008

Thomas M. Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawai`i 96793

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Chief Phillips:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your office's letter dated October 24, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We offer the following comments, in response to your remarks:

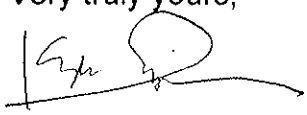
1. Currently, access to the property is provided from Honoapi`ilani Highway via an access easement (locally referred to as Camp Pecusa Road) across Lot 84-A of the subdivision. A more detailed description of the access and potential impacts and mitigation measures with respect to the local roadway system will be included in the Draft Environmental Assessment (EA).

2. If a burglar alarm is installed at this residence, the alarm system will be programmed to minimize the likelihood of false alarms.

We appreciate the input we received from your office. A copy of the Draft EA will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
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CHARMAINE TAVARES
Mayor

MILTON M. ARAKAWA, A.I.C.P.
Director

MICHAEL M. MIYAMOTO
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

November 6, 2007

Mr. Kyle Ginoza
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Ginoza:

SUBJECT: **PROPOSED MARTIN SINGLE-FAMILY RESIDENCE EARLY CONSULTATION**

We reviewed the subject application and have no comments at this time. We look forward to reviewing the Environmental Assessment report.

Please call Michael Miyamoto at 270-7845 if you have any questions regarding this letter.

Sincerely,

MILTON M. ARAKAWA, A.I.C.P.
Director of Public Works

MMA:MMM:ls
xc: Highways Division
Engineering Division
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DEC 2 4 2007

CHARMAINE TAVARES
Mayor

CHERYL K. OKUMA, Esq.
Director

GREGG KRESGE
Deputy Director

TRACY TAKAMINE, P.E.
Solid Waste Division

DAVID TAYLOR, P.E.
Wastewater Reclamation Division

COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
2200 MAIN STREET, SUITE 175
WAILUKU, MAUI, HAWAII 96793

December 19, 2007

Mr. Kyle Ginoza
Project Manager
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: MARTIN SINGLE-FAMILY RESIDENCE AT LOT 46-A
EARLY CONSULTATION
TMK (2) 4-8-003:046, OLOWALU

Dear Mr. Ginoza,

We reviewed the subject project as a pre-application consultation and have the following comments:

1. Solid Waste Division comments

   a. None.

2. Wastewater Reclamation Division comments:

   a. None.

If you have any questions regarding this memorandum, please contact Gregg Kresge at 270-8230.

Sincerely,

Cheryl K. Okuma

Cheryl Okuma, Director

S:\all\DEM\ALL\PlanDSAComments\All Reviews Completed\248003046 Martin Single-Family Residence Lot 46-A Early Consultation - rev.doc

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CHARMAINE TAVARES
Mayor

JEFFREY K. ENG
Director

ERIC H. YAMASHIGE, P.E., L.S.
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2155
www.mauiwater.org

November 29, 2007

Mr. Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku HI 96793

Dear Mr. Ginoza:

SUBJECT: Chapter 343, Hawaii Revised Statutes (HRS) Early Consultation Request for the Proposed Martin Single-Family Residence at Lot 46-A(TMK 2-4-8-003:047) Olowalu Makai-Hikina Subdivision, Olowalu, Maui, Hawaii

Thank you for the opportunity to participate in the EA early consultation process for the above stated project proposal.

Source Availability and Consumption
The project site is outside of the DWS service area. The EA should include projected consumption and the source of potable and non-potable water for the proposed development.

System Infrastructure
We recommend that water systems be built in accordance with the Statewide Water System Standards as certified by a licensed engineer.

Conservation
We encourage the applicant to consider the following water conservation measures in the project design and construction:

Use brackish and /or reclaimed water sources for dust control and for all non-potable water uses, if feasible.

Eliminate Single-Pass Cooling: Single-pass, water-cooled systems should be eliminated per Maui County Code Subsection 14.21.20. Although prohibited by code, single-pass water cooling is still manufactured into some models of air conditioners, freezers, and commercial refrigerators.

Utilize Low-Flow Fixtures and Devices: Maui County Code Subsection 16.20A.680 requires the use of low-flow water fixtures and devices in faucets, showerheads, urinals, water closets, and hose bibs. Water conserving washing machines, ice-makers and other units are also available.

Use Climate -adapted Plants: The project is located in the Maui County Planting Plan - Plant Zones 3 & 5. We encourage the applicant to utilize appropriate native and non invasive species and avoid the use of potentially invasive plants. Native plants adapted to the area, conserve water and protect the watershed from degradation due to invasive alien species. Attached is a list of appropriate plants for the zone as well as potentially invasive plants to avoid.

Limit Irrigated Turf: Limit irrigated turf to 25% or less of total landscaped area. Low-water use shrubs and ground covers can be equally attractive and require substantially less water that turf.

Look for Opportunities to Conserve Water: A few examples of these are as follows: When clearing driveways, etc. of debris, use a broom instead of a hose. When washing cars, use a hand-operated spray nozzle instead of an open hose. Additionally, check for leaks in faucets and toilet tanks.

Pollution Prevention

The project overlies the Olowalu aquifer which has an estimated sustainable yield of 1MGD. In order to protect ground and surface water resources, we recommend that the applicant adopt Best Management Practices (BMPs) designed to minimize infiltration and runoff from construction and vehicle operations. We ask the applicant to take precautionary measures to prevent construction materials, debris and eroded soils from entering coastal waters. The applicant intends to use a septic tank as its on-site wastewater disposal system. We have attached is a copy of Hawaii's Pollution Prevention Information for Household Wastewater Treatment Systems as well as BMPs for minimizing runoff from shoreland property. Additional mitigation measures are enumerated below and should be implemented during construction:

1. Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the water.
2. Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work.
3. Retain ground cover until the last possible date.
4. Stabilize denuded areas by sodding or planting as soon as possible. Replanting should include soil amendments, fertilizers and temporary irrigation. Use high seeding rates to ensure rapid stand establishment.
5. Avoid fertilizers and biocides, or apply only during periods of low rainfall to minimize chemical run-off.
6. Keep run-off on site.

Should you have any questions, please call our Water Resources and Planning Division at 244-8550.

Sincerely,

Jeffrey K. Eng
Director

eam
c: engineering division
applicant, with attachments:
The Costly Drip
A Checklist of Water Conservation Ideas for the Home and Yard
Maui County Planting Plan - Saving Water in the Yard - What and How to Plant in your Area
Ordinance No. 2108 - A Bill for an Ordinance Amending Chapter 16.20 of the Maui County Code, Pertaining to the Plumbing Code
Selected BMP's from "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters"-EPA
HAPPI - Household Wastewater Treatment Systems
Minimizing Runoff from Shoreland Property - University of Minnesota Extension

"THE COSTLY DRIP"

Slowly Dripping
Spigot Wastes
15 Gallons a day.

1/32" Leak Wastes
25 Gallons a day.

1/16" Stream Wastes
100 Gallons a Day.

1/8" Stream Wastes
400 Gallons a day.

ORDINANCE NO. 2108

BILL NO. 6 (1992)

Draft 1

A BILL FOR AN ORDINANCE AMENDING CHAPTER 16.20 OF THE MAUI COUNTY CODE, PERTAINING TO THE PLUMBING CODE

BE IT ORDAINED BY THE PEOPLE OF THE COUNTY OF MAUI:

SECTION 1. Title 16 of the Maui County Code is amended by adding a new section to Chapter 10 of the Uniform Plumbing Code to be designated and to read as follows:

"**16.20.675 Section 1050 added.** Chapter 10 of the Uniform Plumbing Code is amended by adding a new section, pertaining to low-flow water fixtures and devices, to be designated and to read as follows:

Sec. 1050 Low-flow water fixtures and devices. (a) This section establishes maximum rates of water flow or discharge for plumbing fixtures and devices in order to promote water conservation.

(b) For the plumbing fixtures and devices covered in this section, manufacturers or their local distributors shall provide proof of compliance with the performance requirements established by the American National Standards Institute (ANSI) and such other proof as may be required by the director of public works. There shall be no charge for this registration process.

(c) Effective December 31, 1992, only plumbing fixtures and devices specified in this section shall be offered for sale or installed in the County of Maui, unless otherwise indicated in this section. All plumbing fixtures and devices which were installed before December 31, 1992, shall be allowed to be used, repaired or replaced after December 31, 1992.

(1) Faucets (kitchen): All kitchen and bar sink faucets shall be designed, manufactured, installed or equipped with a flow control device or aerator which will prevent a water flow rate in excess of two and two-tenths gallons per minute at sixty pounds per square inch of water pressure.

(2) Faucets (lavatory): All lavatory faucets shall be designed, manufactured, installed or equipped with a flow control device or aerator which will prevent a water flow rate in excess of two and two tenths gallons per minute at sixty pounds per square inch of water

pressure.

(3) Faucets (public rest rooms): In addition to the lavatory requirements set forth in paragraph (2), lavatory faucets located in rest rooms intended for use by the general public shall be of the metering or self-closing types.

(4) Hose bibbs: Water supply faucets or valves shall be provided with approved flow control devices which limit flow to a maximum three gallons per minute.

EXCEPTIONS: (A) Hose bibbs or valves not used for fixtures or equipment designated by the director of public works.

(B) Hose bibbs, faucets, or valves serving fixed demand, timing, or water level control appliances, and equipment or holding structures such as water closets, pools, automatic washers, and other similar equipment.

(5) Showerheads: Showerheads, except where provided for safety or emergency reasons, shall be designed, manufactured, or installed with a flow limitation device which will prevent a water flow rate in excess of two and one-half gallons per minute at eighty pounds per square inch of water pressure. The flow limitation device must be a permanent and integral part of the showerhead and must not be removable to allow flow rates in excess of two and one-half gallons per minute or must be mechanically retained requiring force in excess of eight pounds to remove.

(6) Urinals: Urinals shall be designed, manufactured, or installed so that the maximum flush will not exceed one gallon of water. Adjustable type flushometer valves may be used provided they are adjusted so the maximum flush will not exceed one and six tenths gallons of water.

(7) Water closets (toilets): Water closets shall be designed, manufactured, or installed so that the maximum flush will not exceed one and six tenths gallons of water.

(d) Beginning December 31, 1992, it is unlawful to sell or install any plumbing fixtures or devices not specified in this section, except as permitted under this section.

(e) The director of public works may exempt the use of low-flow water fixtures and devices if there is a finding that the use of such fixtures and devices would not be consistent with accepted engineering practices and would be detrimental to the public health, safety and welfare.

WE HEREBY CERTIFY that the foregoing BILL NO. 6 (1992), Draft 1

1. Passed FINAL READING at the meeting of the Council of the County of Maui, State of Hawaii, held on the 1st day of May, 1992, by the following votes:

Howard S. KIHUNE Chair	Patrick S. KAWANO Vice-Chair	Vince G. BAGOYO, Jr.	Goro HOKAMA	Alice L. LEE	Ricardo MEDINA	Wayne K. NISHIKI	Joe S. TANAKA	Leinaala TERUYA DRUMMOND
Aye	Aye	Excused	Excused	Aye	Aye	Aye	Aye	Aye

2. Was transmitted to the Mayor of the County of Maui, State of Hawaii, on the 1st day of May, 1992.

DATED AT WAILUKU, MAUI, HAWAII, this 1st day of May, 1992.

HOWARD S. KIHUNE, CHAIR
Council of the County of Maui

DARYL T. YAMAMOTO, COUNTY CLERK
County of Maui

THE FOREGOING BILL IS HEREBY APPROVED THIS 5th DAY OF MAY, 1992.

LINDA CROCKETT LINGLE, MAYOR
County of Maui

I HEREBY CERTIFY that upon approval of the foregoing BILL by the Mayor of the County of Maui, the said BILL was designated as ORDINANCE NO. 2108 of the County of Maui, State of Hawaii.

DARYL T. YAMAMOTO, COUNTY CLERK
County of Maui

Passed First Reading on January 17, 1992.
Effective date of Ordinance May 5, 1992.

I HEREBY CERTIFY that the foregoing is a true and correct copy of Ordinance No. 2108, the original of which is on file in the Office of the County Clerk, County of Maui, State of Hawaii.

Dated at Wailuku, Hawaii, on

County Clerk, County of Maui

(f) Any person violating this section shall be fined $250 for each violation and shall correct all instances of non-compliance for which a citation is issued. Violation of this section shall constitute a violation as defined in section 701-107 Hawaii Revised Statutes and shall be enforceable by employees of the department of public works. The foregoing fine may also be imposed in a civil, administrative proceeding pursuant to Rules and Regulations adopted by the department of public works in accordance with chapter 91 Hawaii Revised Statutes."

SECTION 2. New material is underscored. In printing this bill, the County Clerk need not include the underscoring.

SECTION 3. This ordinance shall take effect upon its approval.

APPROVED AS TO FORM
AND LEGALITY:

HOWARD M. FUKUSHIMA
Deputy Corporation Counsel
County of Maui
c:\wp51\ords\flows4\pk

United States
Environmental Protection
Agency

Office of Water
Washington, DC 20460

840-B-92-002
January 1993

EPA

Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of
Section 6217(g) of the Coastal Zone Act
Reauthorization Amendments of 1990

III. CONSTRUCTION ACTIVITIES

A. Construction Site Erosion and Sediment Control Management Measure

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

(2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

1. Applicability

This management measure is intended to be applied by States to all construction activities on sites less than 5 acres in areas that do not have an NPDES permit[3] in order to control erosion and sediment loss from those sites. This management measure does not apply to: (1) construction of a detached single family home on a site of 1/2 acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. (NOTE: All construction activities, including clearing, grading, and excavation, that result in the disturbance of areas greater than or equal to 5 acres or are a part of a larger development plan are covered by the NPDES regulations and are thus excluded from these requirements.) Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The goal of this management measure is to reduce the sediment loadings from construction sites in coastal areas that enter surface waterbodies. This measure requires that coastal States establish new or enhance existing State erosion and sediment control (ESC) programs and/or require ESC programs at the local level. It is intended to be part of a comprehensive land use or watershed management program, as previously detailed in the Watershed and Site Development Management Measures. It is expected that State and local programs will establish criteria determined by local conditions (e.g., soil types, climate, meteorology) that reduce erosion and sediment transport from construction sites.

Runoff from construction sites is by far the largest source of sediment in urban areas under development (York County Soil and Water Conservation District, 1990). Soil erosion removes over 90 percent of sediment by tonnage in urbanizing areas where most construction activities occur (Canning, 1988). Table 4-14 illustrates some of the

[3] On May 27, 1992, the United States Court of Appeals for the Ninth Circuit invalidated EPA's exemption of construction sites smaller than 5 acres from the storm water permit program in *Natural Resources Defense Council* v. *EPA*, 965 F.2d 759 (9th Cir. 1992). EPA is conducting further rulemaking proceedings on this issue and will not require permit applications for construction activities under 5 acres until further rulemaking has been completed.

measured sediment loading rates associated with construction activities found across the United States. As seen in Table 4-14, erosion rates from natural areas such as undisturbed forested lands are typically less than one ton/acre/year, while erosion from construction sites ranges from 7.2 to over 1,000 tons/acre/year.

Table 4-14. Erosion and Sediment Problems Associated With Construction

Location	Problem	Reference
United States	Sediment loading rates vary from 36.5 to 1,000 ton/ac/yr. These are 5 to 500 times greater than those from undeveloped land. Approximately 600 million tons of soil erodes from developed sites each year. Construction site sediment in runoff can be 10 to 20 times greater than that from agricultural lands.	York County Soil and Water Conservation District, 1990
Franklin County, FL	Sediment yield (ton/ac/yr): forest < 0.5 rangeland < 0.5 tilled 1.4 construction site 30 established urban < 0.5	Franklin County, FL
Wisconsin	Erosion rates range from 30 to 200 ton/ac/yr (10 to 20 times those of cropland).	Wisconsin Legislative Council, 1991
Washington, DC	Erosion rates range from 35 to 45 ton/ac/yr (10 to 100 times greater than agriculture and stabilized urban land uses).	MWCOG, 1987
Anacostia River Basin, VA, MD, DC	Sediment yields from portions of the Anacostia Basin have been estimated at 75,000 to 132,000 ton/yr.	U.S. Army Corps of Engineers, 1990
Washington	Erosion rates range from 50 to 500 ton/ac/yr. Natural erosion rates from forests or well-sodded prairies are 0.01 to 1.0 ton/ac/yr.	Washington Department of Ecology, 1989
Anacostia River Basin, VA, MD, DC	Erosion rates range from 7.2 to 100.8 ton/ac/yr.	USGS, 1978
Alabama	1.4 million tons eroded per year.	Woodward-Clyde, 1991
North Carolina	6.7 million tons eroded per year.	
Louisiana	5.1 million tons eroded per year.	
Oklahoma	4.2 million tons eroded per year.	
Georgia	3.8 million tons eroded per year.	
Texas	3.5 million tons eroded per year.	
Tennessee	3.3 million tons eroded per year.	
Pennsylvania	3.1 million tons eroded per year.	
Ohio	3.0 million tons eroded per year.	
Kentucky	3.0 million tons eroded per year.	

Eroded sediment from construction sites creates many problems in coastal areas including adverse impacts on water quality, critical habitats, submerged aquatic vegetation (SAV) beds, recreational activities, and navigation (APWA, 1991). For example, the Miami River in Florida has been severely affected by pollution associated with upland erosion. This watershed has undergone extensive urbanization, which has included the construction of many commercial and residential buildings over the past 50 years. Sediment deposited in the Miami River channel contributes to the severe water quality and navigation problems of this once-thriving waterway, as well as Biscayne Bay (SFWMD, 1988).

ESC plans are important for controlling the adverse impacts of construction and land development and have been required by many State and local governments, as shown in Table 4-13 (in the Site Development section of this chapter). An ESC plan is a document that explains and illustrates the measures to be taken to control erosion and sediment problems on construction sites (Connecticut Council on Soil and Water Conservation, 1988). It is intended that existing State and local erosion and sediment control plans may be used to fulfill the requirements of this management measure. Where existing ESC plans do not meet the management measure criteria, inadequate plans may be enhanced to meet the management measure guidelines.

Typically, an ESC plan is part of a larger site plan and includes the following elements:

- Description of predominant soil types;
- Details of site grading including existing and proposed contours;
- Design details and locations for structural controls;
- Provisions to preserve topsoil and limit disturbance;
- Details of temporary and permanent stabilization measures; and
- Description of the sequence of construction.

ESC plans ensure that provisions for control measures are incorporated into the site planning stage of development and provide for the reduction of erosion and sediment problems and accountability if a problem occurs (York County Soil and Water Conservation District, 1990). An effective plan for urban runoff management on construction sites will control erosion, retain sediments on site, to the extent practicable, and reduce the adverse effects of runoff. Climate, topography, soils, drainage patterns, and vegetation will affect how erosion and sediment should be controlled on a site (Washington State Department of Ecology, 1989). An effective ESC plan includes both structural and nonstructural controls. Nonstructural controls address erosion control by decreasing erosion potential, whereas structural controls are both preventive and mitigative because they control both erosion and sediment movement.

Typical nonstructural erosion controls include (APWA, 1991; York County Soil and Water Conservation District, 1990):

- Planning and designing the development within the natural constraints of the site;
- Minimizing the area of bare soil exposed at one time (phased grading);
- Providing for stream crossing areas for natural and man-made areas; and
- Stabilizing cut-and-fill slopes caused by construction activities.

Structural controls include:

- Perimeter controls;
- Mulching and seeding exposed areas;
- Sediment basins and traps; and
- Filter fabric, or silt fences.

Some erosion and soil loss are unavoidable during land-disturbing activities. While proper siting and design will help prevent areas prone to erosion from being developed, construction activities will invariably produce conditions where erosion may occur. To reduce the adverse impacts associated with construction, the construction management measure suggests a system of nonstructural and structural erosion and sediment controls for incorporation into an

ESC plan. Erosion controls have distinct advantages over sediment controls. Erosion controls reduce the amount of sediment transported off-site, thereby reducing the need for sediment controls. When erosion controls are used in conjunction with sediment controls, the size of the sediment control structures and associated maintenance may be reduced, decreasing the overall treatment costs (SWRPC, 1991).

3. Management Measure Selection

This management measure was selected to minimize sediment being transported outside the perimeter of a construction site through two broad performance goals: (1) **reduce** erosion and (2) **retain** sediment onsite, to the extent practicable. These performance goals were chosen to allow States and local governments flexibility in specifying practices appropriate for local conditions.

While several commentors responding to the draft (May 1991) guidance expressed the need to define "more measurable, enforceable ways" to control sediment loadings, other commentors stressed the need to draft management measures that do not conflict with existing State programs and allow States and local governments to determine appropriate practices and design standards for their communities. These management measures were selected because virtually all coastal States control construction activities to prevent erosion and sediment loss.

The measures were specifically written for the following reasons:

(1) Predevelopment loadings may vary greatly, and some sediment loss is usually inevitable;

(2) Current practice is built on the use of systems of practices selected based on site-specific conditions; and

(3) The combined effectiveness of erosion and sediment controls in systems is not easily quantified.

4. Erosion Control Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Erosion controls are used to reduce the amount of sediment that is detached during construction and to prevent sediment from entering runoff. Erosion control is based on two main concepts: (1) disturb the smallest area of land possible for the shortest period of time, and (2) stabilize disturbed soils to prevent erosion from occurring.

a. *Schedule projects so clearing and grading are done during the time of minimum erosion potential.*

Often a project can be scheduled during the time of year that the erosion potential of the site is relatively low. In many parts of the country, there is a certain period of the year when erosion potential is relatively low and construction scheduling could be very effective. For example, in the Pacific region if construction can be completed during the 6-month dry season (May 1 - October 31), temporary erosion and sediment controls may not be needed. In addition, in some parts of the country erosion potential is very high during certain parts of the year such as the spring thaw in northern areas. During this time of year, melting snowfall generates a constant runoff that can erode soil. In addition, construction vehicles can easily turn the soft, wet ground into mud, which is more easily washed offsite. Therefore, in the north, limitations should be placed on grading during the spring thaw (Goldman et al., 1986).

b. *Stage construction.*

Avoid areawide clearance of construction sites. Plan and stage land disturbance activities so that only the area currently under construction is exposed. As soon as the grading and construction in an area are complete, the area should be stabilized.

By clearing only those areas immediately essential for completing site construction, buffer zones are preserved and soil remains undisturbed until construction begins. Physical markers, such as tape, signs, or barriers, indicating the limits of land disturbance, can ensure that equipment operators know the proposed limits of clearing. The area of the watershed that is exposed to construction is important for determining the net amount of erosion. Reducing the extent of the disturbed area will ultimately reduce sediment loads to surface waters. Existing or newly planted vegetation that has been planted to stabilize disturbed areas should be protected by routing construction traffic around and protecting natural vegetation with fencing, tree armoring, retaining walls, or tree wells.

c. *Clear only areas essential for construction.*

Often areas of a construction site are unnecessarily cleared. Only those areas essential for completing construction activities should be cleared, and other areas should remain undisturbed. Additionally, the proposed limits of land disturbance should be physically marked off to ensure that only the required land area is cleared. Avoid disturbing vegetation on steep slopes or other critical areas.

d. *Locate potential nonpoint pollutant sources away from steep slopes, waterbodies, and critical areas.*

Material stockpiles, borrow areas, access roads, and other land-disturbing activities can often be located away from critical areas such as steep slopes, highly erodible soils, and areas that drain directly into sensitive waterbodies.

e. *Route construction traffic to avoid existing or newly planted vegetation.*

Where possible, construction traffic should travel over areas that must be disturbed for other construction activity. This practice will reduce the area that is cleared and susceptible to erosion.

f. *Protect natural vegetation with fencing, tree armoring, and retaining walls or tree wells.*

Tree armoring protects tree trunks from being damaged by construction equipment. Fencing can also protect tree trunks, but should be placed at the tree's drip line so that construction equipment is kept away from the tree. The tree drip line is the minimum area around a tree in which the tree's root system should not be disturbed by cut, fill, or soil compaction caused by heavy equipment. When cutting or filling must be done near a tree, a retaining wall or tree well should be used to minimize the cutting of the tree's roots or the quantity of fill placed over the tree's roots.

g. *Stockpile topsoil and reapply to revegetate site.*

Because of the high organic content of topsoil, it cannot be used as fill material or under pavement. After a site is cleared, the topsoil is typically removed. Since topsoil is essential to establish new vegetation, it should be stockpiled and then reapplied to the site for revegetation, if appropriate. Although topsoil salvaged from the existing site can often be used, it must meet certain standards and topsoil may need to be imported onto the site if the existing topsoil is not adequate for establishing new vegetation.

h. Cover or stabilize topsoil stockpiles.

Unprotected stockpiles are very prone to erosion and therefore stockpiles must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles should be stabilized by erosion blankets, seeding, and/or mulching.

i. Use wind erosion controls.

Wind erosion controls limit the movement of dust from disturbed soil surfaces and include many different practices. Wind barriers block air currents and are effective in controlling soil blowing. Many different materials can be used as wind barriers, including solid board fence, snow fences, and bales of hay. Sprinkling moistens the soil surface with water and must be repeated as needed to be effective for preventing wind erosion (Delaware DNREC, 1989); however, applications must be monitored to prevent excessive runoff and erosion.

j. Intercept runoff above disturbed slopes and convey it to a permanent channel or storm drain.

Earth dikes, perimeter dikes or swales, or diversions can be used to intercept and convey runoff above disturbed areas. An earth dike is a temporary berm or ridge of compacted soil that channels water to a desired location. A perimeter dike/swale or diversion is a swale with a supporting ridge on the lower side that is constructed from the soil excavated from the adjoining swale (Delaware DNREC, 1989). These practices should be used to intercept flow from denuded areas or newly seeded areas to keep the disturbed areas from being eroded from the uphill runoff. The structures should be stabilized within 14 days of installation. A pipe slope drain, also known as a pipe drop structure, is a temporary pipe placed from the top of a slope to the bottom of the slope to convey concentrated runoff down the slope without causing erosion (Delaware DNREC, 1989).

k. On long or steep, disturbed, or man-made slopes, construct benches, terraces, or ditches at regular intervals to intercept runoff.

Benches, terraces, or ditches break up a slope by providing areas of low slope in the reverse direction. This keeps water from proceeding down the slope at increasing volume and velocity. Instead, the flow is directed to a suitable outlet, such as a sediment basin or trap. The frequency of benches, terraces, or ditches will depend on the erodibility of the soils, steepness and length of the slope, and rock outcrops. This practice should be used if there is a potential for erosion along the slope.

l. Use retaining walls.

Often retaining walls can be used to decrease the steepness of a slope. If the steepness of a slope is reduced, the runoff velocity is decreased and, therefore, the erosion potential is decreased.

m. Provide linings for urban runoff conveyance channels.

Often construction increases the velocity and volume of runoff, which causes erosion in newly constructed or existing urban runoff conveyance channels. If the runoff during or after construction will cause erosion in a channel, the channel should be lined or flow control BMPs installed. The first choice of lining should be grass or sod since this reduces runoff velocities and provides water quality benefits through filtration and infiltration. If the velocity in the channel would erode the grass or sod, then riprap, concrete, or gabions can be used.

n. Use check dams.

Check dams are small, temporary dams constructed across a swale or channel. They can be constructed using gravel or straw bales. They are used to reduce the velocity of concentrated flow and, therefore, to reduce the erosion in

a swale or channel. Check dams should be used when a swale or channel will be used for a short time and therefore it is not feasible or practical to line the channel or implement flow control BMPs (Delaware DNREC, 1989).

o. *Seed and fertilize.*

Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once a dense vegetative cover has been established. However, often seeding and fertilizing do not produce as thick a vegetative cover as do seed and mulch or netting. Newly established vegetation does not have as extensive a root system as existing vegetation and therefore is more prone to erosion, especially on steep slopes. Care should be taken when fertilizing to avoid untimely or excessive application. Since the practice of seeding and fertilizing does not provide any protection during the time of vegetative establishment, it should be used only on favorable soils in very flat areas and not in sensitive areas.

p. *Use seeding and mulch/mats.*

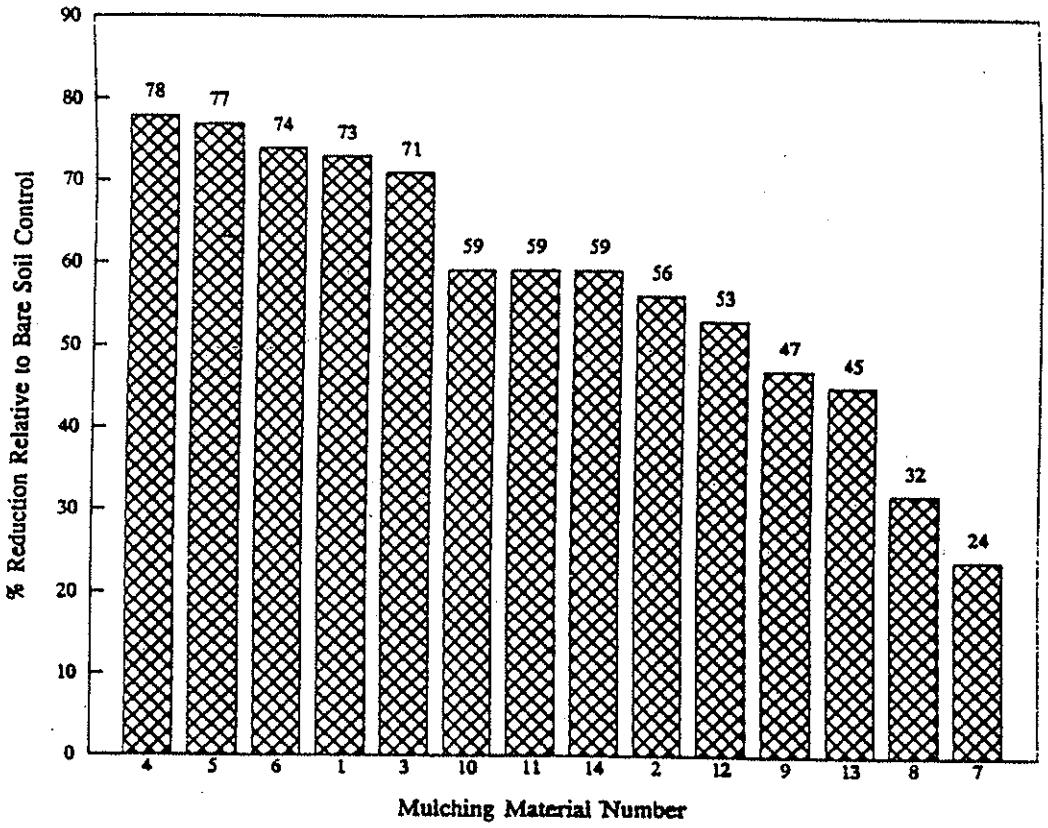
Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once the vegetative cover has been established. The mulching/mats protect the disturbed area while the vegetation becomes established.

The management of land by using ground cover reduces erosion by reducing the flow rate of runoff and the raindrop impact. Bare soils should be seeded or otherwise stabilized within 15 calendar days after final grading. Denuded areas that are inactive and will be exposed to rain for 30 days or more should also be temporarily stabilized, usually by planting seeds and establishing vegetation during favorable seasons in areas where vegetation can be established. In very flat, non-sensitive areas with favorable soils, stabilization may involve simply seeding and fertilizing. Mulching and/or sodding may be necessary as slopes become moderate to steep, as soils become more erosive, and as areas become more sensitive.

q. *Use mulch/mats.*

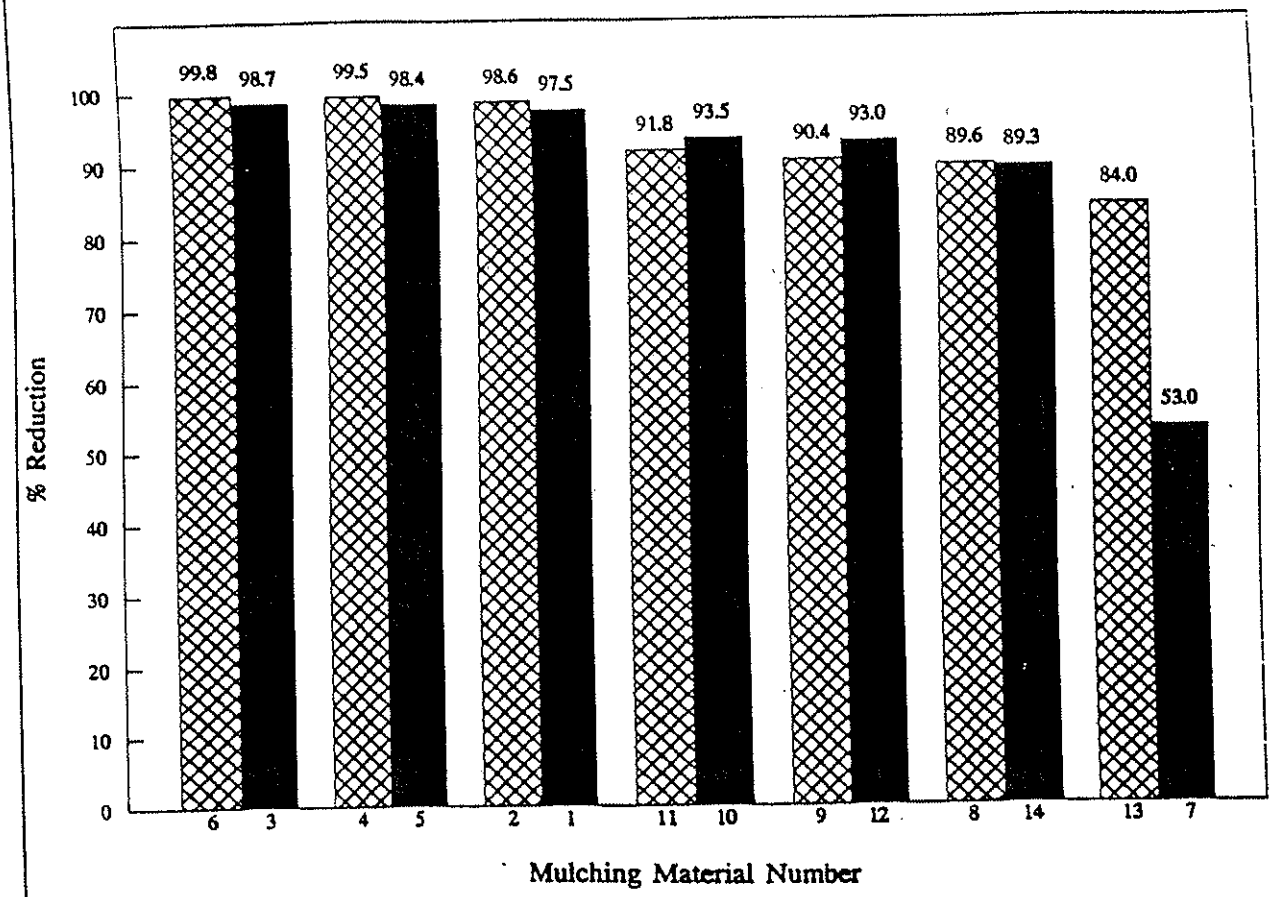
Mulching involves applying plant residues or other suitable materials on disturbed soil surfaces. Mulchs/mats used include tacked straw, wood chips, and jute netting and are often covered by blankets or netting. Mulching alone should be used only for temporary protection of the soil surface or when permanent seeding is not feasible. The useful life of mulch varies with the material used and the amount of precipitation, but is approximately 2 to 6 months. Figure 4-5 shows water velocity reductions that could be expected using various mulching techniques. Similarly, Figure 4-6 shows reductions in soil loss achievable using various mulching techniques. During times of year when vegetation cannot be established, soil mulching should be applied to moderate slopes and soils that are not highly erodible. On steep slopes or highly erodible soils, multiple mulching treatments should be used. On a high-elevation or desert site where grasses cannot survive the harsh environment, native shrubs may be planted. Interlocking ceramic materials, filter fabric, and netting are available for this purpose. Before stabilizing an area, it is important to have installed all sediment controls and diverted runoff away from the area to be planted. Runoff may be diverted away from denuded areas or newly planted areas using dikes, swales, or pipe slope drains to intercept runoff and convey it to a permanent channel or storm drain. Reserved topsoil may be used to revegetate a site if the stockpile has been covered and stabilized.

Consideration should be given to maintenance when designing mulching and matting schemes. Plastic nets are often used to cover the mulch or mats; however, they can foul lawn mower blades if the area requires mowing.



Mulch Material	Characteristics
1	100% wheat straw/top net
2	100% wheat straw/two nets
3	70% wheat straw/30% coconut fiber
4	70% wheat straw/30% coconut fiber
5	100% coconut fiber
6	Nylon monofilament/two nets
7	Nylon monofilament/rigid/bonded
8	Vinyl monofilament/flexible/bonded
9	Curled wood fibers/top net
10	Curled wood fibers/two nets
11	Antiwash netting (jute)
12	Interwoven paper and thread
13	Uncrimped wheat straw – 2,242 kg/ha
14	Uncrimped wheat straw – 4,484 kg/ha

Figure 4-5. Water velocity reductions for different mulch treatments (adapted from Harding, 1990).



Mulch Material	Characteristics
1	100% wheat straw/top net
2	100% wheat straw/two nets
3	70% wheat straw/30% coconut fiber
4	70% wheat straw/30% coconut fiber
5	100% coconut fiber
6	Nylon monofilament/two nets
7	Nylon monofilament/rigid/bonded
8	Vinyl monofilament/flexible/bonded
9	Curled wood fibers/top net
10	Curled wood fibers/two nets
11	Antiwash netting (jute)
12	Interwoven paper and thread
13	Uncrimped wheat straw – 2,242 kg/ha
14	Uncrimped wheat straw – 4,484 kg/ha

Figure 4-6. Actual soil loss reductions for different mulch treatments (adapted from Harding, 1990).

r. Use sodding.

Sodding permanently stabilizes an area. Sodding provides immediate stabilization of an area and should be used in critical areas or where establishment of permanent vegetation by seeding and mulching would be difficult. Sodding is also a preferred option when there is a high erosion potential during the period of vegetative establishment from seeding.

s. Use wildflower cover.

Because of the hardy drought-resistant nature of wildflowers, they may be more beneficial as an erosion control practice than turf grass. While not as dense as turfgrass, wildflower thatches and associated grasses are expected to be as effective in erosion control and contaminant absorption. Because thatches of wildflowers do not need fertilizers, pesticides, or herbicides, and watering is minimal, implementation of this practice may result in a cost savings (Brash et al., undated). In 1987, Howard County, Maryland, spent $690.00 per acre to maintain turfgrass areas, compared to only $31.00 per acre for wildflower meadows (Wilson, 1990).

A wildflower stand requires several years to become established; maintenance requirements are minimal once the area is established (Brash et al., undated).

5. Sediment Control Practices[4]

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Sediment controls capture sediment that is transported in runoff. Filtration and detention (gravitational settling) are the main processes used to remove sediment from urban runoff.

a. Sediment Basins

Sediment basins, also known as silt basins, are engineered impoundment structures that allow sediment to settle out of the urban runoff. They are installed prior to full-scale grading and remain in place until the disturbed portions of the drainage area are fully stabilized. They are generally located at the low point of sites, away from construction traffic, where they will be able to trap sediment-laden runoff.

Sediment basins are typically used for drainage areas between 5 and 100 acres. They can be classified as either temporary or permanent structures, depending on the length of service of the structure. If they are designed to function for less than 36 months, they are classified as "temporary"; otherwise, they are considered permanent structures. Temporary sediment basins can also be converted into permanent urban runoff management ponds. When sediment basins are designed as permanent structures, they must meet all standards for wet ponds.

b. Sediment Trap

Sediment traps are small impoundments that allow sediment to settle out of runoff water. Sediment traps are typically installed in a drainageway or other point of discharge from a disturbed area. Temporary diversions can be

[4]Adapted from Goldman (1986).

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used to direct runoff to the sediment trap. Sediment traps should not be used for drainage areas greater than 5 acres and typically have a useful life of approximately 18 to 24 months.

c. Filter Fabric Fence

Filter fabric fence is available from many manufacturers and in several mesh sizes. Sediment is filtered out as urban runoff flows through the fabric. Such fences should be used only where there is sheet flow (i.e., no concentrated flow), and the maximum drainage area to the fence should be 0.5 acre or less per 100 feet of fence. Filter fabric fences have a useful life of approximately 6 to 12 months.

d. Straw Bale Barrier

A straw bale barrier is a row of anchored straw bales that detain and filter urban runoff. Straw bales are less effective than filter fabric, which can usually be used in place of straw bales. However, straw bales have been effectively used as temporary check dams in channels. As with filter fabric fences, straw bale barriers should be used only where there is sheet flow. The maximum drainage area to the barrier should be 0.25 acre or less per 100 feet of barrier. The useful life of straw bales is approximately 3 months.

e. Inlet Protection

Inlet protection consists of a barrier placed around a storm drain drop inlet, which traps sediment before it enters the storm sewer system. Filter fabric, straw bales, gravel, or sand bags are often used for inlet protection.

f. Construction Entrance

A construction entrance is a pad of gravel over filter cloth located where traffic leaves a construction site. As vehicles drive over the gravel, mud, and sediment are collected from the vehicles' wheels and offsite transport of sediment is reduced.

g. Vegetated Filter Strips

Vegetated filter strips are low-gradient vegetated areas that filter overland sheet flow. Runoff must be evenly distributed across the filter strip. Channelized flows decrease the effectiveness of filter strips. Level spreading devices are often used to distribute the runoff evenly across the strip (Dillaha et al., 1989).

Vegetated filter strips should have relatively low slopes and adequate length and should be planted with erosion-resistant plant species. The main factors that influence the removal efficiency are the vegetation type, soil infiltration rate, and flow depth and travel time. These factors are dependent on the contributing drainage area, slope of strip, degree and type of vegetative cover, and strip length. Maintenance requirements for vegetated filter strips include sediment removal and inspections to ensure that dense, vigorous vegetation is established and concentrated flows do not occur. Maintenance of these structures is discussed in Section II.A of this chapter.

6. Effectiveness and Cost Information

a. Erosion Control Practices

The effectiveness of erosion control practices can vary based on land slope, the size of the disturbed area, rainfall frequency and intensity, wind conditions, soil type, use of heavy machinery, length of time soils are exposed and unprotected, and other factors. In general, a system of erosion and sediment control practices can more effectively reduce offsite sediment transport than can a single system. Numerous nonstructural measures such as protecting natural or newly planted vegetation, minimizing the disturbance of vegetation on steep slopes and other highly

erodible areas, maximizing the distance eroded material must travel before reaching the drainage system, and locating roads away from sensitive areas may be used to reduce erosion.

Table 4-15 contains the available cost and effectiveness data for some of the erosion controls listed above. Information on the effectiveness of individual nonstructural controls was not available. All reported effectiveness data assume that controls are properly designed, constructed, and maintained. Costs have been broken down into annual capital costs, annual maintenance costs, and total annual costs (including annualization of the capital costs).

b. Sediment Control Practices

Regular inspection and maintenance are needed for most erosion control practices to remain effective. The effectiveness of sediment controls will depend on the size of the construction site and the nature of the runoff flows. Sediment basins are most appropriate for drainage areas of 5 acres or greater. In smaller areas with concentrated flows, silt traps may suffice. Where concentrated flow leaves the site and the drainage area is less than 0.5 ac/100 ft of flow, filter fabric fences may be effective. In areas where sheet flow leaves the site and the drainage area is greater than 0.5 acre/100 ft of flow, perimeter dikes may be used to divert the flow to a sediment trap or sediment basin. Urban runoff inlets may be protected using straw bales or diversions to filter or route runoff away from the inlets.

Table 4-16 describes the general cost and effectiveness of some common sediment control practices.

c. Comparisons

Figure 4-7 illustrates the estimated TSS loading reductions from Maryland construction sites possible using a combination of erosion and sediment controls in contrast to using only sediment controls. Figure 4-8 shows a comparison of the cost and effectiveness of various erosion control practices. As can be seen in Figure 4-8, seeding or seeding and mulching provide the highest levels of control at the lowest cost.

Table 4-15. ESC Quantitative Effectiveness and Cost Summary

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Sod	Immediate erosion protection where there is high erosion potential during vegetative establishment.	Average: 99% Observed range: 98% - 99% References: Minnesota Pollution Control Agency, 1989; Pennsylvania, 1983 cited in USEPA, 1991	2	Average: $0.2 per ft^2 [$11,300 per acre] Range: $0.1 - $1.1 References: SWRPC, 1991; Schueler, 1987; Virginia, 1980	Average: 5% Range: 5% Reference: SWRPC, 1991	$0.20 per ft^2 $7,500 per acre
Seed	Establish vegetation on disturbed area.	After vegetation established- Average: 90% Observed range: 50% - 100% References: SCS, 1985 cited in EPA, 1991; Minnesota Pollution Control Agency, 1989; Oberts, 1984 cited in City of Austin, 1988; Delaware Department of Natural Resources, 1989	2	Average: $400 per acre Range: $200 - $1000 per acre References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986; Virginia, 1980	Average: 20% Range: 15% - 25% References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991	$300 per acre
Seed and Mulch	Establish vegetation on disturbed area.	After vegetation established- Average: 90% Observed range: 50% - 100% References: SCS, 1985 cited in EPA, 1991; Minnesota Pollution Control Agency, 1989; Oberts, 1984 cited in City of Austin, 1988; Delaware Department of Natural Resources, 1989	2	Average: $1,500 per acre Range: $800 - $3,500 per acre References: Goldman, 1986; Washington DOT, 1990; NC State, 1990; Schueler, 1987; Virginia, 1980; SWRPC, 1991	Average: NA[b] Range: NA References: None	$1,100 per acre

Table 4-15. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Mulch	Temporary stabilization of disturbed area.	Observed range: sand: 20% slope / 50% slope wood fiber @ 1500 lb/ac: 50-60% / 0-20% wood fiber @ 3000 lb/ac: 50-85% / 50-70% straw @ 3000 lb/ac: 90-100% / 95% Silt-loam: 20% slope / 50% slope wood fiber @ 1500 lb/ac: 20-60% / 40-60% wood fiber @ 3000 lb/ac: 60-90% / 60-70% straw @ 3000 lb/ac: 80-95% / 70-90% Silt-clay-loam: 10-30% slope / 30-50% slope wood fiber @ 1500 lb/ac: 5% / -- wood fiber @ 3000 lb/ac: 40% / -- jute netting: 30-60% / 30% straw @ 3000 lb/ac: 40-70% / 20-40% wood chips @ 10,000 lb/ac: 60-80% / 50-60% mulch blanket: 60-80% / 50-60% excelsior blanket: 60-80% / 50-60% multiple treatment (straw and jute): 90% / 90% References: Minnesota Pollution Control Agency, 1989; Kay, 1983 cited in Goldman, 1986	Straw mulch: 0.25 Wood fiber mulch: 0.33 Jute netting: 0.33 Straw and jute: 0.33	Straw mulch: Average: $1,700 per acre Range: $500 - $5,000 per acre References: Wisconsin DOT cited in SWRPC, 1991; Washington DOT, 1990; Virginia, 1980 Wood fiber mulch: Average: $1,000 per acre Range: $100 - $2,300 per acre References: Washington DOT, 1990; Virginia, 1980 Jute netting: Average: $3,700 per acre Range: $3,500-$4,100 per acre References: Washington DOT, 1990; Virginia, 1980 Straw and jute: Average: $5,400 per acre Range: $4,000-$9,100 per acre References: Washington DOT, 1990; Virginia, 1980	Average: NA[b] Range: NA References: None	Straw mulch: $7,500 per acre Wood fiber mulch: $3,500 per acre Jute netting: $12,500 per acre Straw and jute: $18,000 per acre

Table 4-15. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Terraces	Break up long or steep slopes.	Observed range: Land Slope / Reduction in Erosion 1-12% / 70% 12-18% / 60% 18-24% / 55% Additionally, if the slope steepness is halved, while other factors are held constant, the soil loss potential decreases 2-1/2 times. If both the slope and length are halved, the soil loss potential is decreased 4 times. References: Goldman, 1986; Beasley, 1972	2	Average: $5 per lin ft Range: $1 - $12 References: SWRPC, 1991; Goldman, 1986; Virginia, 1991	Average: 20% Range: 20% Reference: SWRPC, 1991	$4 per lin ft
All Erosion Controls	Reduce amount of sediment entering runoff.	Average: 85% Observed range: 85% Reference: Schueler, 1990	--	Varies but typically low	Varies but typically low	Varies but typically low

NA - Not available.
[a] Useful life estimated as length of construction project (assumed to be 2 years).
[b] For Total Annual Cost, assume Annual Maintenance Cost = 2% of construction cost.

Table 4-16. ESC Quantitative Effectiveness and Cost Summary for Sediment Control Practices

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Sediment basin	Minimum drainage area = 5 acres, maximum drainage area = 100 acres	Average: 70% Observed range: 55% - 100% References: Schueler, 1990; Engle, BW and Jarrett, AR, 1990; Baumann, 1990	2	Less than 50,000 ft^3 storage Average: \$0.60 per ft^3 storage (\$1,100 per drainage acre[c]) Range: \$0.20 - \$1.30 per ft^3	Average: 25% Range: 25% References: Denver COG cited in SWRPC, 1991; SWRPC, 1991	Less than 50,000 ft^3 storage \$0.40 per ft^3 storage \$700 per drainage acre[b]
				Greater than 50,000 ft^3 storage Average: \$0.3 per ft^3 storage (\$550 per drainage acre[c]) Range: \$0.10 - \$0.40 per ft^3 References: SWRPC, 1991		Greater than 50,000 ft^3 storage \$0.20 per ft^3 storage \$900 per drainage acre[c]
Sediment trap	Maximum drainage area = 5 acres	Average: 60% Observed range: (-7%) - 100% References: Schueler, et al., 1990; Tahoe Regional Planning Agency, 1989; Baumann, 1990	1.5	Average: \$0.60 per ft^3 storage (\$1,100 per drainage acre[c]) Range: \$0.20 - \$2.00 per ft^3 References: Denver COG cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986	Average: 20% Range: 20% References: Denver COG cited in SWRPC, 1991; SWRPC, 1991	\$0.70 per ft^3 storage \$1,300 per drainage acre[c]
Filter Fabric Fence	Maximum drainage area = 0.5 acre per 100 feet of fence. Not to be used in concentrated flow areas.	Average: 70% Observed range: 0% - 100% sand: 80% - 99% silt-loam: 50% - 80% silt-clay-loam: 0% - 20% References: Munson, 1991; Fisher et al., 1984; Minnesota Pollution Control Agency, 1989	0.5	Average: \$3 per lin ft (\$700 per drainage acre[c] Range: \$1 - \$8 per lin ft References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986; Virginia, 1991; NC State, 1990	Average: 100% Range: 100% References: SWRPC, 1991	\$7 per lin ft \$850 per drainage acre[c]

Table 4-16. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Straw Bale Barrier	Maximum drainage area = 0.25 acre per 100 feet of barrier. Not to be used in concentrated flow areas.	Average: 70% Observed Range: 70% References: Virginia, 1980 cited in EPA, 1991	0.25	Average: $4 per lin ft ($1,600 per drainage acre[d] Range: $2 - $6 per lin ft References: Goldman, 1986; Virginia, 1991	Average: 100% Range: 100% References: SWRPC, 1991	$17 per lin ft $6,800 per drainage acre[d]
Inlet Protection	Protect storm drain inlet.	Average: NA Observed Range: NA References: None	1	Average: $100 per inlet Range: $50 - $150 References: SWRPC, 1991; Denver COG cited in SWRPC, 1991; Virginia, 1991; EPA cited in SWRPC, 1991	Average: 60% Range: 20% - 100% References: SWRPC, 1991; Denver COG cited in SWRPC, 1991	$150 per inlet
Construction Entrance	Removes sediment from vehicles wheels.	Average: NA Observed Range: NA References: None	2	Average: $2,000 each Range: $1,000 - $4,000 References: Goldman, 1986; NC State, 1990	Average: NA[e] Range: NA References: None	$1,500 each
				With washrack: Average: $3,000 each Range: $1,000 - $5,000 References: Virginia, 1991		$2,200 each

Table 4-16. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Vegetative Filter Strip	Must have sheet flow.	Average: 70% Observed Range: 20% - 80% References: Hayes and Hairston, 1983 cited in Casman, 1990; Dillaha et al., 1989, cited in Glick et al., 1991; Virginia Department of Conservation, 1987; Nonpoint Source Control Task Force, 1983 cited in Minnesota PCA, 1989; Schueler, 1987	2	Established from existing vegetation- Average: $0 Range: $0 References: Schueler, 1987 Established from sod- Average: $11,300 per acre Range: $4,500 - $48,000 per acre References: Schueler, 1987; SWRPC, 1991	Average: NA Range: NA References: None	NA

NA - Not available.

[a] Useful life estimated as length of construction project (assumed to be 2 years)

[e] For Total Annual Cost, assume Annual Maintenance Cost=20% of construction cost.

[b] Assumes trap volume = 1800 cf/ac (0.5 inches runoff per acre).

[c] Assumes drainage area of 0.5 acre per 100 feet of fence (maximum allowed).

[d] Assumes drainage area of 0.25 acre per 100 feet of barrier (maximum allowed).

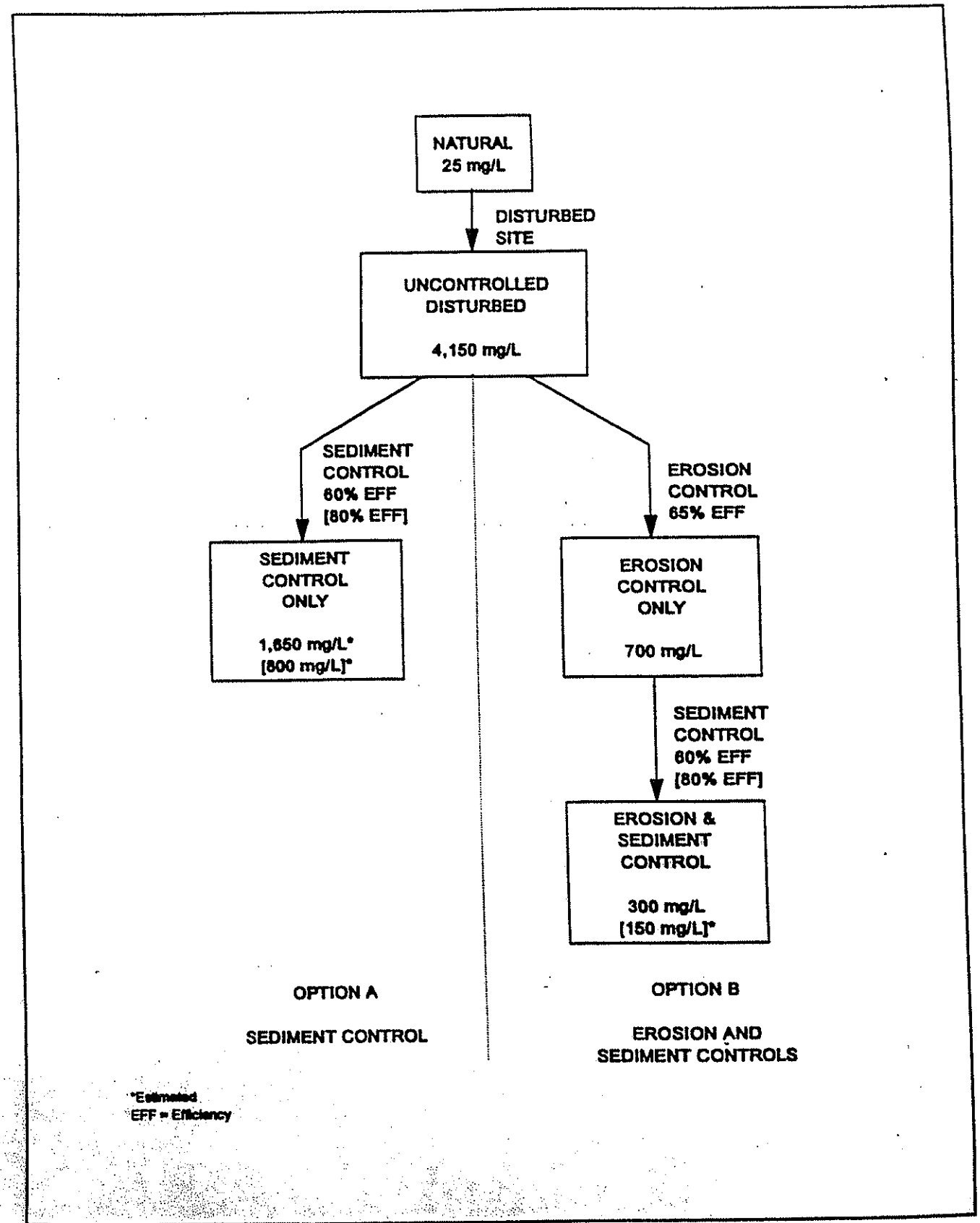

Figure 4-7. TSS concentrations from Maryland construction sites (Schueler, 1987).

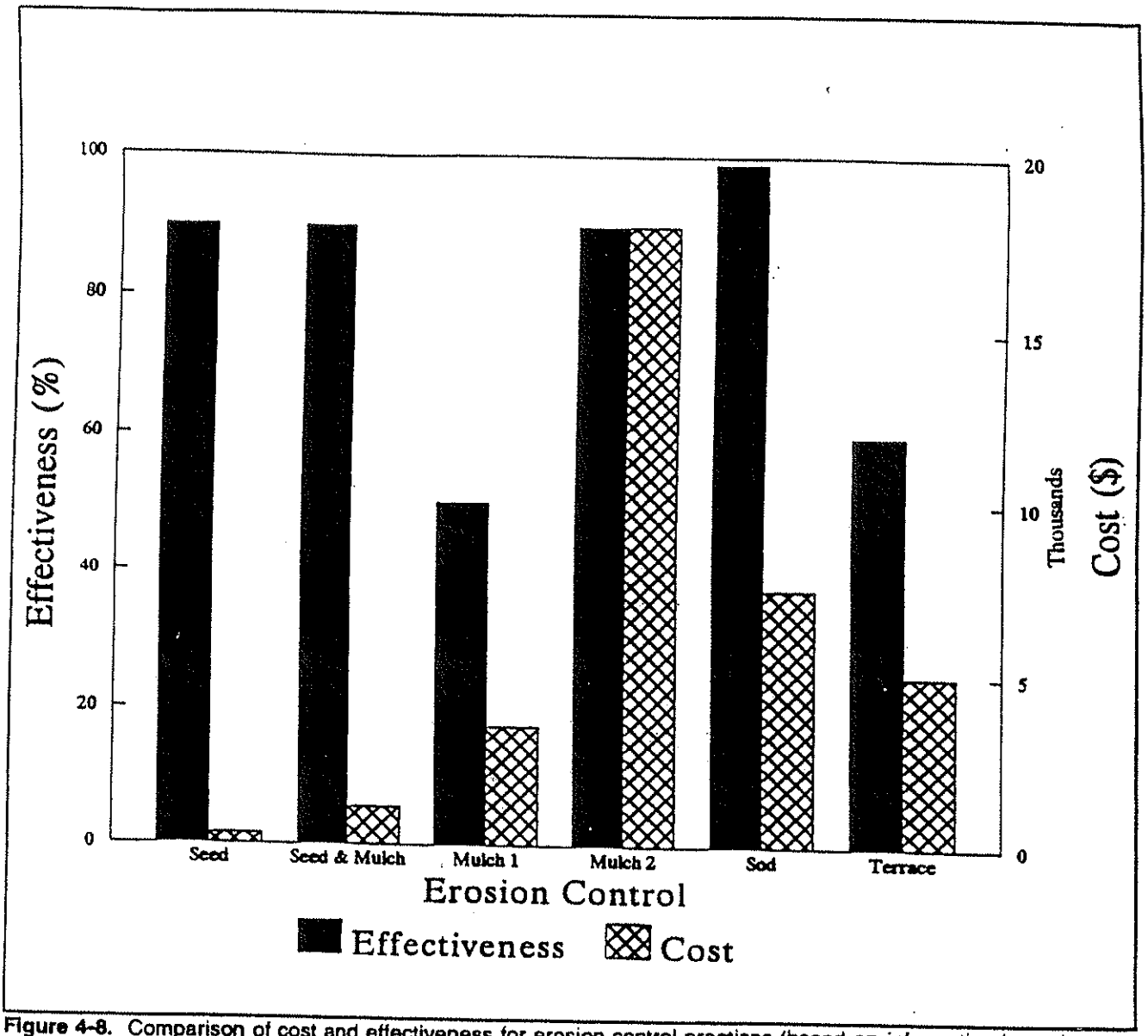

Figure 4-8. Comparison of cost and effectiveness for erosion control practices (based on information in Tables 4-15 and 4-16).

B. Construction Site Chemical Control Management Measure

(1) Limit application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

1. Applicability

This management measure is intended to be applied by States to all construction sites less than 5 acres in area and to new, resurfaced, restored, and reconstructed road, highway, and bridge construction projects. This management measure does not apply to: (1) construction of a detached single family home on a site of 1/2 acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. (NOTE: All construction activities, including clearing, grading, and excavation, that result in the disturbance of areas greater than or equal to 5 acres or are a part of a larger development plan are covered by the NPDES regulations and are thus excluded from these requirements.) Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformance with this management measure and will have flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The purpose of this management measure is to prevent the generation of nonpoint source pollution from construction sites due to improper handling and usage of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site.

Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides (insecticides, fungicides, herbicides, and rodenticides); fertilizers used for vegetative stabilization; petrochemicals (oils, gasoline, and asphalt degreasers); construction chemicals such as concrete products, sealers, and paints; wash water associated with these products; paper; wood; garbage; and sanitary wastes (Washington State Department of Ecology, 1991).

The variety of pollutants present and the severity of their effects are dependent on a number of factors:

(1) **The nature of the construction activity.** For example, potential pollution associated with fertilizer usage may be greater along a highway or at a housing development than it would be at a shopping center development because highways and housing developments usually have greater landscaping requirements.

(2) **The physical characteristics of the construction site.** The majority of all pollutants generated at construction sites are carried to surface waters via runoff. Therefore, the factors affecting runoff volume,

such as the amount, intensity, and frequency of rainfall; soil infiltration rates; surface roughness; slope length and steepness; and area denuded, all contribute to pollutant loadings.

(3) **The proximity of surface waters to the nonpoint pollutant source.** As the distance separating pollutant-generating activities from surface waters decreases, the likelihood of water quality impacts increases.

a. Pesticides

Insecticides, rodenticides, and herbicides are used on construction sites to provide safe and healthy conditions, reduce maintenance and fire hazards, and curb weeds and woody plants. Rodenticides are also used to control rodents attracted to construction sites. Common insecticides employed include synthetic, relatively water-insoluble chlorinated hydrocarbons, organophosphates, carbamates, and pyrethrins.

b. Petroleum Products

Petroleum products used during construction include fuels and lubricants for vehicles, for power tools, and for general equipment maintenance. Specific petroleum pollutants include gasoline, diesel oil, kerosene, lubricating oils, and grease. Asphalt paving also can be particularly harmful since it releases various oils for a considerable time period after application. Asphalt overloads might be dumped and covered without inspection. However, many of these pollutants adhere to soil particles and other surfaces and can therefore be more easily controlled.

c. Nutrients

Fertilizers are used on construction sites when revegetating graded or disturbed areas. Fertilizers contain nitrogen and phosphorus, which in large doses can adversely affect surface waters, causing eutrophication.

d. Solid Wastes

Solid wastes on construction sites are generated from trees and shrubs removed during land clearing and structure installation. Other wastes include wood and paper from packaging and building materials, scrap metals, sanitary wastes, rubber, plastic and glass, and masonry and asphalt products. Food containers, cigarette packages, leftover food, and aluminum foil also contribute solid wastes to the construction site.

e. Construction Chemicals

Chemical pollutants, such as paints, acids for cleaning masonry surfaces, cleaning solvents, asphalt products, soil additives used for stabilization, and concrete-curing compounds, may also be used on construction sites and carried in runoff.

f. Other Pollutants

Other pollutants, such as wash water from concrete mixers, acid and alkaline solutions from exposed soil or rock, and alkaline-forming natural elements, may also be present and contribute to nonpoint source pollution.

Revegetation of disturbed areas may require the use of fertilizers and pesticides, which, if not applied properly, may become nonpoint source pollutants. Many pesticides are restricted by Federal and/or State regulations.

Hydroseeding operations, in which seed, fertilizers, and lime are applied to the ground surface in a one-step operation, are more conducive to nutrient pollution than are the conventional seedbed-preparation operations, in which fertilizers and lime are tilled into the soil. Use of fertilizers containing little or no phosphorus may be required by

local authorities if the development is near sensitive waterbodies. The addition of lime can also affect the pH of sensitive waters, making them more alkaline.

Improper fueling and servicing of vehicles can lead to significant quantities of petroleum products being dumped onto the ground. These pollutants can then be washed off site in urban runoff, even when proper erosion and sediment controls are in place. Pollutants carried in solution in runoff water, or fixed with sediment crystalline structures, may not be adequately controlled by erosion and sediment control practices (Washington Department of Ecology, 1991). Oils, waxes, and water-insoluble pesticides can form surface films on water and solid particles. Oil films can also concentrate water-soluble insecticides. These pollutants can be nearly impossible to control once present in runoff other than by the use of very costly water-treatment facilities (Washington Department of Ecology, 1991).

After spill prevention, one of the best methods to control petroleum pollutants is to retain sediments containing oil on the construction site through use of erosion and sediment control practices. Improved maintenance and safe storage facilities will reduce the chance of contaminating a construction site. One of the greatest concerns related to use of petroleum products is the method for waste disposal. The dumping of petroleum product wastes into sewers and other drainage channels is illegal and could result in fines or job shutdown.

The primary control method for solid wastes is to provide adequate disposal facilities. Erosion and sediment control structures usually capture much of the solid waste from construction sites. Periodic removal of litter from these structures will reduce solid waste accumulations. Collected solid waste should be removed and disposed of at authorized disposal areas.

Improperly stored construction materials, such as pressure-treated lumber or solvents, may lead to leaching of toxics to surface water and ground water. Disposal of construction chemicals should follow all applicable State and local laws that may require disposal by a licensed waste management firm.

3. Management Measure Selection

This management measure was selected based on the potential for many construction activities to contribute to nutrient and toxic NPS pollution.

This management measure was selected because (1) construction activities have the potential to contribute to increased loadings of toxic substances and nutrients to waterbodies; (2) various States and local governments regulate the control of chemicals on construction sites through spill prevention plans, erosion and sediment control plans, or other administrative devices; (3) the practices described are commonly used and presented in a number of best management practice handbooks and guidance manuals for construction sites; and (4) the practices selected are the most economical and effective.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

a. *Properly store, handle, apply, and dispose of pesticides.*

Pesticide storage areas on construction sites should be protected from the elements. Warning signs should be placed in areas recently sprayed or treated. Persons mixing and applying these chemicals should wear suitable protective clothing, in accordance with the law.

Application rates should conform to registered label directions. Disposal of excess pesticides and pesticide-related wastes should conform to registered label directions for the disposal and storage of pesticides and pesticide containers set forth in applicable Federal, State, and local regulations that govern their usage, handling, storage, and disposal. Pesticides and herbicides should be used only in conjunction with Integrated Pest Management (IPM) (see Chapter 2). Pesticides should be the tool of last resort; methods that are the least disruptive to the environment and human health should be used first.

Pesticides should be disposed of through either a licensed waste management firm or a treatment, storage, and disposal (TSD) facility. Containers should be triple-rinsed before disposal, and rinse waters should be reused as product.

Other practices include setting aside a locked storage area, tightly closing lids, storing in a cool, dry place, checking containers periodically for leaks or deterioration, maintaining a list of products in storage, using plastic sheeting to line the storage area, and notifying neighboring property owners prior to spraying.

b. Properly store, handle, use, and dispose of petroleum products.

When storing petroleum products, follow these guidelines:

- Create a shelter around the area with cover and wind protection;
- Line the storage area with a double layer of plastic sheeting or similar material;
- Create an impervious berm around the perimeter with a capacity 110 percent greater than that of the largest container;
- Clearly label all products;
- Keep tanks off the ground; and
- Keep lids securely fastened.

Oil and oily wastes such as crankcase oil, cans, rags, and paper dropped into oils and lubricants should be disposed of in proper receptacles or recycled. Waste oil for recycling should not be mixed with degreasers, solvents, antifreeze, or brake fluid.

c. Establish fuel and vehicle maintenance staging areas located away from all drainage courses, and design these areas to control runoff.

Proper maintenance of equipment and installation of proper stream crossings will further reduce pollution of water by these sources. Stream crossings should be minimized through proper planning of access roads. Refer to Chapter 3 for additional information on stream crossings.

d. Provide sanitary facilities for constructions workers.

e. Store, cover, and isolate construction materials, including topsoil and chemicals, to prevent runoff of pollutants and contamination of ground water.

f. Develop and implement a spill prevention and control plan. Agencies, contractors, and other commercial entities that store, handle, or transport fuel, oil, or hazardous materials should develop a spill response plan.

Post spill procedure information and have persons trained in spill handling on site or on call at all times. Materials for cleaning up spills should be kept on site and easily available. Spills should be cleaned up immediately and the contaminated material properly disposed of. Spill control plan components should include:

- Stop the source of the spill.
- Contain any liquid.
- Cover the spill with absorbent material such as kitty litter or sawdust, but do not use straw. Dispose of the used absorbent properly.

g. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff.

Thinners or solvents should not be discharged into sanitary or storm sewer systems when cleaning machinery. Use alternative methods for cleaning larger equipment parts, such as high-pressure, high-temperature water washes, or steam cleaning. Equipment-washing detergents can be used, and wash water may be discharged into sanitary sewers if solids are removed from the solution first. (This practice should be verified with the local sewer authority.) Small parts can be cleaned with degreasing solvents, which can then be reused or recycled. Do not discharge any solvents into sewers.

Washout from concrete trucks should be disposed of into:

- A designated area that will later be backfilled;
- An area where the concrete wash can harden, can be broken up, and then can be placed in a dumpster; or
- A location not subject to urban runoff and more than 50 feet away from a storm drain, open ditch, or surface water.

Never dump washout into a sanitary sewer or storm drain, or onto soil or pavement that carries urban runoff.

h. Develop and implement nutrient management plans.

Properly time applications, and work fertilizers and liming materials into the soil to depths of 4 to 6 inches. Using soil tests to determine specific nutrient needs at the site can greatly decrease the amount of nutrients applied.

i. Provide adequate disposal facilities for solid waste, including excess asphalt, produced during construction.

j. Educate construction workers about proper materials handling and spill response procedures. Distribute or post informational material regarding chemical control.

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Hawaii's Pollution Prevention Information
Dec. 2000
HAPPI-Home 11

Household Wastewater Treatment Systems

Many Hawaii residents use some type of on-site wastewater disposal system, such as a septic tank or cesspool. Household wastewater can contain contaminants that may cause water pollution. Wastewater can carry disease-causing bacteria, viruses, and other pathogens, as well as organic wastes containing nutrients, including nitrogen and phosphorus. Such nutrients promote weed growth and lower oxygen levels in surface water and thus affect fishing and recreational uses of rivers and lakes.

Wastewater treatment systems are designed to remove or break down contaminants before they enter groundwater, nearby streams, or the ocean. Wastewater treatment is often ignored until problems occur. This worksheet covers wastewater system design and location, maintenance, and proper use. It will help you determine if your wastewater treatment system has any problems and how to prevent problems in the future. A failed system can cost thousands of dollars to replace. Taking time now can help you decrease your risks.

Septic systems and cesspools

Septic systems and cesspools are the two common types of on-site wastewater treatment in Hawaii. Construction of new cesspools is now illegal on Oahu, but existing systems can still be used.

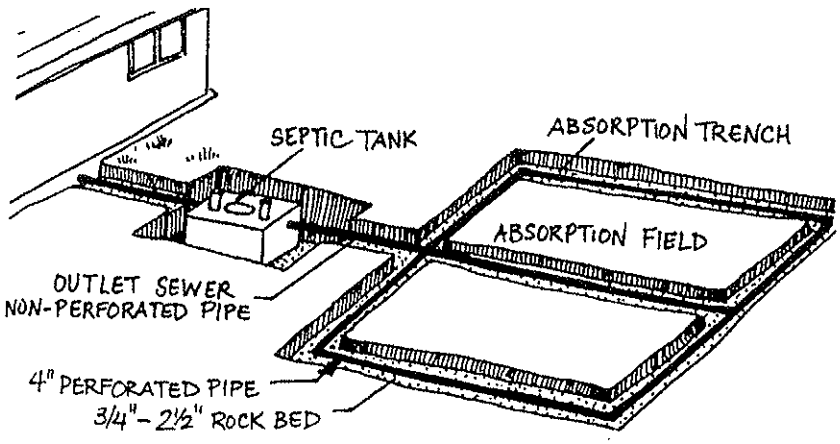
New cesspools can still be constructed on other islands. Cesspools, also called seepage pits, are perforated tanks or pits lined with concrete blocks or bricks through which wastewater can seep into the ground. They are usually less effective and have a higher risk of water pollution than septic tank and drain-field systems because they are located closer to the water table and have too little soil surface area for good wastewater treatment. If you have a cesspool, most of this worksheet still applies to your situation. However, installing a septic tank and drainfield system when you have the resources available to do so will reduce pollution risks.

A typical septic system

A conventional septic system has three components:

- a septic tank that separates, stores, and begins to treat solid waste (sludge and scum)
- a distribution system that distributes the liquid effluent (wastewater) over a large area of soil
- the soil in the drainfield or soil absorption field, which absorbs the effluent and treats it by natural physical, chemical, and biological processes.

Typical septic system



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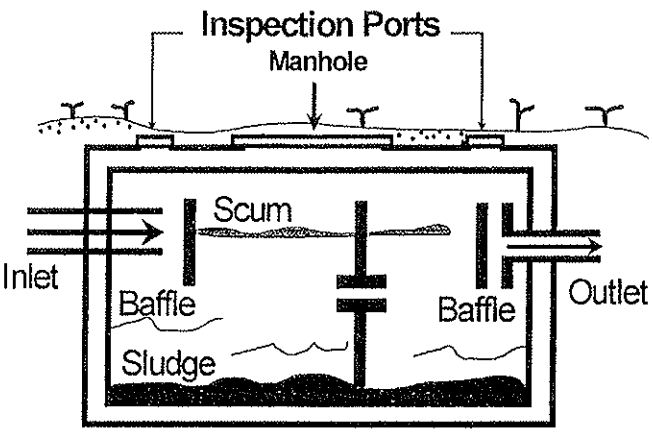
Wastewater flows through a sewer pipe out of your house and into the septic tank, a box or cylinder commonly made out of concrete. Fiberglass and polyethylene tanks are also used. The tank must be watertight to keep sewage from leaking out and groundwater from seeping in. Lighter solids in the wastewater like grease, hair, and soap float to the top of the tank and form a scum layer. Heavier solids settle to the bottom and form a layer of sludge. Bacteria in the tank begin to break down some of the sludge into nutrients, gas, and water. The remaining solids are stored in the tank until they are pumped out. A baffle or a sanitary "T" pipe at the tank inlet slows the incoming rush of water, so the sludge is not stirred up. A baffle or a sanitary "T" pipe located at the tank's outlet keeps solids from leaving the tank. Inspection pipes at the top of the tank are for inspecting the inlet and outlet pipes, baffles, and "T" pipes.

Next, the liquid waste, or effluent, flows out of the tank, through the distribution system, and into the drainfield or soil absorption field. The distribution system is a series of perforated plastic distribution pipes laid in the ground, usually in gravel-filled trenches. Effluent is fed into the pipes by gravity or by a pump. The effluent moves slowly out of the pipes and trenches and is absorbed into the soil. A filter at the tank outlet is recommended, because large particles carried out of the septic tank can clog the drainfield.

The soil must be of a suitable type and deep enough to treat wastewater before it reaches groundwater. The soil filters out larger particles and disease causing organisms called pathogens. The pathogens die off in the soil and beneficial soil microbes and natural chemical processes break down or remove most of the contaminants in the effluent. Two kinds of soil microbes can break down wastes from your septic systems. Aerobic microbes, which need air to live, digest wastes quickly. Anaerobic microbes do not need air, but they digest wastes slowly and give off bad odors.

The kind of soil on your property determines how well your drainfield will work. Well drained, medium textured soils such as loam are best. Coarse gravel or sandy soils allow wastewater to flow too quickly for treatment. In fine clay or compacted soils, water moves too slowly. If water stays in the soil because groundwater levels are high, surface runoff saturates the drainfield, or excessive amounts of water are used in your household, then anaerobic conditions will exist. Your system will not work well and will smell bad.

Septic system details and operation



The drainfield can be changed if soil or site conditions are a problem. In a mound system, the drainfield is built up to add soil depth for treatment. A sand filter is another option. It consists of layers of sand and gravel where wastewater is treated before it goes into the soil.

System location

You must know where the system is to take care of it. Since it is underground, finding it may be tough. If you do not know where your system is, a previous homeowner, county health department, or septic tank pumper's records may hold the answer.

To locate your septic tank yourself, look under your house for the sewer pipe and note which way it is going. Then, go outside and dig or probe in the ground for the tank about 10–20 feet away from the house in the direction the sewer line is going. The septic tank is usually within 2 feet of the ground surface. The distribution box and drainfield are usually downslope from the septic tank, but sometimes the wastewater is pumped to a drainfield uphill from the septic tank.

Once you've located the septic tank, mark it on your house and yard map that you made using HAPPI-Home

2. Note the distances from the septic tank opening to at least two permanent points such as the corner of the house foundation or survey stakes on the property line. If you can, show the location of the drainfield. Keep the map on file along with other maintenance records and pass it on to the next owner if you sell the house.

To reduce water pollution risks, the septic tank and drainfield should be as far as possible from streams, wetlands or the ocean. One hundred feet as a reasonable minimum distance. Hawaii state guidelines state that new drinking water wells must be located at least 1000 feet from septic tanks or cesspools.

If you have a private drinking water well, it is even more important to maintain your septic system. It is best if your septic system is downhill from the well, In addition, you should test your well water more often for nitrates and bacteria if your system is closer to your well than recommended or is uphill from your well. Refer to HAPPI-Home 9, *Drinking water wells*, for more information on how to keep your drinking water safe.

System design

Both the septic tank and drainfield should have adequate capacity to treat all the wastewater generated in your house, even at times of peak use. The system must be designed for the maximum occupancy of your home. Studies estimate that households generate 100–200 gallons of water per bedroom per day. So if you have a four bedroom house, you probably generate between 400 and 800 gallons of wastewater per day. It takes about two days for solids to settle out by gravity, so the septic tank should be large enough to hold two days' worth of wastewater. A three-bedroom home usually has a 1000-gallon tank. A two-compartment tank or a second tank in series can improve sludge and scum removal and help prevent drainfield clogging.

Using more water than the system can hold will stop it from working properly and lead to inadequate wastewater treatment or system failure. Conserving water, including installing low-flow toilets and water-saving faucets, or more frequent pumping may extend the life of the system. Adding space or a water-using appliance (such as a garbage disposal, jacuzzi, dishwasher, or water softener) to your home may require expanding your system. Using vacation homes a lot may overload existing systems. Teenagers or other heavy water users living in the home may also overload the system and cause problems.

Solids that do not settle out in the tank can be carried out of the tank and cause problems. Effluent filters on the outlet capture small particles. But, they must be cleaned regularly to keep them working well. Gas bubbles are produced by anaerobic bacteria slowly di-

Is your septic system's capacity adequate?

Water usage in the United States ranges from 50 to 100 gallons per day (gpd) per person. Estimate the wastewater load from your household using the equation below. Your septic tank should be able to hold two days' worth of wastewater.

_____ people in household x 75 gpd (average) =

_____ gpd x 2 days = _____ gallons

What is your septic tank capacity? _____ gallons

Based on your calculation above, is your tank capacity adeqaute for your present household size?

☐ Yes ☐ No

Calucalte the wastewater load from your home if each bedroom were occupied by two people:

_____ bedrooms x 150 gpd = _____ gpd x 2 days

= _____ gallons

This is the recommended tank size for your home if each bedroom were occupied by two people.

Would your septic tank be adequate if each bedroom were occupied by two people?

☐ Yes ☐ No

gesting wastes in the tank. A gas baffle near the outlet keeps the gas and sludge in the tank.

Septic systems can last a long time if they were appropriately designed for the site and are well maintained. But, if your septic tank is made of steel, it will rust and need replacement. If you have an older system, it may not meet the latest safety standards. Even a relatively new system can fail if it is located in poor soil, undersized, or not properly installed and maintained.

Maintenance

Keeping good records each time your septic system is pumped, inspected, or repaired is a good idea. You will know when your system needs regular maintenance. This information will also be valuable if you sell or transfer your property.

Regular pumping is the most important action you can take. As more solids build up, they are more likely to flow out of the tank and into the drainfield and cause problems. Pumping a septic tank or cesspool at a cost of $100–$250 is far less expensive than replacing a clogged drainfield at $2,000 to $8,000 or cleaning up the mess from an overflowed cesspool.

The best way to determine when to pump your tank is to have it inspected annually. Pumping as needed based on the results of periodic inspections will minimize your maintenance costs and maximize the system's longevity. Inspections can also identify problems with system components before they cause a backup or drainfield failure.

In general, a septic tank should be pumped by a licensed pumper every three to five years. The size of your tank, the amount of wastewater generated in your household, the amount of solids carried in the wastewater, and the age of the system, determine how often pumping is needed . Check your local yellow pages for the names and phone numbers of licensed septic tank pumpers and inspectors in your community.

After pumping, the tank should also be inspected by a professional for cracks and the condition of the baffles. Leaks should be repaired promptly. Never crawl inside or lean into a septic tank without proper ventilation and safety procedures-the gases inside the tank can be deadly!

The distribution box should be periodically checked to be sure that the distribution pipes are properly leveled. Solids building up in the distribution box indicate damaged baffles, the need to pump the tank, or the need for a bigger tank. If the system includes a pump, the pump should be checked along with the float switch, alarm, and air vents to the dosing tank.

Estimated number of years between septic tank pumpings

Tank size (gal)	Number of people in household					
	1	2	3	4	5	6
	Years between pumpings					
500	5.8	2.6	1.5	1.0	0.7	0 .4
1000	12.4	5.9	3.7	2.6	2.0	1.5
1500	18.9	9.1	5.9	4.2	3.3	2.6
2000	25.4	12.4	8.0	5.9	4.5	3.7

The drainfield is an important part of your system. Some tips for protecting the drainfield are

- Do not drive vehicles on the drainfield.
- Do not pave, build, pile logs or other heavy objects, or put a swimming pool over the drainfield.
- Divert roof runoff, footer drains, sump pumps, and other surface runoff away from the drainfield.
- Avoid planting trees and shrubs with deep roots over the drainfield. Grass is the best drainfield cover.
- Install an effluent filter or screen on the septic tank outlet.

Some typical signs of trouble with your system are

- Foul odors in your home or yard
- Slow or backed-up drains even after cleaning the pipes inside your house
- Wet, spongy ground or lush plant growth near the cesspool, septic tank, or drainfield.
- Repeated intestinal illnesses in your family.
- Algal blooms and excessive weed growth in nearby streams.

Proper use of your system

Your wastewater treatment system is not a substitute for the trash can or a compost pile. Dispose of tissues, diapers, baby wipes, sanitary napkins, tampons, condoms,

cigarette butts, and other solid waste with regular garbage and not down the toilet. Since these materials do not break down easily, they will cause your septic tank or cesspool to fill up faster.

Do not use a garbage grinder or garbage disposal in the kitchen sink; it adds more water and waste to the system. Excess grease, fats, and coffee grounds can clog your system. Consider composting food waste and even some paper wastes as an alternative. HAPPI-Home #3 provides information on trash disposal, recycling and composting.

Septic system and cesspools are not designed to neutralize the wide variety of common household chemicals. Paints, solvents, acids, drain cleaners, oils, and pesticides can pass untreated through your system and contaminate the groundwater and surface waters. Though generally safe when diluted, high concentrations or large volumes of water-soluble cleaners or bleach can harm septic tank microbes. See HAPPI-Home #4 on managing hazardous household products, for information on the proper disposal of hazardous chemicals.

Chemical products advertised to "sweeten" or improve your septic system and cesspool cannot replace routine pumping and may even be harmful. Buying and adding yeasts, bacteria, or enzymes is not necessary; plenty of the right microbes are already in your system. Additives containing solvents to unclog your system can kill the microbes and may contaminate groundwater and surface waters.

Assessing your risks

Complete the risk assessment table on pages 6–7 to determine your water pollution risks. Items with asterisks apply to septic tanks only, not cesspools. For each category, choose the set of practices that best fits your situation. Then, go to page 8 and develop an action plan to minimize water pollution hazards from your home's wastewater treatment system.

For more information . . .

. . . contact the Wastewater Branch of the Hawaii Department of Health by mail at 919 Ala Moana Blvd. Room 309, Honolulu, HI 96814; by e-mail at <wwb@eha.health.state.hi.us>; or by phone at 974-4000 ext. 64294 (island of Hawaii), 984-2400 ext. 64294 (Maui), 274-3141 ext. 64294 (Kauai), 1-800-468-4644 ext. 64294 (Molokai and Lanai), or 586-4294 (Oahu).

The National Small Flows Clearinghouse (NSFC) has several publications on septic system design and maintenance, as well as information about alternative systems. Look for these on the Web at <http://www.estd.wvu.edu/nsfc/NSFC_homepage.html>; or contact them by mail at NSFC, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064; or by phone at (800) 624-8301 to request their catalog.

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Risk Assessment Table for Home Wastewater Treatment Systems

	Low risk	Moderate risk	High risk	Your risk
Capacity of system	Tank or cesspool is designed to handle more wastewater than required, based on the size of the home	Capacity just meets load requirements, but I watch out for factors indicating system overload and use water conservation measures	System does not meet current disposal needs, or new bathrooms or appliances were added without upgrading the system	❑ low ❑ moderate ❑ high
Maps and records	Have map of system location and keep good records of repairs and maintenance	Location of tank and date of last pumping are known but not recorded	Location of system is unknown; no record of pumping and repairs	❑ low ❑ moderate ❑ high
Separation distance	Septic tank, drainfield, and cesspool are at least 100 ft from any surface water and 1000 ft from wells	Septic tank, drainfield or cesspool is between 50 and 100 ft from surface water	Septic tank, drainfield, or cesspool is <50 ft from a well or surface water	❑ low ❑ moderate ❑ high
Age of system	System is 5 years old or less	System is between 6 and 20 years old	System is >20 years old	❑ low ❑ moderate ❑ high
Effluent filter *	An effluent filter is installed and cleaned regularly	An effluent filter is installed but only cleaned occasionally	There is no effluent filter installed on the septic tank outlet	❑ low ❑ moderate ❑ high
Tank pumping (including holding tanks and cesspools)	The septic tank or cesspool is pumped on a regular basis as determined by an annual inspection, or about every 3–5 years	The septic tank or cesspool is pumped, but not regularly	The septic tank or cesspool is not pumped	❑ low ❑ moderate ❑ high
Condition of tank and baffles *	The tank and baffles are inspected for cracks; repairs are made promptly		The condition of the tank and baffles is unknown	❑ low ❑ high
Drainfield protection *	Vehicles and other heavy objects or activities are kept from the drainfield area	Occasionally, the drainfield is compacted by heavy objects or activities	Vehicles and other heavy objects or activities are permitted in the drainfield area	❑ low ❑ moderate ❑ high
Diverting surface water	All surface runoff is diverted away from the drainfield or cesspool	Some surface water flows into the drainfield area or cesspool	Runoff from land, rooftops, driveways, etc. flows into the drainfield or cesspool	❑ low ❑ moderate ❑ high
Plantings over the drainfield *	Grass or other shallow-rooted plantings are over the drainfield		Trees and shrubs are growing on or near the drainfield	❑ low ❑ high

* Applies to septic tanks only, not to cesspools.

Risk Assessment Table for Home Wastewater Treatment Systems

	Low risk	Moderate risk	High risk	Your risk
Signs of trouble	Household drains flow freely; there are no sewage odors inside or outside; soil over the drainfield is firm and dry	Household drains run slowly; soil over the drainfield is sometimes wet	Household drains back up; sewage odors noticed in the house or yard; soil is wet or spongy in the drainfield area	❑ low ❑ moderate ❑ high
Solid wastes	There is no garbage grinder or garbage disposal in the kitchen; no grease or coffee grounds are put down the drain; only toilet tissue is put in the toilet	There is moderate use of a garbage grinder, and some solids are disposed of down the drain	There is heavy use of a garbage grinder, and many solids are disposed of down the drain; many paper products or plastics are flushed down the toilet	❑ low ❑ moderate ❑ high
Cleaners, solvents, and other chemicals	No solvents, fuels, or other hazardous chemicals are poured down the drain	Hazardous household chemicals are occasionally disposed of in the wastewater system	Hazardous household chemicals are regularly disposed of in the wastewater system	❑ low ❑ moderate ❑ high

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Your action plan

Now that you have assessed your home's wastewater treatment system, you can take action to change practices that may be causing water pollution. For areas that you identified as high or moderate risk, decide what action you need to take and fill out the Action Plan below.

Write down your moderate-risk and high-risk activities below	What can you do to reduce the potential risk for water pollution?	Set a target date for action
Samples of action items:		
Low area over drainfield is always wet	*Have drainfield inspected for blockages, and clean as needed; divert runoff water*	*One week from today*

This HAPPI document was adapted by Michael Robotham, Carl Evensen, and Linda J. Cox from *Household wastewater—Septic systems and other treatment methods* by Barbara Kneen Avery, Chapter 4, pp. 33-46, in *Home•A•Syst: An environmental risk assessment guide for the home* developed by the National Farm•A•Syst / Home•A•Syst Program in cooperation with NRAES, the Northeast Regional Agricultural Engineering Service. Additional graphics are taken from *Protecting your resources through a farm and home assessment*. Permission to use these materials was granted by the National Farm•A•Syst/Home•A•Syst Office. HAPPI-Home materials are produced by the Hawaii's Pollution Prevention Information (HAPPI) project (Farm•A•Syst / Home•A•Syst for Hawaii) of the University of Hawaii College of Tropical Agriculture and Human Resources (UH-CTAHR) and the USDA Cooperative Extension Service (USDA-CES). Funding for the program is provided by a U.S. EPA 319(h) grant administered by the Hawaii State Department of Health.

LAND USE TYPE: Residential

LAND_USE: Septic tank

CONCERN:
Septic tanks

GOAL:
Prevent contamination in unsewered areas

SUGGESTED PRACTICES:
Have the septic tank inspected regularly, and pump when necessary. Ideally, septic systems should be inspected annually.

Practice water conservation to increase system life span.

Keep roof drains and stormwater runoff away from the drain field area.

Keep leaching area free of vehicles, buildings, trees and shrubs.

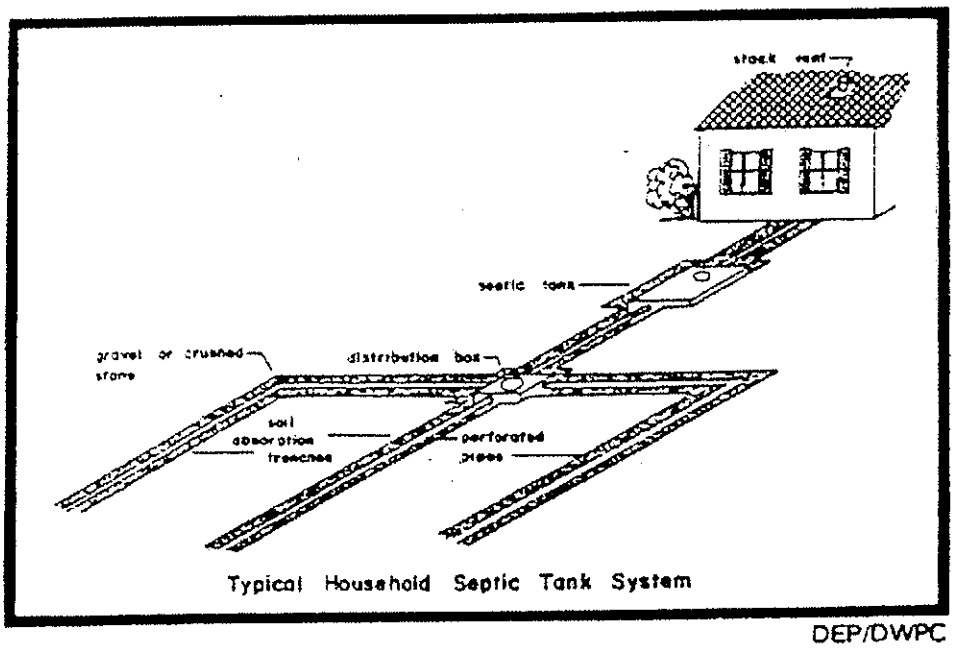
Natural wetlands should not be filled, and the required "set back" distances must be achieved.

Never use septic system additives - they may cause more problems than they solve.

Prevent strong chemicals from entering the system.

Keep accurate records of your on-site maintenance activities.

Keep an accurate map of the location of all system components.



Typical Household Septic Tank System

DEP/DWPC

REFERENCE:
Massachusetts Nonpoint Source Management Manual "The MegaManual", A Guidance For Municipal Officials. Massachusetts Department of Environmental Protection. 1994

LAND USE TYPE: Residential

LAND_USE: Septic tank

CONCERN:
Septic tanks

GOAL:
Prevent contamination in unsewered areas

SUGGESTED PRACTICES:
Your septic system is designed to have its effluent discharge into a drainage field where it undergoes some decomposition by micro-organisms in the soil as it works its way down to the groundwater. If your system is not pumped out frequently enough, solid materials can leave the tank and enter the drainage field. Any substances poured down your drains also will enter that drainage field - and eventually, the groundwater.

To prevent ground-water contamination from your septic system:

Have your septic system inspected annually and pumped out regularly; no chemical or other additive can be a substitute for this, and these septic systems chemicals actually can prevent your septic system from functioning properly.

Be cautious about what you put into your system; substances like coffee grounds, cigarette butts, sanitary items, or fats do not break down easily in septic systems, and chemicals like paints, solvents, oil, and pesticides will go from your septic system into the groundwater.

Limit the amount of water entering your system by using water-saving fixtures and appliances.

REFERENCE:
Citizen's Guide To Groundwater Protection. EPA 1990.

MI-06946 1998

To Order

Minimizing Runoff from Shoreland Property

Shoreland Best Management Practices

Number 8 of 18 in the Series

What Are Shoreland BMPs?

Best Management Practices (BMPs) are actions you can take to reduce your impact on the environment. BMPs have been described for agriculture, forest management, and construction. This fact sheet describes BMPs you can adopt on your shoreland property to help protect and preserve water quality. In many cases, the best management for shorelands may be retaining the natural characteristics of your property.

Why Is Runoff a Problem?

When an area is developed or altered, the way water flows is also changed. As land surfaces are covered with roads, driveways, or impervious surfaces (rooftops, decks, sidewalks, and parking lots), less water can seep into the soil, so runoff increases. This increased runoff is usually channeled into ditches, drainageways, storm sewers, or road gutters and often ends up in nearby lakes and streams.

High flows of water can cause flooding or erosion, as well as increasing sediment in streams and lakes. Fine sediment can also transport nutrients such as nitrate or phosphorus, and pollutants such as sands or salts from icy roads. All of these processes have an adverse effect on water quality.

Preventing Runoff

Planning ahead is the first and most important step in preventing or minimizing erosion due to runoff. An easy way to do this is to pretend that you are a raindrop. In looking at the landscape or any impervious surfaces, which route would you travel? Obviously, you would want to take the easiest path downhill. Keeping that in mind, note any areas that runoff would choose to travel.

Evaluate your property before you begin your landscape design. Consider slope, soil type, and existing vegetation as you plan your development. Fact sheet #6 offers additional tips for landscape planning.

Identifying Problems Caused by Runoff

Problem	Possible Cause
• Is the water near shore cloudy?	• excess sediment reaching water
• Is there an oily rainbow film on the water	• possible petroleum contamination
• Are there algal blooms, green scum, or abundant plant growth in the water?	• excess nutrients such as nitrate or phosphorus reaching the water
• Are washouts, trenches, small piles of sediment, leaves, or debris found at the bottom of slopes?	• excessive runoff across the property

Long-term BMPs

Follow these long-term BMPs to minimize runoff and prevent erosion:

- Limit paved and covered areas that prevent water from seeping into the ground.
- Invest in permanent stabilization practices for long-term protection of your shoreland property by planting new vegetation, installing erosion control structures, and diverting drainage.
- Retain trees and shrubs; trees provide a natural umbrella by shedding water and can reduce runoff by as much as 50%; fact sheets #6, 9, and 11 offer landscaping tips.
- Plan and complete an annual maintenance schedule to make sure that your runoff and erosion control plan is working to protect your property.
- Limit clearing and grading on slopes and minimize cutting and filling for roads, sidewalks, and footpaths to reduce erosion and still provide access.
- Avoid damaging adjacent property with temporary erosion control methods, because water does not stop flowing at your property line.

Drainageways

- Use existing natural drainage systems such as valleys or low areas instead of digging new ditches.
- Design culverts and drainage structures to handle excessive amounts of runoff; assistance is available from your county Soil and Water Conservation District (SWCD) or the Natural Resources Conservation Service (NRCS).
- Protect storm sewers from sedimentation so they are able to carry storm water as intended.

Roads, Driveways, and Sidewalks

- Minimize pavements and impervious surfaces.

- Use gravel driveways instead of pavement.
- Where paved areas are necessary, locate them as close to the main road as possible to minimize the length of paved driveway.
- Do not pave wasted space such as corners near buildings that are not large enough for parking or driving.
- Locate driveways, sidewalks, stairways, and footpaths away from slopes because steeper slopes have greater erosion potential; if you must cross a hillside, follow the contour of the slope.
- Use steps when a walkway must go directly up and down a slope, particularly near the waterfront.
- Minimize road crossings over waterways and cross at a right angle to the stream if possible.
- Sweep driveways or sidewalks instead of washing them down with a hose, to prevent sediment, salt, and petroleum products from washing into storm sewers; cover stockpiles of salt and sand with a tarp or store them in a building.
- Use shallow grassed areas by roadsides instead of curb and gutter runoff and storage for snow.
- Install water bars on sloping roadways to slow and divert runoff.
- Use paving stones instead of solid concrete for walkways; this allows water to seep around the stones instead of running off.
- Avoid shortcutting down slopes because shortcutting causes erosion; compacted soil on footpaths also promotes excessive runoff.

Landscaping and Construction

- When landscaping, stage construction so one area is stabilized before another area is disturbed.
- Avoid construction in areas with:
  --little vegetative cover; preserve existing cover
  --erodable soils (sands, or soils that appear fluffy when dry)
  --mainly bedrock with a thin covering of soil
  --steep slopes of greater than 10%; to picture a 10% slope, imagine putting the bottom end of a board 10 feet out from the wall and the top end at 1 foot up the wall; this is a 10% slope (see Figure 1)
- Control erosion during construction by using temporary methods such as **diversions** to carry water away from the construction site to where it can be safely dispersed or **silt fences** or **hay bales** to trap sediments before they enter the water; a combination of methods may be the best solution (see Figures 2 and 3).
- Use only clean fill (free from debris and dirt) such as rock, sand, or gravel near lakes and streams.
- Use only solid concrete forms such as interlocking blocks or slabs; do not use liquid concrete and avoid treated timbers or railroad ties.
- Make sure utility trenches are drained of water, backfilled, seeded, and mulched.
- Inspect construction projects immediately after initial installation of erosion control measures, during construction, following any severe rainstorm, before reseeding, and when nearing the completion of construction work; temporary erosion controls should be removed; ensure that stabilization is complete and drainageways are

in proper working order.

Figure 1: A 10% slope is represented by leaning a board against the wall with the top at 1 foot and the base set 10 feet away from the wall.

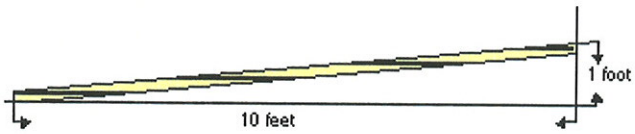
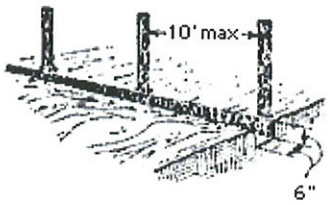
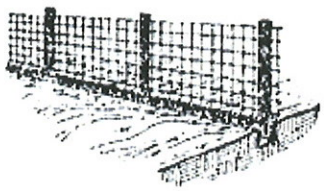


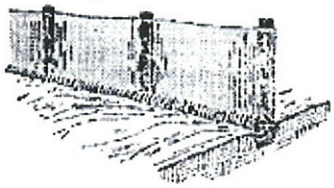
Figure 2: Constructing a silt fence to slow runoff and prevent erosion.



1. Set posts and excavate a 6"x6" trench upslope along the line of posts.



2. Staple wire fencing to the posts.



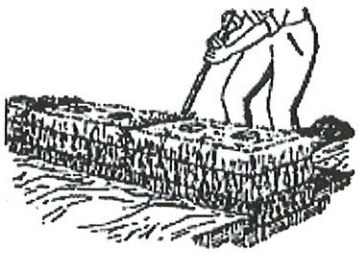
3. Attach the filter fabric to the wire fence and extend it into the trench.

4. Backfill and compact the excavated soil.

Figure 3: Constructing a straw bale barier to slow runoff and prevent erosion.

1. Excate the trench.

2. Place and stake straw bales.



3. Wedge loose straw between bales.

4. Backfill and compact the excavated soil.

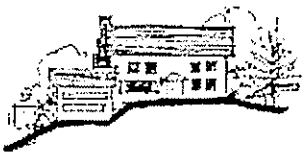
As a general rule, the erosion

hazard will become critical if slope lengths exceed these values:	
0-6%	*200 feet*
6-12%	*100 feet*
13% and over	*50 feet*

Buildings and Runoff

- Install rain gutters along the edge of rooftops to help carry water off of the roof and away from the building to areas where soil won't be eroded; make sure there is erosion protection where the gutters outlet onto soil.
- Keep gutters free from debris and draining properly.
- Keep rooftops free of snow and ice buildup to help control the magnitude of runoff in the spring and protect your roof from damage.
- Pave patios with flagstones or decay-resistant wood blocks instead of solid material to permit some water to seep around the stones or blocks.
- Position rooftops so they are perpendicular to the slope, instead of parallel, to slow down runoff (Figure 4).

Figure 4: Build rooflines perpendicular to slopes



roofline perpendicular to slope slows down runoff

roofline parallel to slope increases potential for runoff damage

Regulations that Apply

Most zoning ordinances restrict the amount of impermeable surface allowed in the shoreland area; check with your local zoning officials for more information. Alteration or filling of wetlands is strictly regulated; check with your county Soil and Water Conservation District before beginning any projects that impact wetlands. For any development along waterways or lakeshores, contact the Department of Natural Resources, Division of Waters for any necessary permits.

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KAREN KANAHELE

MARK ALEXANDER ROY

January 30, 2008

Jeffrey K. Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai`i 96793-2155

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Eng:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your letter dated November 29, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We offer the following comments, in response to your remarks:

1. As requested, the Draft Environmental Assessment (EA) will include the projected consumption and the source of potable and non-potable water, if applicable, for the proposed single-family residence.

2. The water system will be designed and constructed in accordance with the Statewide Water System Standards and certified by the applicant's licensed civil engineer.

3. The applicant will forward the information you provided regarding water conservation measures to the project architect for implementation, where appropriate.

4. The applicant will ensure that applicable Best Management Practices (BMPs) are implemented during construction to minimize impacts to surface and ground water resources and to adjacent and downstream properties.

We appreciate the input we received from your office. A copy of the Draft EA will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
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NOV 2 6 2007

Network Engineering and Planning
OSP Engineering - Maui

Hawaiian Telcom

60 S. Church Street
Wailuku, Maui, HI 96793

Phone 808 242-5258
Fax 808 242-8899

November 21, 2007

Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793
Attention: Kyle Ginoza, Project Manager
Phone: (808) 244-2015 / Fax: (808) 244-8729

SUBJECT: Chapter 343, Hawai'i Revised Statutes (HRS) Early Consultation Request for Proposed Martin Single-Family Residence at Lot 46-A (TMK (2)4-8-03:046), Olowalu Makai-Hikina Subdivision, Olowalu, Maui, Hawaii

Dear Mr. Ginoza:

Thank you for providing Hawaiian Telcom Incorporated, the opportunity to comment on the proposed action for Chapter 343, HRS Early Consultation Request for the proposed Martin Single-Family residence at Lot 46-A, Olowalu Makai-Hikina on the Island of Maui. At this time, Hawaiian Telcom Inc. would like to notify you that telephone service requests for this project will require a perpetual easement through the surrounding properties from Honoapiilani Highway and may be subject to a Line Extension or service connection fee as well as State or County permitting processes, should work along a State Highway or County access road be required in order to service this project.

If there are any questions, please call Brent Matsui at (808) 242-5289.

Sincerely,

Gordon Yadao
Manager – Network Engineering & Planning

c: File (3045 0710-084)
B. Matsui

15V

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KAREN KAWAHARA

MARK ALEXANDER ROY

January 30, 2008

Gordon Yadao, Manager
Hawaiian Telcom
Network Engineering and Planning
OSP Engineering-Maui
60 S. Church Street
Wailuku, Hawai`i 96793

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Yadao:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your office's letter dated November 21, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

The comments you provided regarding the potential requirements of a perpetual easement, line extension, service connection fee, and State and County permits will be forwarded to the applicant's civil engineer. The applicant's civil engineer will coordinate with your office during the design phase of the residence to facilitate the provision of telephone service.

We appreciate the input we received from your office. A copy of the Draft Environmental Assessment will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
Kirk Tanaka, R.T. Tanaka Engineers, Inc.
F:\DATA\Martin\OlowaluLot46\Hawtel.ecl.Resp.wpd

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

November 9, 2007

Mr. Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Mr. Ginoza,

Subject: Early Consultation Request for Proposed
Martin Single-Family Residence at Lot 46-A
Olowalu, Maui, Hawaii
TMK: (2) 4-8-003:046

Thank you for allowing us to comment on the early consultation phase of the proposed subject project, which was received on October 23, 2007.

In reviewing our records and the information received, Maui Electric Company (MECO) has no objection to the project at this time. However, we highly encourage the developer's electrical consultant to submit its electrical demand requirements and project time schedule as soon as practical so that service can be provided on a timely basis.

In addition, may we suggest that the developer and/or their consultant make contact with Sage Kiyonaga of our Demand Side Management (DSM) group at 872-3283 to review potential energy conservation and efficiency opportunities for their project.

Should you have any other questions or concerns, please call Kim Kawahara at 871-2345.

Sincerely,

Neal Shinyama
Manager, Engineering

NS/kk:lh
cc: Sage Kiyonaga – MECO DSM

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GLEN OSHIRO HIRAGA
MITSURU "MICH" HIRANO
KATHY KAKIMARA

MARK ALEXANDER ROY

January 30, 2008

Neal Shinyama, Manager, Engineering
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawai`i 96733-6898

SUBJECT: Proposed Martin Single-Family Residence, Olowalu, Maui, Hawai`i; TMK (2)4-8-003:046

Dear Mr. Shinyama:

We are writing to you on behalf of the applicants, Peter and Deborah Martin, to thank you for your office's letter dated November 9, 2007, regarding the Proposed Martin Single-Family Residence project located in Olowalu, Maui, Hawai`i.

We offer the following comments, in response to your remarks:

1. The project's electrical consultant will submit electrical drawings, the projected electrical demand requirements, and a project time schedule, as early as is practical, to facilitate the provision of electrical service.

2. Energy conservation and efficiency opportunities will be considered in the design phase of the development. Coordination with MECO's Demand Side Management Group will be undertaken at that time.

We appreciate the input we received from your office. A copy of the Draft Environmental Assessment will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Peter and Deborah Martin
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X. AGENCIES/ ORGANIZATIONS CONSULTED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIOD AND RESPONSES TO SUBSTANTIVE COMMENTS

X. AGENCIES/ORGANIZATIONS CONSULTED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIOD AND RESPONSES TO SUBSTANTIVE COMMENTS

A notice of the Draft Environmental Assessment for the subject project was filed and published in the Office of Environmental Quality Control's, The Environmental Notice on March 23, 2008.

The following agencies were also sent a copy of the Draft Environmental Assessment for review and comment. Comments on the Draft EA were received during the 30-day public comment period. Comments, as well as responses to substantive comments, are included in this chapter.

1. Larry Yamamoto, State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850-0001

2. Ranae Ganske-Cerizo, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

3. George Young
Chief, Regulatory Branch
U.S. Department of the Army
U.S. Army Engineer District, Honolulu
Regulatory Branch
Building 230
Fort Shafter, Hawaii 96858-5440

4. Russ K. Saito, State Comptroller
Department of Accounting and General Services
1151 Punchbowl Street, #426
Honolulu, Hawaii 96813

5. Sandra Lee Kunimoto, Chair
Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814-2512

6. Theodore E. Liu, Director
State of Hawaii
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawaii 96804

7. Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

8. Ron Okumura
Complex Area Superintendent
(Lanai/Molokai/Hana/Lahaina)
Department of Education
54 High Street, 4th Floor
Wailuku, Hawaii 96793

9. Micah Kane, Chairman
Department of Hawaiian Home Lands
P. O. Box 1879
Honolulu, Hawaii 96805

10. Chiyome Fukino, M.D., Director
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

11. Alec Wong, P.E., Acting Chief
Clean Water Branch
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

12. Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

13. Barry Fukunaga, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813
cc: Fred Cajigal

14. Mary Lou Kobayashi
State of Hawaii
Office of Planning
P.O. Box 2359
Honolulu, Hawaii 96804

15. Jeffrey A. Murray, Chief
County of Maui
Department of Fire
and Public Safety
200 Dairy Road
Kahului, Hawaii 96732

16. Vanessa A. Medeiros, Director
County of Maui
Department of Housing and
Human Concerns
200 South High Street
Wailuku, Hawaii 96793

17. Tamara Horcajo, Director
County of Maui
Department of Parks and Recreation
700 Halia Nakoa Street, Unit 2
Wailuku, Hawaii 96793

18. Thomas Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

19. Milton Arakawa, Director
County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawaii 96793

20. Cheryl Okuma, Director
County of Maui
Department of Environmental Management
200 South High Street
Wailuku, Hawaii 96793

21. Donald Medeiros, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawaii 96793

22. Jeffrey Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

23. **Hawaiian Telcom**
60 South Church Street
Wailuku, Hawaii 96793

24. Neal Shinyama, Manager – Engineering
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733

25. Theo Morrison, Executive Director
Lahaina Bypass Now
505 Front Street, Suite 202
Lahaina, Hawaii 96761

26. Keoki Freeland, Executive Director
Lahaina Restoration Foundation
120 Dickenson Street
Lahaina, Hawaii 96761

27. Karee Karlucci, Executive Director
Lahaina Town Action Committee
648 Wharf Street, Suite 102
Lahaina, Hawaii 96761

28 Joe Pluta, President
West Maui Improvement Foundation
P. O. Box 10338
Lahaina, Hawaii 96761

29. Zeke Kalua, Executive Director
West Maui Taxpayers Association
P.O. Box 10338
Lahaina, Hawaii 96761

NRCS
Natural Resources Conservation Service
P.O. Box 50004 Rm. 4-118
Honolulu, HI 96850
808-541-2600

April 9, 2008

Kyle Ginoza
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Kyle,

In response to your request for review of the Martin Single-Family Residence Project in Olowalu, please find enclosed an NRCS Soil Survey Map and soil reports. The Prime and Important Farmlands report indicates that soil map unit PpA—Pulehu silt loam, 0 to 3 percent slopes, is Prime Farmland. This information is provided for your aid in determining if a Farmland Impact Conversion Rating Form (AD-1006) is needed for this project. Typically, this form is required on projects that convert farmlands into non-farmland uses and have federal dollars attached to the project. See the website link below for more information on the Farmland Protection Act and a copy of the AD-1006 form with instructions. The soil mapping does not identify any hydric soils in this area. Hydric soils identify potential areas of wetlands. If wetlands do exist, any proposed impacts to these wetlands would need to demonstrate compliance with the "Clean Water Act", and may need an Army Corp of Engineers 404 permit.

The NRCS Soil Survey Map identifies soil map units in the project area. The soil reports provide selected soil properties, and interpretations, i.e. flooding hazard, limitations for roads and dwellings, soil layers with USDA textures, and engineering classifications. The limitation ratings for the selected uses, i.e. roads and streets, range from somewhat limited to very limited. These ratings do not preclude the intended land use, however it does identify limitations for the use, which may require corrective measures, increase costs, and require continued maintenance.

The NRCS Soil Survey is a general planning tool and does not eliminate the need for an onsite investigation. If you have any questions concerning the soils or interpretations for this project please call, Tony Rolfes, Assistant State Soil Scientist, (808) 541-2600 x129, or email, Tony.Rolfes@hi.usda.gov.

NRCS - Farmland Protection Policy Act Website:
http://www.nrcs.usda.gov/programs/fppa/

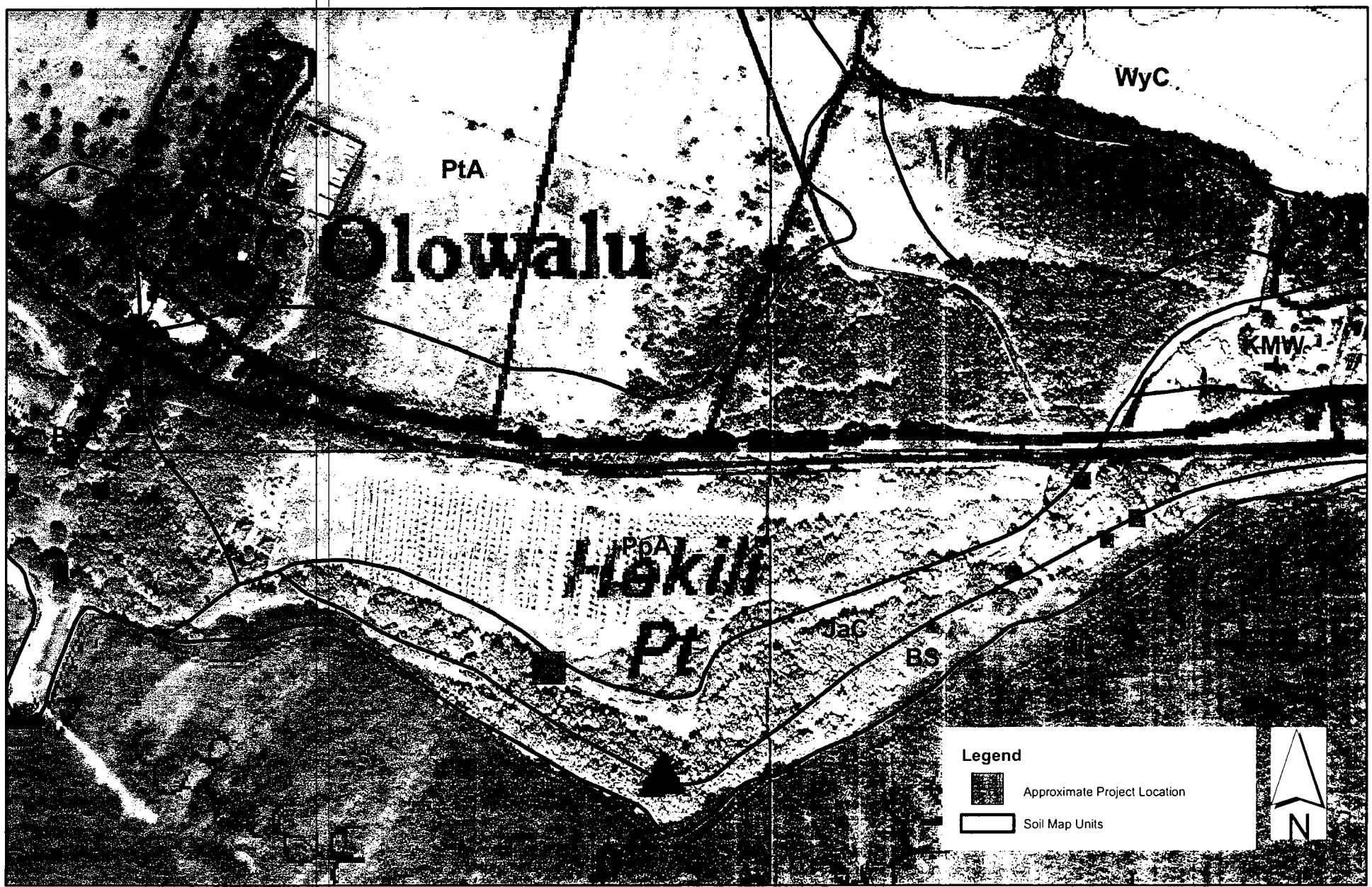
Sincerely,

LAWRENCE T. YAMAMOTO
Director
Pacific Islands Area

cc: Michael Robotham, Assistant Director for Soil Science and Natural Resource Assessments

Enclosures: (6)

SOILS MAP
Martin Single -Family Home Residence project in Olowalu



USDA NRCS
4/2008

Prime and other Important Farmlands

Island of Maui, Hawaii

Map symbol	Map unit name	Farmland classification
PpA	Pulehu silt loam, 0 to 3 percent slopes	Prime farmland if irrigated

Engineering Properties

Island of Maui, Hawaii

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
JaC:												
Jaucas	0-13	Sand	SP-SM	A-2, A-3	0	0-3	95-100	90-100	50-70	5-15	0-14	NP
	13-60	Loamy fine sand, Loamy sand, Sand	SP-SM	A-2, A-3	0	0-3	95-100	90-100	50-80	5-15	0-14	NP
PpA:												
Pulehu	0-21	Silt loam	CL, CL-ML, ML	A-4, A-6	0-5	0-5	80-95	75-90	70-90	55-80	20-40	NP-20
	21-60	Silty clay loam	CL-ML, ML, SC-SM, SM	A-4	0-5	0-5	75-85	75-85	60-85	40-60	20-30	NP-10

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Island of Maui, Hawaii

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JaC:							
Jaucas	100	Somewhat limited		Very limited		Very limited	
		Flooding	0.40	Cutbanks cave	1.00	Carbonate content	1.00
		Slope	0.01	Slope	0.01	Droughty	0.96
						Too sandy	0.50
						Slope	0.01
PpA:							
Pulehu	100	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
				Cutbanks cave	0.10	Large stones content	0.01

Dwellings and Small Commercial Buildings

Island of Maui, Hawaii

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JaC:							
Jaucas	100	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Slope	0.01	Slope	0.01	Slope	1.00
PpA:							
Pulehu	100	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00

Water Features

Island of Maui, Hawaii

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
JaC:										
Jaucas	A	Low	January	---	---	---	---	None	Very brief	Rare
			February	---	---	---	---	None	Very brief	Rare
			March	---	---	---	---	None	Very brief	Rare
			April	---	---	---	---	None	Very brief	Rare
			May	---	---	---	---	None	Very brief	Rare
			June	---	---	---	---	None	Very brief	Rare
			July	---	---	---	---	None	Very brief	Rare
			August	---	---	---	---	None	Very brief	Rare
			September	---	---	---	---	None	Very brief	Rare
			October	---	---	---	---	None	Very brief	Rare
			November	---	---	---	---	None	Very brief	Rare
			December	---	---	---	---	None	Very brief	Rare
PpA:										
Pulehu	B	Low	January	---	---	---	---	None	Very brief	Occasional
			February	---	---	---	---	None	Very brief	Occasional
			March	---	---	---	---	None	Very brief	Occasional
			April	---	---	---	---	None	Very brief	Rare
			May	---	---	---	---	None	Very brief	Rare
			June	---	---	---	---	None	Very brief	Rare
			July	---	---	---	---	None	Very brief	Rare
			August	---	---	---	---	None	Very brief	Rare
			September	---	---	---	---	None	Very brief	Rare
			October	---	---	---	---	None	Very brief	Rare
			November	---	---	---	---	None	Very brief	Occasional
			December	---	---	---	---	None	Very brief	Occasional

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Lawrence T. Yamamoto, Director
Pacific Islands Area
Natural Resources Conservation Service
P. O. Box 50004, Room 4-118
Honolulu, Hawai`i 96850

SUBJECT: Proposed Martin Single-Family Residence; TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Yamamoto:

Thank you for your office's letter dated April 9, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following responses to your comments.

1. We note that no Federal funding will be used for the project and, as such, the completion of a Farmland Impact Conversion Rating Form (AD-1006) is not required.

2. We note that the soil mapping does not identify any hydric soils in the area.

3. We note that dwellings without basements and lawns and landscaping are rated as very limited and somewhat limited, respectively, in the soil report you provided. The applicant's civil engineer will implement appropriate corrective measures, as required, with respect to the underlying soil properties at the project site.

4. We reviewed the Farmland Protection Policy Act (FPPA) website and note that the project will be planned and completed without the financial or technical assistance of a Federal agency. Consequently, the project is considered an activity not subject to the FPPA.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza
Project Manager

KG:lfm
cc: Peter Martin, West Maui Land Company, Inc.
Kirk Tanaka, R. T. Tanaka Engineers, Inc.
S:\DATA\Martin\OlowaluLot46\NRCS.dea.resp.wpd

MAY 0 6 2008

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EPO-08-062

April 24, 2008

Mr. Kyle Ginoza, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, HI 96793

Dear Mr. Ginaza:

SUBJECT: Draft Environmental Assessment for Martin Single-Family Residence in Olowalu
Makai-Hikina Subdivision, Olowalu, Maui, Hawaii
TMK: (2) 4-8-003: 046

Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

If there are any questions about these comments please contact Jiacai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
EH-Maui

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Dr. Chiyome Fukino, Director
Department of Health
P.O. Box 3378
Honolulu, Hawai`i 96801

SUBJECT: Proposed Martin Single-Family Residence, TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Dr. Fukino:

Thank you for your office's letter dated April 24, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following response to your comments. We will review the department's standard comments on the department website and the applicant will adhere to any comments specifically applicable to this project.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lh
cc: Peter and Deborah Martin
S:\DATA\Martin\OlowaluLot46\StateDOHdea.res.wpd

APR 1 0 2008

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD / CWB

04023PLMUW.08

April 8, 2008

Mr. Kyle Ginoza
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Ginoza:

Subject: Review of the Draft Environmental Assessment (EA) for the Proposed Martin Single-Family Residence at Lot 46-A of Olowalu Makai-Hikina Subdivision Olowalu, Maui, Hawaii

The Department of Health (Department), Clean Water Branch (CWB), acknowledges receipt of your letter, dated March 31, 2008, requesting review of the Draft EA for the Proposed Martin Single-Family Residence at Lot 46-A of Olowalu Makai-Hikina Subdivision. The Department has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

   a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   b. Hydrotesting water.

   c. Construction dewatering effluent.

   d. Treated effluent from recycled water distribution systems.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For types of wastewater not listed in Item 2 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

4. You must also submit a copy of the NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the CWB that SHPD has or is in the process of evaluating your project. Please submit a copy of your request for review by SHPD or SHPD's determination letter for the project along with your NOI or NPDES permit application, as applicable.

5. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 Water Quality Certification are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

LMUW:np

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Alec Wong, P.E., Chief
Clean Water Branch
Department of Health
State of Hawai`i
P. O. Box 3378
Honolulu, Hawai`i 96801-3378

SUBJECT: Proposed Martin Single-Family Residence; TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Wong:

Thank you for your letter dated April 8, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following responses to your comments.

1. The applicant's civil engineer will evaluate potential impacts to State waters to determine whether or not specific sections of Hawai`i Administrative Rules (HAR), Chapter 11-54 are applicable. All discharges related to project construction or operation activities will comply with relevant State Water Quality Standards. Discharges will be kept at a minimum through the application of engineering Best Management Practices (BMPs).

2. The applicant's civil engineer will contact the Clean Water Branch to address applicable National Pollutant Discharge Elimination System (NPDES) permit requirements for the project, including the possible submittal of a Notice of Intent (NOI) for general permit coverage.

3. It is noted that a NPDES individual permit is required for types of wastewater not covered under No. 2 above or wastewater discharging into Class 1 or Class AA waters. As applicable, the applicant's civil engineer will contact the Clean Water Branch to prepare a NPDES individual permit.

4. The NOI, as applicable, will be submitted for review by the State Historic Preservation Division of the Department of Land and Natural Resources. The applicant will submit a copy of its request for review by SHPD or SHPD's

determination letter for the project along with the NOI or NPDES permit application, as applicable.

5. All discharges related to project construction or operation activities will comply with the applicable State Water Quality Standards as specified in HAR, Chapter 11-54 and/or permitting requirements as specified in HAR, Chapter 11-55. Discharges will be kept to a minimum through the application of engineering BMPs.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza
Project Manager

KG:lfm
cc: Peter Martin, West Maui Land Company, Inc.
S:\DATA\Martin\OlowaluLot46\DOH CWB.dea.resp.wpd

MAY 0 6 2008

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M. D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M. D., M. P. H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

May 5, 2008

Mr. Kyle Ginoza
Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Mr. Ginoza:

Subject: **Martin Single Family Residence Project in Olowalu**
TMK: (2) 4-8-003: 046

The comments offered during the early consultation process for this project are still valid. Please be aware that reference was made to the old Department of Health website for the Department's standard comments. The correct website is:

http://hawaii.gov/health/environmental/env-planning/landuse/landuse.html

Should you have any questions, please call me at 808 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Mr. Herbert S. Matsubayashi
Department of Health
State of Hawai`i
54 High Street
Wailuku, Hawai`i 96793

SUBJECT: Proposed Martin Single-Family Residence, TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Matsubayashi:

Thank you for your office's letter dated May 5, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following response to your comments. We will review the department's standard comments on the department website and the applicant will adhere to any comments specifically applicable to this project.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lh
cc: Peter and Deborah Martin
S:\DATA\Martin\OlowaluLot46\MauiDOHdea.res.wpd

MAR 0 5 2008

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Ref: OCCL:MC
File NO.: CDUA MA-3458

Acceptance Date: February 26, 2008
180-Day Expiration Date: August 24, 2008

Kyle Ginoza
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

MAR - 4 2008

Dear Mr. Ginoza,

NOTICE OF ACCEPTANCE and
PRELIMINARY ENVIRONMENTAL DETERMINATION

Conservation District Use Application (CDUA) File No. MA-3458
(BOARD Permit)

This acknowledges the receipt and acceptance for the processing of your CDUA for the proposed single family residence (SFR) located at Olowalu, Lahaina District, Maui, TMK: (2) 4-8-03:46. The 0.8 acre property is located in the Limited Subzone of State Land Use Conservation District. The applicant has submitted maps showing that the proposed residence is in Flood Zone A4, and understands that the project must comply with the National Flood Insurance guidelines.

The applicants propose to build a 3215 square foot single family residence. The maximum hight will be 23 feet, and the residence will be set back 40 to 50 feet from the property boundaries. Elements included in the applicant's computation of Maximum Developable Area (MDA) include three bedrooms, one media room, a large common room, a kitchen, and three bathrooms. There are an additional three lanai totaling 1134 square-feet of lanai, one of which appears to act as an outdoor kitchen, that were not included in the calculations of the MDA. There is also a porte-cochere, connected to the house by a trellised walkway. It is unclear from the application whether these were included in the MDA calculations or not.

The Office of Conservation and Coastal Lands (OCCL) is unable to confirm the applicant's calculation of MDA based upon the information given. Prior to making its final recommendation, OCCL will need to see a more detailed breakdown of how the applicant calculated the MDA in order to determine if the structure is in compliance with the design guidelines set forth in Hawai`i Administrative Rules (HAR) §13-5. These should be included in the Final Environmental Assessment (FEA). The house plans will need to be modified should they be found to exceed the MDA.

In an earlier correspondence with the applicant OCCL recommended that the house be built on post and pier rather than slab on grade. We would like to see a justification for this choice in the FEA.

The application did not contain a thorough landscaping plan. One will also need to be developed for the Final Environmental Assessment.

The parcel is part of the Olowalu Makai Hikina subdivision in Olowalu. Neighboring parcels include the former Plantation Mill manager's property, the Olowalu General Store, camp Olowalu to the west, and a 70' wide private parcel between the subject parcel and the coastline to the south. Access to the parcel is from Honoapi`ilani Highway.

The land is generally flat. There are ten kiawe trees on the mauka end of the property. Otherwise, flora is dominated by low lying shrubs and grasses. Dominant fauna are also invasive; a survey revealed mice, rates, and mongoose. No known threatened or endangered species are known to frequent this parcel; however, the larger Olowalu area is home to some species of protected avifauna.

An archaeological survey of the property did not reveal any surface or subsurface cultural resources.

After reviewing the application, we find that:

1. The SFR is an identified land use within the Conservation District, pursuant to Hawai`i Administrative Rules (HAR) §13-5-23 *Identified land uses in the limited subzone,* L-6 SINGLE FAMILY RESIDENCE, (D-1) *A single family residence in a floodplain or coastal high hazard area that conforms to applicable county regulations regarding the National Flood Insurance Program and single family residential standards as outlined in this chapter.* This use requires a permit from the DLNR. The final decision as to whether to grant or deny the permits lies with the Board of Land and Natural Resources (BLNR).

2. Pursuant to HAR §13-5-40 *Hearings*, no public hearing will be required.

3. Pursuant to HAR §13-5-31 *Permit applications,* the permit requires that an environmental assessment be carried out. A Finding of No Significant Impact (FONSI) to the environment is anticipated for the proposed project. The draft environmental assessment (DEA) for the project will be submitted to the Office of Environmental Quality Control (OEQC) to be published in the *Environmental Notice.*

The filing fee for Board Permits is $100. You can send a check to our office, made payable to the State of Hawai`i. We will also require an additional twelve copies of the application to distribute to other agencies for comments. These can be sent to our office. Per our conversation, the CDUA and DEA should be separate documents. The CDUA should include a site plan, house plan, and location map.

To save paper on the CDUA, you do not need to include Attachment A (Land Ownership Documentation). In addition, Section IX of the DEA seems to be padded with a great deal of extraneous information (internet downloads, copies of brochures, etc.). Unless these have a direct relationship to this specific project they should not be included.

Should you have any questions, please contact Michael Cain at 587-0048.

Aloha,

for LAURA H. THIELEN, Chair
Board of Land and Natural Resources

cc: Office of Hawaiian Affairs
Maui County Planning
DLNR- Forestry, Land Division, Historic Preservation, Maui Land Division
Lahaina Public Library
US Fish and Wildlife Service
DOH - Office of Environmental Quality Control

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Laura H. Thielen, Chair
Board of Land and Natural Resources
State of Hawai`i
P. O. Box 621
Honolulu, Hawai`i 96809

SUBJECT: Proposed Martin Single-Family Residence; TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Ms. Thielen:

Thank you for your letter dated March 4, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following responses to your comments.

1. The Maximum Developable Area (MDA) was calculated by the project's licensed architect, Rich Young, to be 3,215 square feet. The porte-cochere and lanais were not included in the MDA since these features are not enclosed on a minimum of three (3) sides. We understand that the house plans will have to be modified should they be found to exceed the MDA.

2. The applicants explored the possibility of developing the proposed residence in a post and pier configuration. However, the applicants prefer not to deal with going up and down stairs due to health reasons (knee problems). In addition, the applicants felt that a residence nestled lower to the ground would better blend into the surrounding landscape. Further, the applicants felt that a residence with a lower profile would be more appealing to surrounding landowners. We believe that the current slab on grade configuration is in conformance with Hawai`i Administrative Rules Chapter 13-5, Conservation District.

3. The project landscaping plan is attached.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza
Project Manager

KG:lfm
Enclosure
cc: Peter Martin, West Maui Land Company, Inc.
Kirk Tanaka, R.T. Tanaka Engineers, Inc.
S:\DATA\Martin\OlowaluLot46\BLNR.dea.resp.wpd

WWW.LANDSCAPEARCHITECT.NET

MAXWELL

MARTIN
RESIDENCE

LP-1

APR 2 3 2008

aINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI

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

IN REPLY REFER TO:

HWY-PS
2.7781

April 22, 2008

Mr. Kyle Ginoza
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Ginoza:

Subject: Draft Environmental Assessment (DEA)
Peter and Deborah Martin Proposed Single-Family Residence at Lot 46-A of Olowalu Makai-Hikina Subdivision
Maui, Lahaina District, Olowalu, TMK: (2) 4-8-003: 046

Thank for consulting with us on the subject project. We have the following comments:

1. The proposed single-family residence will not adversely impact our State highway facilities. However, the applicant should address and mitigate possible operational problems at the intersection of the (a) 40-foot roadway easement with the 50-foot State owned rights-of-way and (b) 50-foot State owned rights-of-way with Honoapiilani Highway.

2. The applicant shall provide an engineer's report regarding the line of sight adequacy at the two intersections mentioned in comment number 1.

3. The intersection at the 40-foot roadway easement with the 50-foot State owned rights-of-way should be located and designed to prevent possible vehicle backup onto Honoapiilani Highway. Note that the roadway easement serving the project is adjacent to and fronts our State highway.

4. The Draft Environmental Assessment (DEA) should include an existing and proposed scaled geometric intersection layout plan at the two intersections mentioned in comment number 1. Indicate on the layout plan the location of the beach access road.

5. Applicant shall provide us with proper documentation/recordation of existing easements "A" and "B" shown on Figure 3 (Access Plan), Appendix F. Indicate on the plan the correct location of easement "B".

6. On pages 30 and 31, under D. Infrastructure, 1. Roadways, there should be discussions as to what other properties or traffic generators this 50-foot State owned rights-of-way is serving.

7. Construction plans must be prepared and submitted to us for all work done within our State highway and State owned rights-of-way.

8. Applicant shall consult/coordinate with our Highways Division, Maui District Office for any additional traffic concerns caused by the proposed project.

If there are any questions, please contact Ken Tatsuguchi, Head Planning Engineer, Highways Division, at (808) 587-1830.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Brennon T. Morioka, Ph.D., P.E.
Department of Transportation
State of Hawai`i
869 Punchbowl Street
Honolulu, Hawai`i 96813

SUBJECT: Proposed Martin Single-Family Residence; TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Morioka:

Thank you for your letter dated April 22, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following responses to your comments.

1. As part of the Olowalu Makai-Hikina Subdivision, the intersections of interest were designed to mitigate possible operational problems. For instance, utilization of Easements A and B were limited to four (4) lots, so as to minimize the likelihood of adverse impacts to the intersections. The proposed project, a single-family residence, is consistent with the subdivision plan and, consequently, adverse impacts on the two (2) State highway facilities are not anticipated.

2. A site plan and a sight distance report to determine required and available sight distances at the two (2) intersections of interest will be provided to the department during the construction plans review process.

3. The intersection of the 40-foot roadway easement with the 50-foot State-owned right-of-way is an existing intersection which will not be altered as part of the subject project. Vehicular traffic on the 40-foot roadway easement is limited as the easement serves only Lots 45-A, 46-A (the subject property), Lot 47-A, and a portion of a Land Court Award parcel. Lots 45-A and Lot 47-A are currently vacant and undeveloped. As such, vehicle backup onto Honoapi`ilani Highway due to traffic on the 40-foot roadway easement generally does not occur.

4. The existing scaled geometric intersection layout plan at the two (2) intersections mentioned is attached.

5. Appendix A of the Environmental Assessment is the final plat map, which shows the designation of Easements A, B, and C. As shown on the final plat map, Easement A is located to the southeast of the State-owned 50-foot right-of-way and Easement B is located to the east of Easement A. The final plat map is attached.

6. The 50-foot, State-owned right-of-way serves the Olowalu House, Camp Olowalu, and various residences as part of the agricultural Olowalu Makai-Hikina Subdivision.

7. During the design phase of the project, construction plans will be prepared and submitted to your department for all work done within the State highway and the State-owned right-of-way.

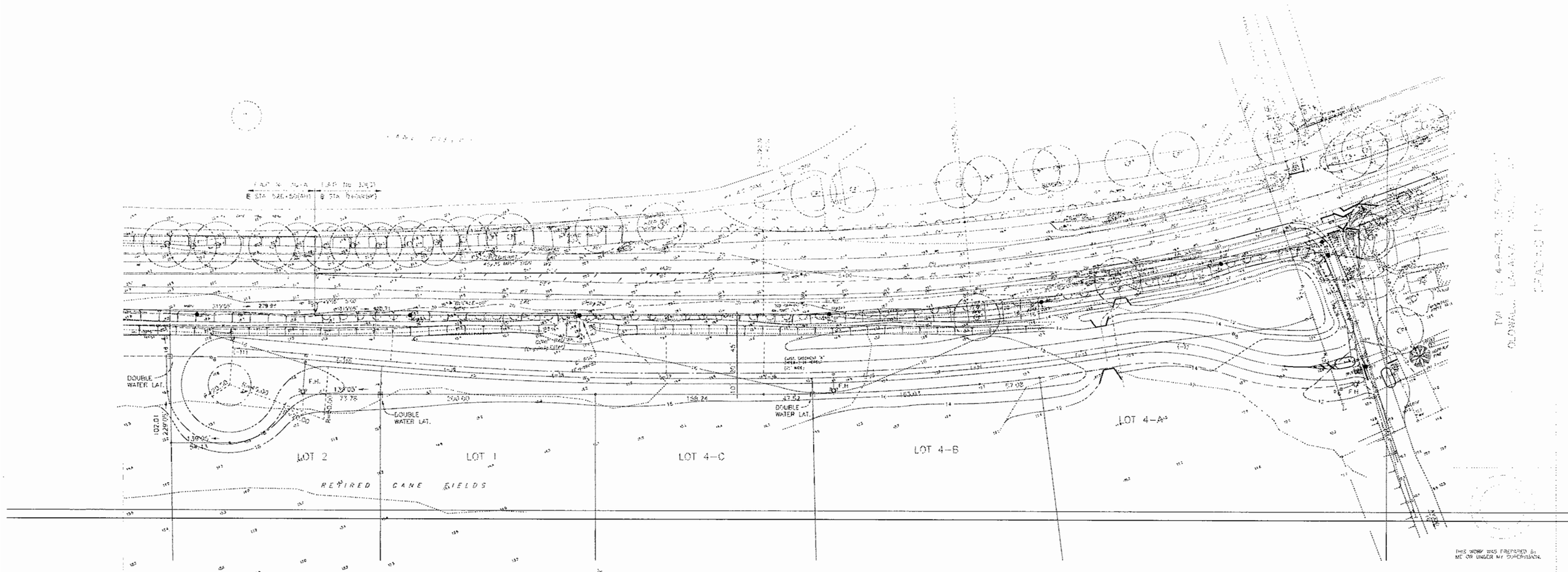
8. The applicant's civil engineer will coordinate and consult, as necessary, with the Highways Maui District Office regarding any additional traffic concerns they may have regarding the proposed single-family residence.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza
Project Manager

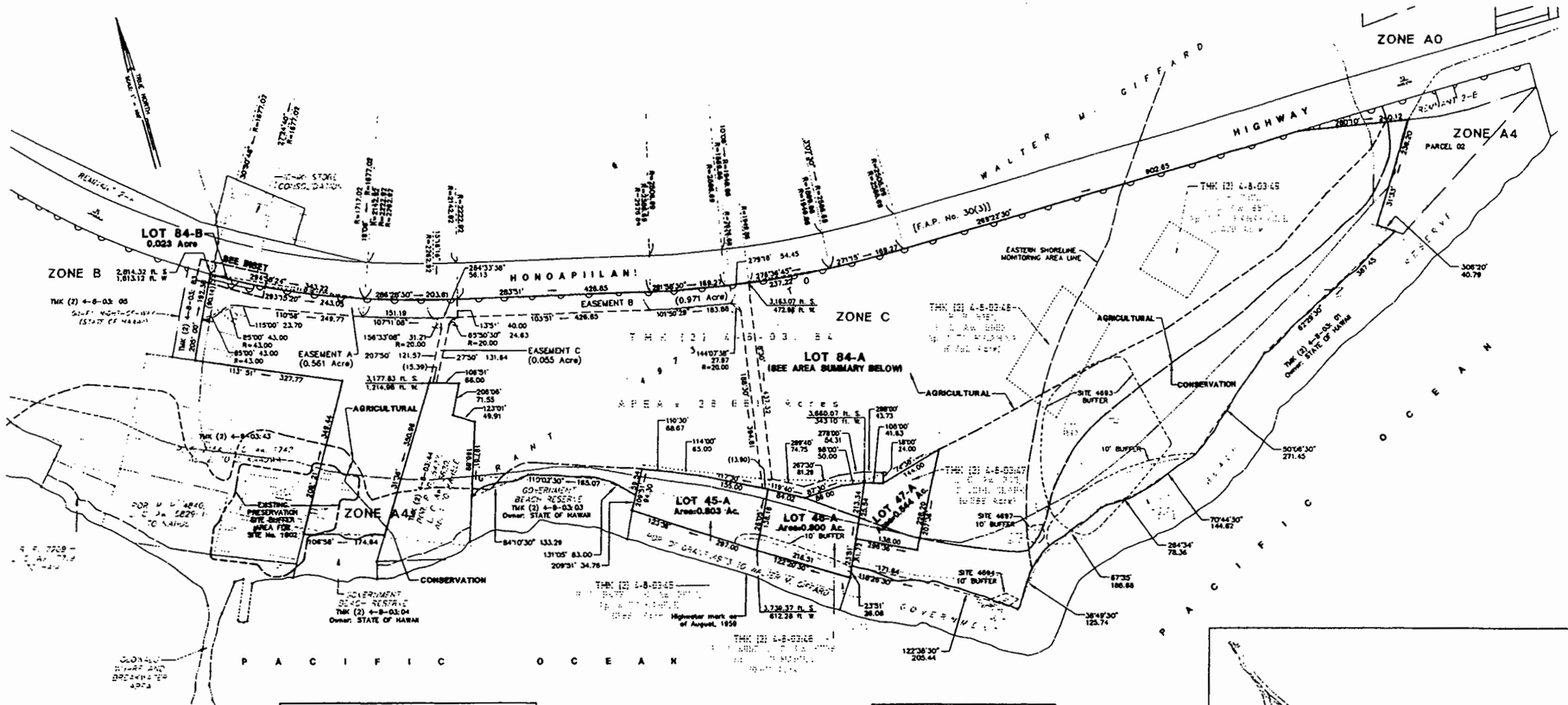
KG:lfm
cc: Peter Martin, West Maui Land Company, Inc.
Kirk Tanaka, R.T. Tanaka Engineers, Inc.
S:\DATA\Martin\OlowaluLot46\DOT.dea.resp.wpd

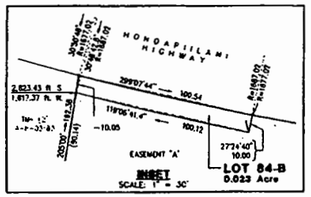


GRADING PLAN

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET C-9





LOT 84-A AREA SUMMARY:

GROSS AREA :	28.871 Acres
LESS EASEMENT A :	0.561 Acre
LESS EASEMENT B :	0.971 Acre
LESS EASEMENT C :	0.055 Acre
NET AREA :	27.284 Acres

LEGEND:

- STATE LAND USE COMMISSION BOUNDARY SEPARATING CONSERVATION LANDS FROM AGRICULTURAL LANDS. TAKEN FROM L.U.C. BOUNDARY INTERPRETATION No. 96-48 CERTIFIED BY THE L.U.C. ON MARCH 01, 1999.
- WEST MAUI COMMUNITY PLAN DESIGNATION BOUNDARY LINE BETWEEN AGRICULTURAL (AG), SINGLE FAMILY (SF), PARK (PK) AND OPEN SPACE (OS).
- BASE FLOOD CONTOUR

NOTES:

1. ADJOINING OWNERS AS SHOWN TAKEN FROM TAX MAP.
2. ALL LOTS TO BE SERVED BY A PRIVATE WATER SYSTEM.
3. ALL LOTS TO BE SEWERED IN ACCORDANCE TO DEPARTMENT OF HEALTH REQUIREMENTS.
4. ALL BOUNDARY CORNERS MARKED WITH 1/2-INCH PIPE UNLESS OTHERWISE NOTED
5. ALL AZIMUTHS AND RECORD COORDINATES AS SHOWN REFERRED TO GOVERNMENT SURVEY TRIANGULATION STATION "KILEA" △.
6. o-o-o DENOTES NO VEHICULAR ACCESS PERMITTED.
7. DENOTES VEHICULAR ACCESS PERMITTED.
8. LOT 84-B IS A HIGHWAY WIDENING LOT TO BE DEDICATED TO THE STATE DEPARTMENT OF TRANSPORTATION.
9. EASEMENT A IS A 40.00 FOOT WIDE ACCESS AND UTILITY EASEMENT IN FAVOR OF LOTS 45-A, 46-A, 47-A AND A PORTION OF R. P. 5477, L. C. AW. 5620, AP. 1 TO KAHELE.
10. EASEMENT B IS AN ACCESS AND UTILITY EASEMENT IN FAVOR OF LOTS 45-A, 46-A AND 47-A.
11. EASEMENT C IS A 15.00 FOOT WIDE ACCESS AND UTILITY EASEMENT IN FAVOR OF A PORTION OF R. P. 5477, L. C. AW. 5620, AP. 1 TO KAHELE.
12. THE ARCHAEOLOGICAL SITES AND EASTERN SHORELINE MONITORING AREA LINE AREA BASED ON THE PRESERVATION PLANS APPROVED BY THE STATE HISTORIC PRESERVATION DIVISION.
13. THE FLOOD ZONE INFORMATION AND BASE FLOOD CONTOURS SHOWN ARE INTERPOLATED AND DIGITIZED FROM THE FLOOD INSURANCE RATE MAP PANEL NO. 150003 0229B, DATED JUNE 01, 1981.
14. PURSUANT TO MAUI COUNTY CODE SECTION 3.44.015(C), THE COUNTY OF MAUI IS NOT RESPONSIBLE FOR ANY PARK, ROADWAY, EASEMENT (INCLUDING BUT NOT LIMITED TO DRAINAGE, SEWER, ACCESS, RECLAIMED WATER, OR IRRIGATION EASEMENT), OR ANY OTHER INTEREST IN REAL PROPERTY SHOWN ON THIS MAP OR SHOWN ON THESE PLANS, UNLESS THE MAUI COUNTY COUNCIL HAS ACCEPTED ITS DEDICATION BY A RESOLUTION APPROVED BY A MAJORITY OF COUNCIL'S MEMBERS AT A REGULAR OR SPECIAL MEETING OF THE MAUI COUNTY COUNCIL.

120 60 0 120 240
GRAPHIC SCALE IN FEET

OLOWALU MAKAI - HIKINA SUBDIVISION

CONSOLIDATION OF A PORTION OF GRANT 4973 TO WALTER M. GIFFARD, R. P. 5477, L.C. AW. 5620, AP. 4 TO KAHELE, R. P. 4952, L. C. AW. 6728, AP. 2 TO MAHULU, L. C. AW. 240 TO JOHN CLARK, R. P. 5181, L. C. AW. 5952, AP. 1 TO MINAMINA AND R. P. 7572, L. C. AW. 8817, AP. 1 TO KANAKAOLE

AND RESUBDIVISION OF SAID CONSOLIDATION INTO LOTS 45-A, 46-A, 47-A, 84-A AND 84-B

AND DESIGNATION OF EASEMENTS A, B AND C

AT OLOWALU, LAHAINA, MAUI, HAWAII

PORTION OF GRANT 4973 TO WALTER M. GIFFARD
Owner: OLOWALU ELUA ASSOCIATES, LLC
Address: 173 HO'OHANA STREET, SUITE 201 KAHULUI, HAWAII 96732

R.P. 5477, L. C. Aw. 5620, Ap. 4 TO KAHELE, L. C. Aw. 240 TO JOHN CLARK AND R. P. 7572, L. C. Aw. 8817, Ap. 2 TO KANAKAOLE
Owner: J. B. WEST, LLC
Address: 541 LAULEA PLACE PAIA, HAWAII 96779

R. P. 4952, L. C. Aw. 6728, Ap. 2 TO MAHULU AND R. P. 5181, L. C. Aw. 5952, Ap. 1 TO MINAMINA
Owner: KIPA HARRISON, LLC
Address: 590-A OLD STABLE ROAD PAIA, HAWAII 96779

"[illegible] SUBDIVISION APPROVAL [illegible] 2ND LAND SECTION [illegible] TMK NO(2) 4-8-03:48 [illegible] Bureau of Conveyances [illegible] Department of Taxation [illegible] Director of Public Works and Waste Management" 11/9/01

KIRK T. TANAKA LICENSED PROFESSIONAL LAND SURVEYOR No. 7223-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION

KIRK T. TANAKA
Licensed Professional Land Surveyor
Certificate No. 7223

10/12/01
DATE

REVISED: OCTOBER 18, 2001
REVISED: OCTOBER 08, 2001
REVISED: AUGUST 23, 2001
REVISED: AUGUST 06, 2001
REVISED: JUNE 04, 2001
MAY 24, 2001

L.U.C.A. File No. 4,834
JOB NO. 95-58

Tax Map Key (2) 4-8-03: 45, 46, 47, 48, 49 AND 84

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

MC

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD08/3308C

April 11, 2008

Samuel Lemmo, Administrator
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, HI 96809

RE: Request for comments on the Draft Environmental Assessment for the Martin single-family residence in the Olowalu Makai-Hikina Subdivision, Maui, TMK: (2) 4-8-003:046.

Dear Samuel Lemmo,

The Office of Hawaiian Affairs (OHA) is in receipt of the above-referenced Draft Environmental Assessment for the construction of Peter and Deborah Martin's single-family residential home on 0.8 acres in Olowalu, Maui. OHA has reviewed the project and offers the following comments.

We will rely on the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

In addition, OHA recommends that the applicant use native vegetation in its landscaping plan for subject parcel. Landscaping with native plants furthers the traditional Hawaiian concept of mālama 'āina and creates a more Hawaiian sense of place.

Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong (808) 594-0248 or e-mail him at sterlingw@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Clyde Namu`o
Office of Hawaiian Affairs
State of Hawai`i
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai`i 96813

SUBJECT: Proposed Martin Single-Family Residence, TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Namu`o:

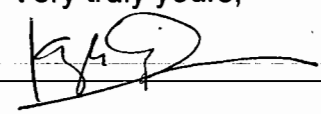
Thank you for your office's letter dated April 11, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, should iwi kupuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, in accordance with Section 6E-43.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, work will stop in the immediate vicinity and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR) and the Office of Hawaiian Affairs (OHA) will be contacted.

In addition, the applicant will use native vegetation in its landscaping plan, as applicable, for the subject project to create a more Hawaiian sense of place.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:lh
cc: Peter and Deborah Martin
S:\DATA\Martin\OlowaluLot46\OHAdea.res.wpd

Martin/Olowalu SF
MAY 1 2 2008 #1280

POLICE DEPARTMENT
COUNTY OF MAUI

CHARMAINE TAVARES
MAYOR

OUR REFERENCE
YOUR REFERENCE tj

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

GARY A. YABUTA
DEPUTY CHIEF OF POLICE

May 5, 2008

Mr. Kyle Ginoza
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Ginoza:

SUBJECT: Martin Single-Family Residence Project in Olowalu

This is in response to your letter of March 31, 2008, requesting comments on the above subject.

We have reviewed the information for the above mentioned subject and offer the enclosed comment.

Thank you for giving us the opportunity to comment on this project.

Very truly yours,

AC Wayne T. Ribao

Assistant Chief Wayne T. Ribao
for: Thomas M. Phillips
Chief of Police

c: Jeffrey Hunt, Maui County Planning Department

COPY

TO: Thomas PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI

VIA: CHANNELS

FROM: Lawrence N. KAUHA'AHA'A, POLICE OFFICER, DISTRICT IV

SUBJECT: Martin Single-Family Residence Project in Olowalu

CONCUR:
A. Wayne Phillips
04/29/08

The following to/from transmittal is being submitted in response to this proposed project.

A review of this project has been done. A single-family residential project should have no adverse impact on the traffic flow in this area.

Submitted for your perusal,

Lawrence N. KAUHA'AHA'A, E-8851
POLICE OFFICER, DISTRICT IV
04.21.08 @ 1700 HOURS

NO SIGNIFICANT IMPACT.

4/28/08

CHARMAINE TAVARES
Mayor

MILTON M. ARAKAWA, A.I.C.P.
Director

MICHAEL M. MIYAMOTO
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM NO. 434
WAILUKU, MAUI, HAWAII 96793

April 15, 2008

Mr. Kyle Ginoza
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Ginoza:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED MARTIN SINGLE-FAMILY RESIDENCE PROJECT IN OLOWALU

We reviewed the subject application and have the following comments:

1. The architect and owner are advised that the project is subject to possible tsunami and flood inundation. As such, said project must conform to Ordinance No. 1145, pertaining to flood hazard districts.

2. A verification shall be provided by a Registered Civil Engineer that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties.

3. A detailed and final drainage report and a Best Management Practices (BMP) Plan shall be submitted with the grading plans for review and approval prior to issuance of grading permits. The drainage report shall include hydrologic and hydraulic calculations and the schemes for disposal of runoff waters. It must comply with the provisions of the "Rules and Design of Storm Drainage Facilities in the County of Maui" and must provide verification that the grading and runoff water generated by the project will not have an adverse effect on adjacent and downstream properties. The BMP plan shall show the location and details of structural and non-structural measures to control erosion and sedimentation to the maximum extent practicable.

4. The applicant shall be responsible for all required improvements, as required by Hawaii Revised Statutes, Maui County Code and rules and regulations.

5. Construction plans shall be designed in conformance with Hawaii Standard Specifications for Road and Bridge construction dated 2005 and Standard Details for Public Works Construction, 1984, as amended.

6. The scope of the 1997 Uniform Building Code, does not apply to buildings or structures on lands designated Conservation District by the State Land Use Commission unless required by Conservation District Use Application.

7. Recommend that an all-weather surfaced access be provided to the property from Honoapiilani Highway.

Please call Michael Miyamoto at 270-7845 if you have any questions regarding this letter.

Sincerely,

MILTON M. ARAKAWA, A.I.C.P.
Director of Public Works

MMA:MMM:ls
xc: Highways Division
Engineering Division
Department of Planning
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MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Mr. Milton Arakawa, AICP, Director
Department of Public Works
County of Maui
200 South High Street
Wailuku, Hawai`i 96793

SUBJECT: Proposed Martin Single-Family Residence, TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Arakawa:

Thank you for your office's letter dated April 15, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following response to your comments.

1. The applicant will conform to Ordinance No. 1145, pertaining to flood hazard districts .

2. The Preliminary Civil Engineering and Drainage Report (PCEDR), prepared by Tanaka Engineers, Inc. in December 2007, verifies that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties.

3. Grading plans will be submitted along with a Final Drainage Report (FDR) and a Best Management Practices (BMP) Plan for review and approval prior to the issuance of grading permits. All necessary hydrologic and hydraulic calculations, as well as schemes for the disposal of runoff waters will be included in the FDR, which will be prepared to be in compliance with the provisions of the "Rules and Design of Storm Drainage Facilities in the County of Maui". As with the PDR, the FDR will also provide verification that grading and runoff water generated by the project will not have an adverse effect on adjacent and downstream properties. The BMP Plan will show the location and details of structural measures to control erosion and sedimentation to the maximum extent practicable.

4. The applicant's civil engineer will ensure compliance with the Hawai`i Revised Statutes, Maui County Code, and other applicable rules and regulations.

5. Construction plans will be developed in accordance with the Hawai`i Standard Specifications for Road and Bridge Construction dated 2005 and the Standard Details for Public Works Construction, 1984, as amended.

6. It is noted that the 1997 Uniform Building Code does not apply to buildings or structures on lands located in the Conservation District, unless required by the Conservation District Use Application.

7. The applicant will consider participating in the installation of an all-weather access road from the property to Honoapi`ilani Highway.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lh
cc: Peter and Deborah Martin
S:\DATA\Martin\OlowaluLot46\DPWdea.res.wpd

APR 1 8 2008

CHARMAINE TAVARES
Mayor

CHERYL K. OKUMA, Esq.
Director

GREGG KRESGE
Deputy Director

TRACY TAKAMINE, P.E.
Solid Waste Division

DAVID TAYLOR, P.E.
Wastewater Reclamation Division

COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
2200 MAIN STREET, SUITE 175
WAILUKU, MAUI, HAWAII 96793

April 14, 2008

Mr. Kyle Ginoza
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: MARTIN SINGLE FAMILY RESIDENCE PROJECT IN OLOWALU
DRAFT ENVIRONMENTAL ASSESSMENT
TMK (2) 4-8-003:046, OLOWALU

Dear Mr. Ginoza,

We reviewed the subject document and have the following comments:

1. Solid Waste Division comments

   a. Include a plan for construction waste disposal, recycling, reuse.

2. Wastewater Reclamation Division comments:

   a. None. No County sewer in the area.

If you have any questions regarding this memorandum, please contact Gregg Kresge at 270-8230.

Sincerely,

Cheryl K. Okuma

Cheryl Okuma, Director

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Cheryl Okuma, Director
Department of Environmental Management
County of Maui
2200 Main Street, Suite 175
Wailuku, Hawai`i 96793

SUBJECT: Proposed Martin Single-Family Residence, TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Ms. Okuma:

Thank you for your office's letter dated April 14, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we note that a construction waste disposal plan will be submitted during construction plan review stage of the project. The applicants will employ an appropriate recycling and reuse program consistent with single-family residential usage. In addition, we acknowledge that the County sewer system does not serve the subject property.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lh

cc: Peter and Deborah Martin
S:\DATA\Martin\OlowaluLot46\DEMdea.res.wpd

APR 1 0 2008
Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

April 8, 2008

Munekiyo & Hiraga, Inc.
Attn: Kyle Ginoza
305 High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Mr. Ginoza,

Subject: Martin Single-Family Residence at Lot 46-A
Olowalu, Maui, Hawaii
TMK: (2) 4-8-003:046

Thank you for allowing us to comment on the Draft Environmental Assessment for the proposed subject project, which was received on April 2, 2008.

In reviewing our records and the information received, Maui Electric Company (MECO) has no objection to the project at this time. However, we would like to correct the statement on page 34 that says, "MECO's 69 kilovolt overhead transmission lines from Central Maui to the Lahaina-Kapalua area..." And would like to state that our transmission lines that extend out towards the Lahaina-Kapalua area originate from the Maalaea Generating Station (MGS) and not our Kahului Generating Station (KGS).

Again, we also highly encourage the developer's electrical consultant to submit its electrical demand requirements and project time schedule as soon as practical so that service can be provided on a timely basis.

May we also suggest that the developer and/or their consultant make contact with Ray Cibulskis of our Demand Side Management (DSM) group at 872-3226 to review potential energy conservation and efficiency opportunities for their project.

~~Should you have any other questions or concerns, please call Kim Kawahara at 871-2345.~~

Sincerely,

Gregorysenn Kauhi
Customer Operations Manager

GK/kk:lh
cc: Ray Cibulskis – MECO DSM

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Mr. Gregorysenn Kauhi
Maui Electric Company
200 South High Street
Kahului, Hawai`i 96732

SUBJECT: Proposed Martin Single-Family Residence, TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Kauhi:

Thank you for your letter dated April 8, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following response to your comments.

1. The Final Environmental Assessment will include a statement that MECO's transmission lines that extend towards the Lahaina-Kapalua area originate from the Ma`alaea Generating Station.

2. As mentioned in our previous correspondence to you, the project's electrical consultant will submit electrical drawings, the projected electrical demand requirements, and a project time schedule, as early as is practical, to facilitate the provision of electrical service. In addition, energy conservation and efficiency opportunities will be considered in the design phase of the development. Coordination with Ray Cibulskis of the Demand Side Management group will be undertaken at that time.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza, Project Manager

KG:lh
cc: Peter and Deborah Martin
S:\DATA\Martin\OlowaluLot46\MECOdea.res.wpd

COUNTY COUNCIL
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793
www.mauicounty.gov/council

April 21, 2008

Munekiyo and Hiraga
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Dagdag,

Subject: Martin Application

The following are comments based on public complaints about the past practices of the subject applicant. Prior to any approval of a permit(s) these reports should be thoroughly researched and addressed since they involve serious infractions and prior illegal actions that may or may not be resolved.

The applicant or his representative cut down an ancient hau tree growing on the shoreline at Olowalu. This tree was written about in ancient chants and legends and was illegally removed. As a result there was supposedly a fine that was issued by the State, however, I do not know whether this was ever resolved. To this day it is still a sore point with many Hawaiian people.

Numerous complaints were received from local area residents, and Native Hawaiians, that access was denied to them in several areas in the Olowalu area near to where the applicant intends to construct their dwelling. One area was at Olowalu landing, which was gated off. Another complaint was access to a family burial site, just mauka of Olowalu. Another complaint was from an individual who was upset that the Camp Pecusa was closed by the applicant and they could no longer enjoy this family activity.

The applicant operated illegal commercial activities in the old plantation home adjacent to Olowalu Landing without any permits, and was finally forced to obtain an after the fact permit. I do not know if any fines were ever assessed or if all of the back fees were paid over the years that these activities took place.

An illegal stock car race track was set up and a roadway cut into the hillside (no grading permits to my knowledge), on a weekend when enforcement would be impossible, adjacent to a heiau and just mauka of the Olowalu Store. Many area residents called to report this illegal activity and by the time enforcement could respond the activity was concluded. I personally witnessed the spectacle (as did other public officials) and there were stadium type lights erected and the cars were creating a huge disturbance almost on top of the heiau. The outrage expressed by Native Hawaiians was evident. To my knowledge no fines were ever issued due to the inability of the department to respond on a timely basis.

On a separate parcel, which the applicant owns, the U. S. Geological Survey personnel were denied access to the property to begin instream flow studies for the Kauaula Stream area. I was informed that access could not be denied however, the U.S.G.S. personnel did not argue with the applicant and tried to gain access to historical data via other means. I do not know if this has ever been resolved. In any event, the establishment of instream flow levels is critical to the water allocation issues in the area and the applicant is impeding the rights of Native Hawaiians to water for their use.

On a separate property that the applicant owns, access was denied to a former Mayor and public officials to conduct a site inspection and to obtain access to a Hawaiian family home site. Subsequent access was cut off for the Hawaiian family through their traditional access route and the applicant issued a TRO against the Hawaiian family(s) living in the area. Difficulties still exist between the family members and the applicant.

The applicant was required by State Historic Preservation Division to preserve a buffer area adjacent to the Kauaula Stream, which was a rich cultural site, and no permits were to be issued until this buffer zone was established. The applicant ignored the directive and proceeded to file for permits which were issued with a "hold harmless indemnification clause" that the county attached to the permit in case they were sued. Both the actions of the county and also the applicant were inexcusable however I had no authority over the administration. This area now has little or no buffer from adjacent properties and it also has a horse trail that traverses the stream area with no buffer at all. I do not know if this has ever been resolved or if archaeological sites have been compromised.

A huge fire erupted at Olowalu that was reportedly due to an electrical contractor doing work on one of the sites that is under the control of the applicant and/or his partner. Two people reported directly to me that the fire was a result of this electrical work and while they said that they did not witness the applicant in the area, they believe that work being done was related to development created by the applicant and is the reason for the fire. They hold the applicant and their partners responsible for damages they incurred however they have no way to prove it. The fire department confirmed that they could not substantiate evidence to actually assign blame and the subcontractor that was working on the project recanted their original report. While one might say that "accidents happen" the substantial development that has occurred in the area adjacent to Olowalu is causing a huge financial burden on the county, and is overtaxing our police and fire
personnel. This development is directly the result of the applicant's segmentation of the ag lands and conversion to residential development, with inadequate water supplies to support agricultural activities, which are a requirement under HRS 205.

The immediate problems with any further development in the Olowalu area are that West Maui is under drought conditions and any additional impacts to the area will only create a greater problem for existing farming operations (such as the piggery which has been under pressure from the applicant to shutdown or move). Water to the family that runs the piggery was an issue
per my understanding.

Services such as school buses, fire, police, vector control, etc. are becoming increasingly difficult to provide as Lahaina has only four police officers who reside on the West side and the State has limited resources as well. This is stretching our resources to the maximum and we cannot continue to expand our urban boundaries without causing hardship to the existing families that are within the West Maui Community Plan area. The West Maui community plan also stipulates that no development should occur South of Puamana and no development should occur makai of the Highway.

The county of Maui is interested in preserving portions of the Olowalu area for the Puamana to Pali Parkway and does not want any further development to occur which would obstruct the shoreline views. The former planning Director, Mike Foley, should be contacted for comments as some of the lands that were to be preserved may either traverse the area the applicant intends to build on or may be needed for the coastal trail that is being planned.

The state also is in the process of doing the planning for the relocation and/or expansion of the Honoapiilani Highway and since the route has not yet been finally determined by the task force, it is important that all options be kept open. Building on any additional sites in this area may pose problems.

The impact being referred to as minimal is truly a mischaracterization of the situation, since it is in a sensitive cultural and environmental area. Not one of the mauka subdivisions that the applicant has developed has had an environmental impact statement done, since there was no "trigger" however, the damage to the reef area from mauka runoff and also the density in some areas is doing serious damage to the nearshore waters and the reef.

I believe the applicant's record of disrespect for the environment, for the law, for Native Hawaiian culture and historic sites is deplorable and as a result, any representations made as to adherence to conditions of any permit(s) would be highly questionable. I base my comments on the numerous complaints reported to me and my personal observations of the conduct of this applicant. The applicant has stated publicly that he does not believe in government oversight.

Conservation development land use permits should be granted based on the ability of the applicant to act as a proper steward of the land and should be granted only if strict adherence to the laws/conditions are assured. For this reason I could not support this measure going forward in any manner for this applicant.

Sincerely,

Jo Anne Johnson
Councilmember - West Maui
200 S. High Street - #813
Wailuku, Hi.

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Councilmember Jo Anne Johnson
Maui County Council
County of Maui
200 South High Street
Wailuku, Hawai`i 96793

SUBJECT: Proposed Martin Single-Family Residence; TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Councilmember Johnson:

Thank you for your letter dated April 21, 2008, providing comments on the Draft Environmental Assessment for the subject project.

On behalf of the applicants, Peter and Deborah Martin, we offer the following responses to your comments.

1. There have been a number of baseless allegations regarding stewardship of lands owned by the applicants. The applicants have made concerted efforts to accommodate native Hawaiian gathering rights and permitting requirements of various State and County agencies. The applicants will continue to cooperate with these State and County agencies regarding potentially non-permitted activities, which may be occurring on these lands. The applicants have not been involved in these activities and will continue to aid in the prevention of continued abuse of their lands.

2. Regarding potable and non-potable water use, the project site will be serviced by Olowalu Water Company, LLC (OWC). OWC is a private water system, which provides both potable and non-potable water for residents and agricultural users within the 700-acre region known as Olowalu.

3. The subject property is located in proximity to Olowalu town; specifically, the property is located approximately a quarter of a mile to the southeast of Olowalu General Store. As a result, it is not anticipated that the service limits for existing public services will be significantly extended.

4. The applicants understand that both the State and County governments have undertaken both roadway and recreational studies in the West Maui region.

However, the subject property and proximate properties either contain or are being proposed to contain single-family residences as part of the Olowalu Makai-Hikina agricultural subdivision. This area has historically contained residences up to the plantation era and present day.

5. The applicants will strictly adhere to State and County development regulations with respect to the Special Management Area and Conservation District.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza
Project Manager

KG:lfm
cc: Peter Martin, West Maui Land Company, Inc.
S:\DATA\Martin\OlowaluLot46\Johnson.dea.resp.wpd

April 21, 2008

To: **Peter and Deborah Martin**
590-A Old Stable Road
Paia, Hawai'i 96779
Contact: **Peter Martin**, (808 283-1273)

From: Living Being in the HuMan Function with the attached name
Foster Robin Ampong, kanaka maoli, "native Hawaiian" ahupua`a o kahoma, moku o Lahaina, mokupuni o piilani.

Subject: **Opposition to Proposed Martin Single-Family Residence (HRS 343 DEA)**
District: Lahaina
TMK: (2) 4-8-003:046

CC: **Office of Conservation and Coastal Lands,**
P.O. Box 621, Honolulu, Hawai'i 96809
Contact: Samuel J. Lemmo, (808 587-0433)

Munekiyo & Hiraga, Inc.,
305 High Street, Suite104, Wailuku, Hawai'i 96793.
Contact: Kyle Ginoza, (808 244-2015)

To all concerned parties,

With sincere respect, I submit the following written testimony opposing the **Proposed Martin Single-Family Residence (HRS 343 DEA)** located in the district of Lahaina, island of Maui.

Being born and raised on the island of Maui I am deeply concerned for the people and limited resources presently available such as, but not limited to, **"guaranteed" sustainable water source.**

Presently the residents already living in West Maui and throughout the rest of Maui has **no "guarantee" of any sustainable water source.**

Year after year, Maui has experienced water moratoriums because of dwindling rainfall while development and promoting growth increases unabated; straining our resources and further raising the already high cost-of-living now impacting the lower and middle income earning population.

The dwindling rain-fall which directly affects the availability of our water resource is now scientifically proven to be attributed to Global Warming, i.e. "Man-Made", the *current*

high cost-of-living Maui and the rest of Hawaii is experiencing is *equally* Man-Made, attributing to an "unsustainable environment" whose past and present policies and practices benefit a select few at the expense and demise of our greater community

Unless we as a society acknowledge these hard facts and reprioritize our value-system to not only reflect a truly "sustainable" lifestyle, we demonstrate by example the full potential of our Humanity, community by community, to rebuilding what we have destroyed in less than 150 years. Both in our environment and within our souls

In light of the present economic and financial circumstances, *just to name a few,* if we do not immediately confront and remedy:

1. Mass Home Foreclosures (Sub-prime Mortgage Lending Crisis)
2. Plummeting value of the US Dollar
3. Rising Cost of Oil & Gas
4. Rising Food Prices
5. Loss of Jobs Nationwide
6. Bankruptcy and shut down of Business (Aloha Airlines, ATA Airlines)
7. Geo-Political instability
8. Two Wars (Afghanistan & Iraq) draining the nations funds.
9. Slow-down in Tourism

We *all* will suffer greatly and so will our children we leave behind who shall inherit what we sow

At this time, approving the **Proposed Martin Single-Family Residence (HRS 343 DEA) will exasperate an already "unsustainable environment" and dire crisis we now face in our local community, throughout the nation and world.**

The So-Called "CEDED LANDS"

Another important element I strongly believe must be addressed and consequently resolved before any consideration of development can take place is the so-called "Ceded Lands" issue most recently cited by the Hawaii Supreme Court 25570 [pdf] (Office of Hawaiian Affairs v. Housing and Community Development Corporation of Hawaii (HCDCH), 1st Circuit Court, 117 Haw. 174.

Excerpt from the High-Courts Ruling:

"For the reasons discussed infra, we vacate the January 31, 2003 judgment and remand this case to the circuit court with instructions to issue an order granting the plaintiffs' request for an injunction against the defendants from selling or otherwise transferring to third parties (1) the parcel of ceded land on Maui and (2) any ceded lands from the public lands trust until the claims of the native Hawaiians to the ceded lands has been resolved."

Much of the lands impacted in this **Proposed Martin Single-Family Residence (HRS 343 DEA)** are potential (pending a "complete inventory of lands) ***and/or*** lands of the so-called "Ceded Lands" purported to have been left in trust for the benefit and betterment of "native Hawaiians" roughly estimated to be well over 400,000 living today.

Please take carful note of lines 2-4, *"order granting the plaintiffs' request for an injunction against the defendants from selling or otherwise transferring to third parties (1) the parcel of ceded land on Maui and (2) any ceded lands from the public lands trust until the claims of the native Hawaiians to the ceded lands has been resolved."* which refers to "third parties" such as the former Pioneer Mill Company and any subsequent corporation that came into existence and acquired these lands following the end of Sugar and Pineapple Cultivation in West Maui.
The Proposed Martin Single-Family Residence (HRS 343 DEA), i.e. Peter and Deborah Martin is a *"third party'* "; and as the original Land Titles from the Mahele (Awarding of Land Titles, 1845-1855) attest to, portions of the lands at Kahoma were awarded to the Crown (i.e. Aliis` Lunalilo,Kamamalu, Kameha,eha III & IV, Kalakua, Liliuokalani, David Malo, Paki, Kaeo, T. Keaweiwi, etc.) , government (i.e. Kahoma and Kanaha Stream, Polima and Konohiki lands, roads and trails that extended across the Ahupua`a of Kahoma and Kanaha respectively.

To date, no settlement has been made with the "native Hawaiians" regarding the so-called "Ceded Lands" issue cited in the Hawaii Supreme Court Ruling 25570 [pdf] (Office of Hawaiian Affairs v. Housing and Community Development Corporation of Hawaii (HCDCH), 1st Circuit Court, 117 Haw. 174.

Though this written testimony is in opposition to the **Proposed Martin Single-Family Residence (HRS 343 DEA),** it also serves as a **Caveat** to all concerned parties should the applicant be given County and/or State approvals of permits; and the applicant be allowed to proceed to develop upon the lands of Kahoma without addressing and resolving the afore mentioned issues as cited in Hawaii Supreme Court Ruling 25570 [pdf] (Office of Hawaiian Affairs v. Housing and Community Development Corporation of Hawaii (HCDCH), 1st Circuit Court, 117 Haw. 174.

Let us first remedy the economic and financial ills we currently are burden with and resolve the so-called "Ceded Lands" issue with the "native Hawaiians" before we commit to further social/community self-inflicting mutilation.

Thank you.

Living being in the HuMan function with the attached name
Foster Robin Ampong
Email: kekahunakeaweiwi@yahoo.com
Phone: 877-9097

---

cc: Council Member, JoAnn Johnson
Maui Mayor, Charmain Tavares
Senator, Colleen Hanabusa
Representative, Calvin Say
Senator, Russell S. Kokubun
House Representative, Mele Carroll

Senator, Rosalyn H, Baker
House Representative, Angus L.K. McKelvey
Maui County G.P.A.C. Committee
Internet Community Networks


Kahoma (Martin) Proposal.doc


Kahoma (WMLC) Proposal.doc

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Via email: kekahunakeaweiwi@yahoo.com

Mr. Foster Robin Ampong

SUBJECT: Proposed Martin Single-Family Residence; TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Mr. Ampong:

Thank you for your letter dated April 21, 2008, providing comments on the Draft Environmental Assessment for the subject project.

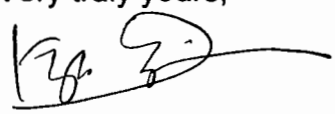
On behalf of the applicants, Peter and Deborah Martin, we offer the following responses to your comments.

1. The proposed project, limited in scope to the construction of a single-story, single-family residence and related improvements, is not anticipated to result in significant adverse impacts to the public's health and welfare. Water quality is not anticipated to be affected with the implementation of engineering Best Management Practices (BMPs). Consequently, in the long term, the proposed project is not anticipated to have a significant impact on the sustainability of the West Maui region.

2. The applicants' property interest in the subject property has been legally acquired. A warranty deed recorded with the State of Hawai`i, Bureau of Conveyances on September 20, 2004 notes Peter Klint Martin and Deborah Lee Martin, husband and wife, as grantees of the subject property.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:lfm
cc: Peter Martin, West Maui Land Company, Inc.
S:\DATA\Martin\OlowaluLot46\Ampong.dea.resp.wpd

April 22, 2008

TO: Munukiyo & Hiraga, Inc.
Attn: Mr. Kyle Ginoza
305 High Street, Suite 104
Wailuku, Hi 96793

FROM: Josephine Keliipio
P.O. Box 368
Kealakekua, Hi 96750

RE: Comments - Draft Environmental Assessment for Peter Martin's Olowalu Residence

The following are my comments:

1) It is my understanding that, Mr. Martin is constructing his residence just 70 feet from the shoreline. THAT IS TOO DARN CLOSE TO THE OCEAN!! He has almost an acre of land at this Olowalu site, right? Please require him to set his home, pool, driveway, tennis court, lawn, patio, gazebo, and anything of a "BUILT" nature BACK 200 feet from the shoreline. We don't want him or his structures intruding onto public property or polluting the ocean and I am certain that Mr. Martin doesn't want his home washed into the ocean in the next large storm surge.

   PLEASE REQUIRE THAT MR. MARTIN BUILD ALL OF HIS "BUILT" STRUCTURES BACK 200 FEET FROM THE HIGH WATER MARK!!

2) It is also my understanding that Mr. Martin is an owner of Kahoma Land Company and that his company claims to own a number of parcels along Kahoma Stream WITHOUT clear title because those lands were leased to Pioneer Mill and were never returned to their original Native Hawaiian owners who are now deceased. Mr. Martin should be required to give those lands back to the families of the original owners FIRST before he is allowed to develop anywhere in West Maui. ALSO, he and his KIPA HUI group needs to IMEDIATELY REMOVE their name from the KALEPA family parcel TMK 450180070000. My Uncle Dallas Kalepa and now his daughter Mrs. Lillian Sutter have been paying the property taxes on that land FOR GENERATIONS! Peter Martin, Kahoma Land Company and Kipa Hui have no business STEALING LAND THAT DOES NOT BELONG TO THEM!!

   DO NOT ALLOW MR. MARTIN TO PROCEED WITH THIS RESIDENTIAL PROJECT UNTIL HE RESOLVES HIS UNRESOLVED ISSUES WITH THE KALEPA FAMILY AND WITH ALL THE FAMILIES OF KAHOMA VALLEY. MAHALO.

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

June 6, 2008

Ms. Josephine Keliipio
P. O. Box 368
Kealakekua, Hawai`i 96750

SUBJECT: Proposed Martin Single-Family Residence; TMK (2)4-8-003:046, Olowalu, Maui, Hawai`i

Dear Ms. Keliipio:

Thank you for your letter dated April 22, 2008, providing comments on the Draft Environmental Assessment for the subject project.

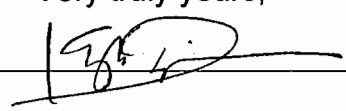
On behalf of the applicants, Peter and Deborah Martin, we offer the following responses to your comments.

1. The proposed residence will incorporate an approximately 100-foot setback from the shoreline. Further, the applicants will construct their residence in accordance with Chapter 19.62 of the Maui County Code (MCC), Flood Hazard Areas.

2. Peter Martin is part-owner of a number of parcels in the Kahoma area of West Maui. Mr. Martin's property interests, including the subject property, have been legally acquired. Regarding TMK (2) 4-8-003:046, a warranty deed recorded with the State of Hawai`i, Bureau of Conveyances on September 20, 2004 notes Peter Klint Martin and Deborah Lee Martin, husband and wife, as grantees of the subject property.

Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:lfm
cc: Peter Martin, West Maui Land Company, Inc.
S:\DATA\Martin\OlowaluLot46\Keliipio.dea.resp.wpd

XI. REFERENCES

XI. REFERENCES

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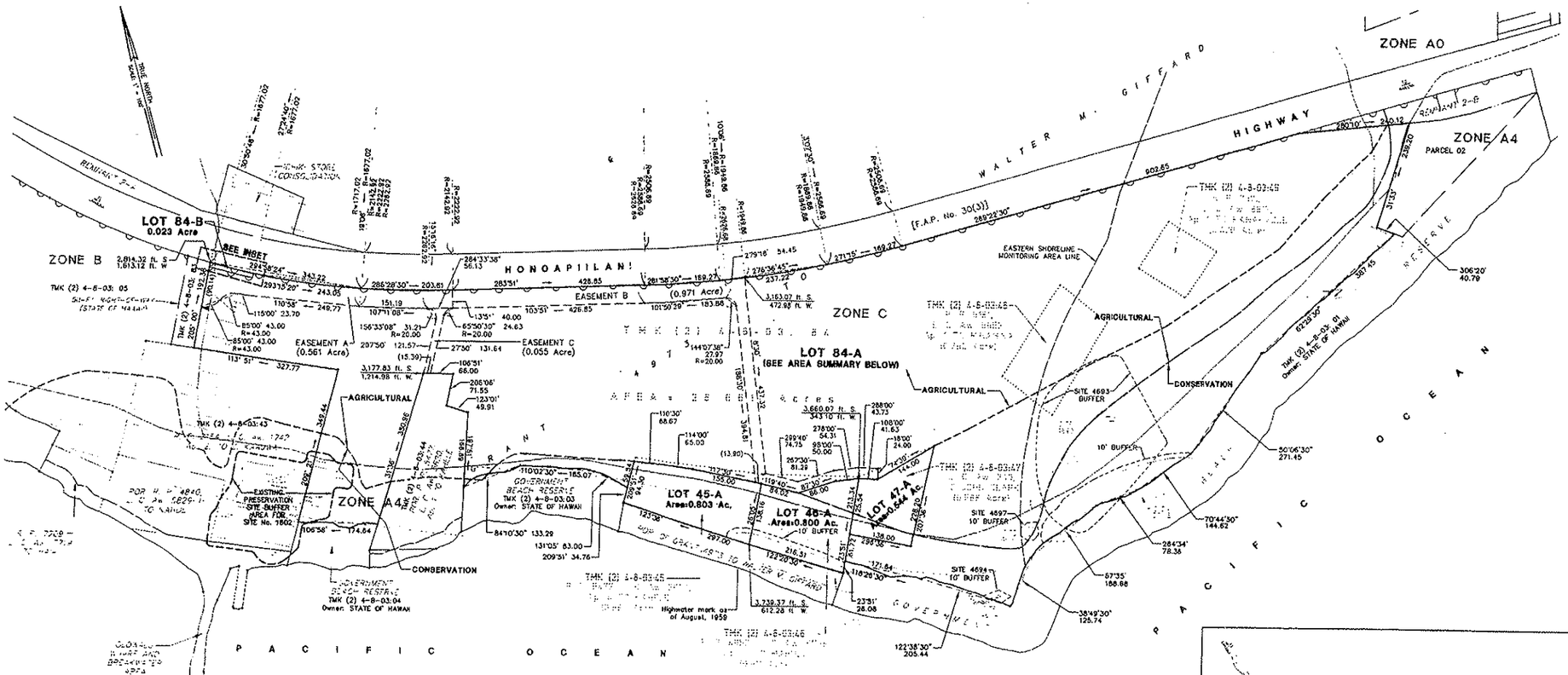
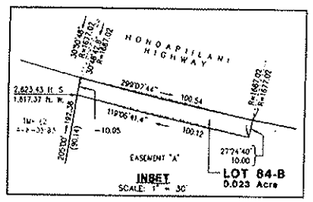
Xamanek Researches, Archaeological Inventory Survey of Makai Portion of Olowalu Development Parcel L (Phase II), Olowalu Ahupua`a, Lahaina District, Maui Island, July 23, 1999 (Revised February 2, 2000).

APPENDIX A.

Olowalu Makai-Hikina Final Subdivision Plat Map





LEGEND:

- STATE LAND USE COMMISSION BOUNDARY SEPARATING CONSERVATION LANDS FROM AGRICULTURAL LANDS. TAKEN FROM L.U.C. BOUNDARY INTERPRETATION No. 98-48 CERTIFIED BY THE L.U.C. ON MARCH 01, 1999.
- WEST MAUI COMMUNITY PLAN DESIGNATION BOUNDARY LINE BETWEEN AGRICULTURAL (AG), SINGLE FAMILY (SF), PARK (PK) AND OPEN SPACE (OS).
- BASE FLOOD CONTOUR

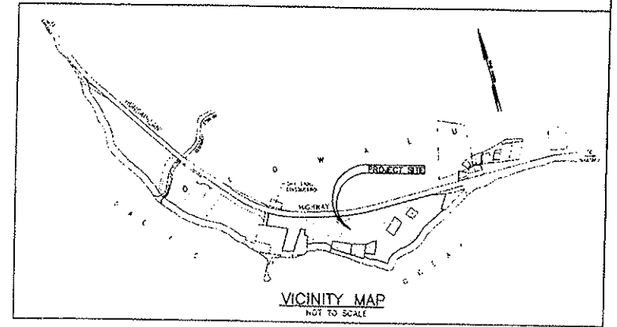
NOTES:

1. ADJOINING OWNERS AS SHOWN TAKEN FROM TAX MAP.
2. ALL LOTS TO BE SERVED BY A PRIVATE WATER SYSTEM.
3. ALL LOTS TO BE SEWERED IN ACCORDANCE TO DEPARTMENT OF HEALTH REQUIREMENTS.
4. ALL BOUNDARY CORNERS MARKED WITH 1/2-INCH PIPE UNLESS OTHERWISE NOTED
5. ALL AZIMUTHS AND RECORD COORDINATES AS SHOWN REFERRED TO GOVERNMENT SURVEY TRIANGULATION STATION "HALEA".
6. o o o DENOTES NO VEHICULAR ACCESS PERMITTED.
7. DENOTES VEHICULAR ACCESS PERMITTED.
8. LOT 84-B IS A HIGHWAY WIDENING LOT TO BE DEDICATED TO THE STATE DEPARTMENT OF TRANSPORTATION.
9. EASEMENT A IS A 40.00 FOOT WIDE ACCESS AND UTILITY EASEMENT IN FAVOR OF LOTS 45-A, 46-A, 47-A AND A PORTION OF R. P. 5477, L. C. AW. 5620, AP. 1 TO KAHELE.
10. EASEMENT B IS AN ACCESS AND UTILITY EASEMENT IN FAVOR OF LOTS 45-A, 46-A AND 47-A.
11. EASEMENT C IS A 15.00 FOOT WIDE ACCESS AND UTILITY EASEMENT IN FAVOR OF A PORTION OF R. P. 5477, L. C. AW. 5620, AP. 1 TO KAHELE.
12. THE ARCHAEOLOGICAL SITES AND EASTERN SHORELINE MONITORING AREA LINE AREA BASED ON THE PRESERVATION PLANS APPROVED BY THE STATE HISTORIC PRESERVATION DIVISION.
13. THE FLOOD ZONE INFORMATION AND BASE FLOOD CONTOURS SHOWN ARE INTERPOLATED AND DIGITIZED FROM THE FLOOD INSURANCE RATE MAP PANEL NO. 150003 0229D, DATED JUNE 01, 1981.
14. PURSUANT TO MAUI COUNTY CODE SECTION 3.44.015(G), THE COUNTY OF MAUI IS NOT RESPONSIBLE FOR ANY PARK, ROADWAY, EASEMENT (INCLUDING BUT NOT LIMITED TO DRAINAGE, SEWER, ACCESS, RECLAIMED WATER, OR AVIGATION EASEMENT), OR ANY OTHER INTEREST IN REAL PROPERTY SHOWN ON THIS MAP OR SHOWN ON THESE PLANS, UNLESS THE MAUI COUNTY COUNCIL HAS ACCEPTED ITS DEDICATION BY A RESOLUTION APPROVED BY A MAJORITY OF COUNCIL'S MEMBERS AT A REGULAR OR SPECIAL MEETING OF THE MAUI COUNTY COUNCIL.

120 60 0 120 240
GRAPHIC SCALE IN FEET

LOT 84-A AREA SUMMARY:

GROSS AREA =	28.871 Acres
LESS EASEMENT A =	0.561 Acre
LESS EASEMENT B =	0.971 Acre
LESS EASEMENT C =	0.055 Acre
NET AREA =	27.284 Acres



OLOWALU MAKAI - HIKINA SUBDIVISION

CONSOLIDATION OF A PORTION OF GRANT 4973 TO WALTER M. GIFFARD, R. P. 5477, L.C. AW. 5620, AP. 4 TO KAHELE, R. P. 4952, L. C. AW. 6728, AP. 2 TO MAHULU, L. C. AW. 240 TO JOHN CLARK, R. P. 5181, L. C. AW. 5952, AP. 1 TO MINAMINA AND R. P. 7572, L. C. AW. 8817, AP. 1 TO KANAKAOLE

AND RESUBDIVISION OF SAID CONSOLIDATION INTO LOTS 45-A, 46-A, 47-A, 84-A AND 84-B

AND DESIGNATION OF EASEMENTS A, B AND C

AT OLOWALU, LAHAINA, MAUI, HAWAII

Tax Map Key (2) 4-8-03: 45, 46, 47, 48, 49 AND 84

PORTION OF GRANT 4973 TO WALTER M. GIFFARD
Owner: OLOWALU ELUA ASSOCIATES, LLC
Address: 173 HO'OHANA STREET, SUITE 201
KAHULUI, HAWAII 96732

R.P. 5477, L. C. Aw. 5620, Ap. 4 TO KAHELE, L. C. Aw. 240 TO JOHN CLARK AND R. P. 7572, L. C. Aw. 8817, Ap. 2 TO KANAKAOLE
Owner: J. B. WEST, LLC
Address: 541 LAULEA PLACE
PAIA, HAWAII 96779

R. P. 4952, L. C. Aw. 6728 Ap. 2 TO MAHULU AND R. P. 5181, L. C. Aw. 5952, Ap. 1 TO MINAMINA
Owner: KIPA HARRISON, LLC
Address: 590-A OLD STABLE ROAD
PAIA, HAWAII 96779

"PRELIMINARY SUBDIVISION APPROVAL
SURVEY SECTION
TAX MAP SECTION
TMK NO. (2) 4-8-03:45, 46, 47, 48, 49 AND 84
Department of Taxation
Director of Public Works
and Waste Management"

KIRK T. TANAKA
LICENSED PROFESSIONAL LAND SURVEYOR No. 7723-LS
HONOLULU, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION

KIRK T. TANAKA
License Professional Land Surveyor
Certificate No. 7723

10/15/01
DATE

REVISED: OCTOBER 19, 2001
REVISED: OCTOBER 08, 2001
REVISED: AUGUST 23, 2001
REVISED: AUGUST 08, 2001
REVISED: JUNE 04, 2001
MAY 24, 2001

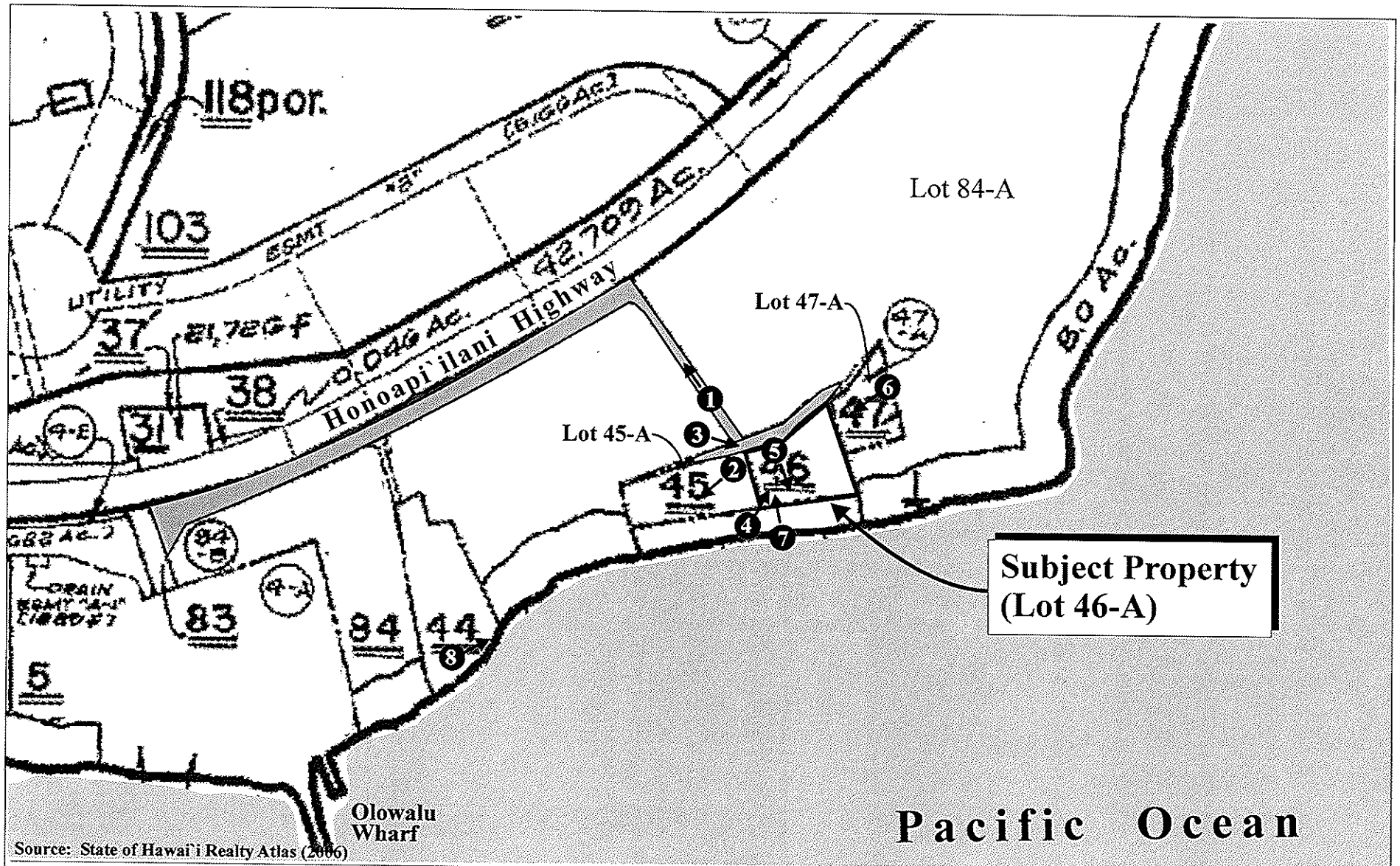
L.U.C.A. File No. 4.834
JOB NO. 98-50

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

APPENDIX B.

Site Photographs



Source: State of Hawai`i Realty Atlas (2006)

Proposed Martin Single-Family Residence

Photographic Reference Map

NOT TO SCALE

Prepared for: Peter and Deborah Martin

MUNEKIYO & HIRAGA, INC.

Martin\OlowaluLot46\PhotoRef

PHOTO NO. 1

PHOTO NO. 2

PHOTO NO. 3

PHOTO NO. 4

PHOTO NO. 5

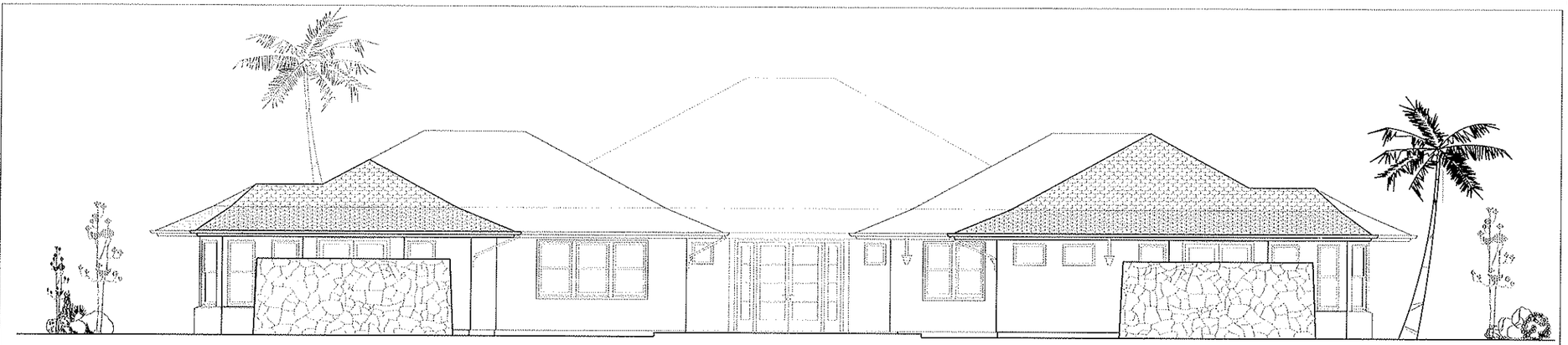
PHOTO NO. 6

PHOTO NO. 7

PHOTO NO. 8

APPENDIX C.

Architectural Plans and Renderings



Martin Residence

TMK: 4-8-03:46
Olowalu, Maui

OWNER

PETER and DEBBIE MARTIN
33 LONO AVE - Suite 450
KAHULUI, HI 96732

ARCHITECT

RICHARD S. YOUNG
HC-1, BOX 185
KAUNAKAKAI, HI 96748

LANDSCAPE ARCHITECT

CIVIL / STRUCTURAL

KIRK TANAKA
871 KOLU ST - Suite 201
WAILUKU, HI 96793

CONTRACTOR

RICHARD S. YOUNG REGISTERED PROFESSIONAL ARCHITECT No. 0401 HAWAII, U.S.A.

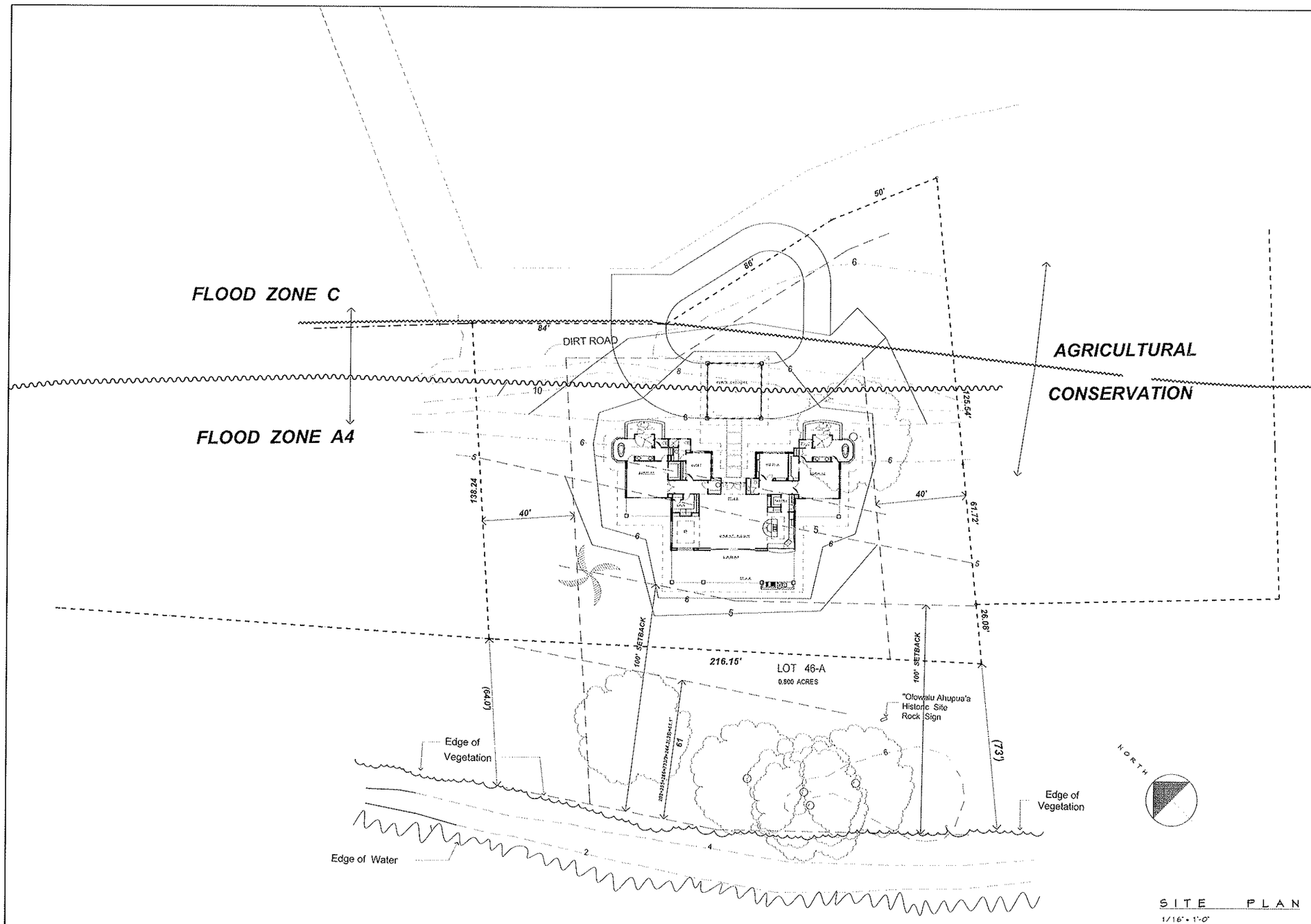
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION

Supervision of construction to be as defined in Section 1-2, Chapter 10, Title VII, Professional and Vocational Licensing Division, Department of Regulatory Agencies, State of Hawaii.

RICHARD S. YOUNG - ARCHITECT
HC-1 BOX 185, KAUNAKAKAI, MOLOKAI, HAWAII 96748

MARTIN RESIDENCE
PETER and DEBBIE MARTIN
OLOWALU, MAUI, HAWAII
TMK 4-8-03:46

DATE 8-20-07
JOB NO 07-25
SHEET A-0



SITE PLAN

1/16" = 1'-0"

RICHARD S. YOUNG - ARCHITECT
HC-1 BOX 185, KAUNAKAKAI, MOLOKAI, HAWAII 96748

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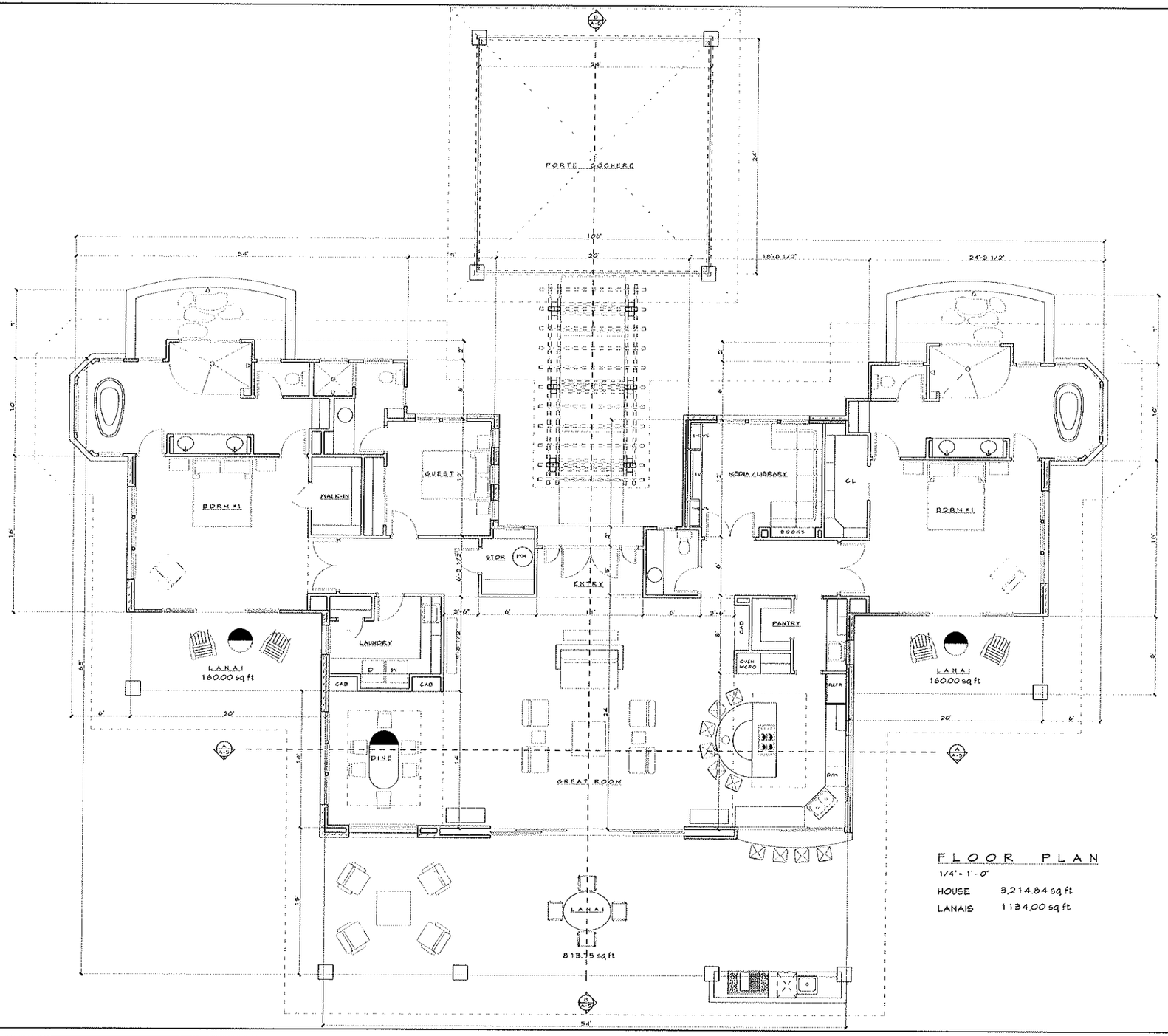
MARTIN RESIDENCE

PETER and DEBBIE MARTIN
OLOWALU, MAUI, HAWAII
TMK 4-8-03:46

DATE 8-12-07
JOB NO 28-07
SHEET A - 1



FLOOR PLAN

1/4" = 1'-0"

HOUSE	3,214.84 sq ft
LANAIS	1134.00 sq ft

RICHARD S. YOUNG REGISTERED PROFESSIONAL ARCHITECT No. 6411 HAWAII, U.S.A.

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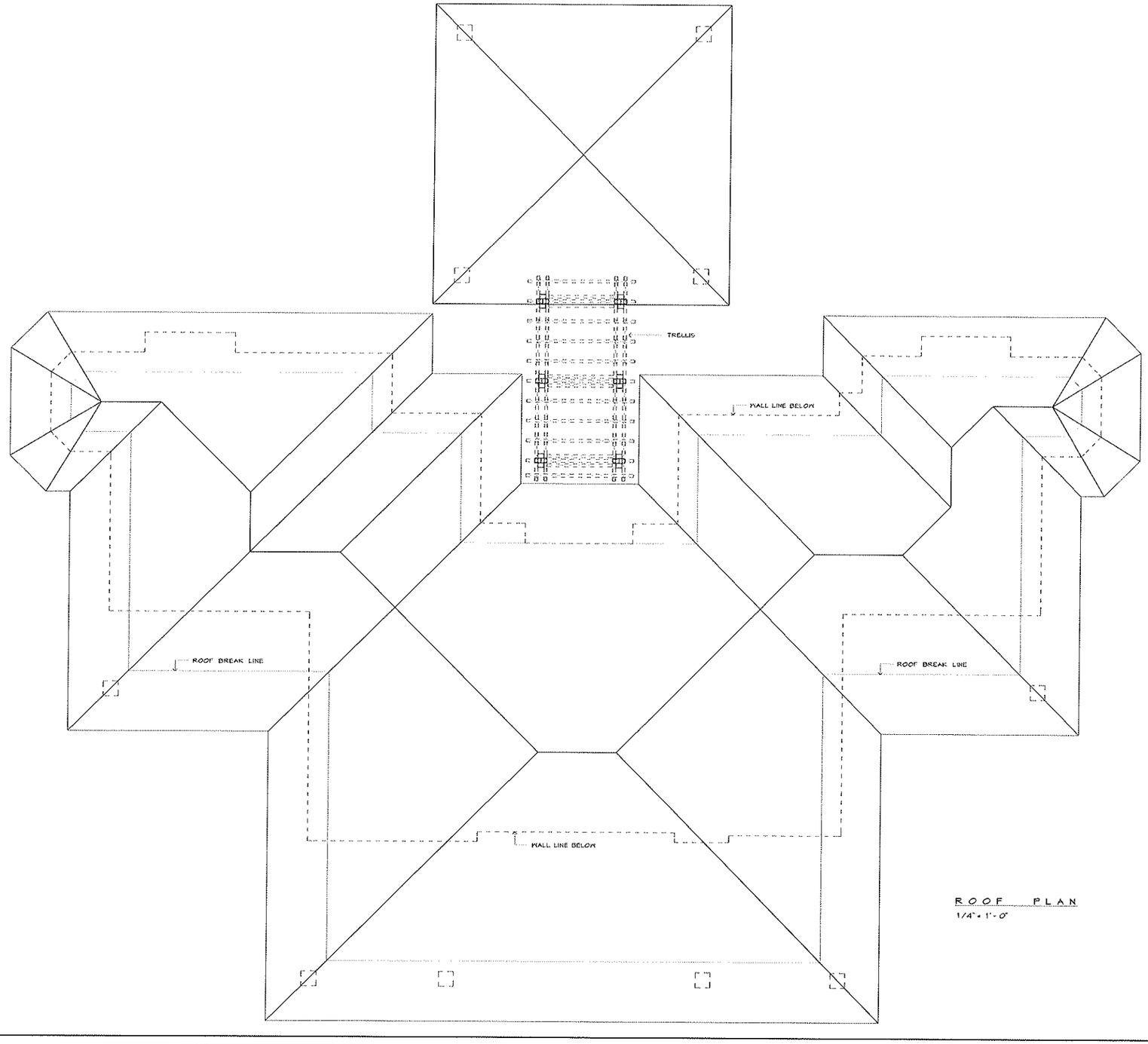
RICHARD S. YOUNG - ARCHITECT

HC-1 BOX 185, KAUNAKAKAI, MOLOKAI, HAWAII 96748

MARTIN RESIDENCE

PETER and DEBBIE MARTIN
OLOWALU, MAUI, HAWAII
TMK 4-8-03:46

DATE 8-20-07
JOB NO 07-25
SHEET A-2



ROOF PLAN
1/4" = 1'-0"

RICHARD S. YOUNG REGISTERED PROFESSIONAL ARCHITECT No. 663 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION

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RICHARD S. YOUNG - ARCHITECT
HC-1 BOX 185, KAUNAKAKAI, MOLOKAI, HAWAII 96748

MARTIN RESIDENCE
PETER and DEBBIE MARTIN
OLOWALU, MAUI, HAWAII
TMK 4-8-09:46

DATE 8-20-07
JOB NO 07-25
SHEET A-3

MATERIALS:

ROOF: SLATE SHINGLES

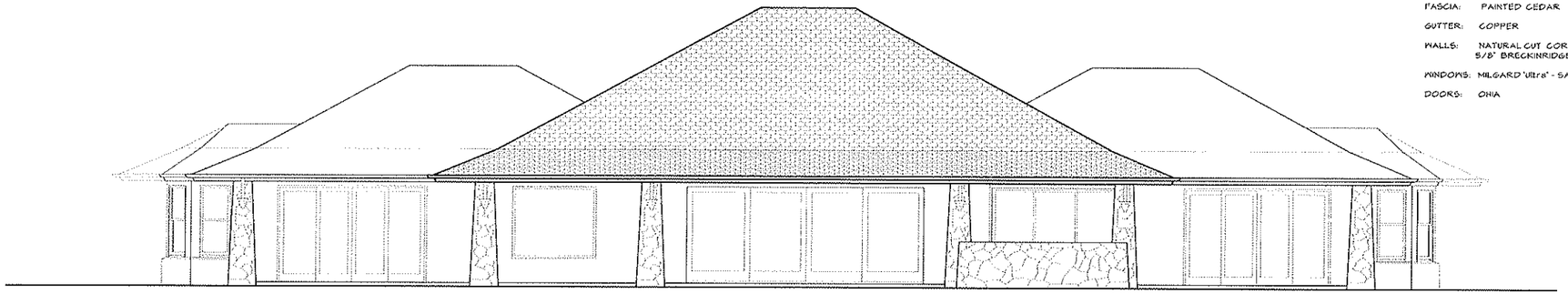
FASCIA: PAINTED CEDAR

GUTTER: COPPER

WALLS: NATURAL CUT CORAL
5/8" BRECKINRIDGE W/ 1x3 APPLIED BATTENS

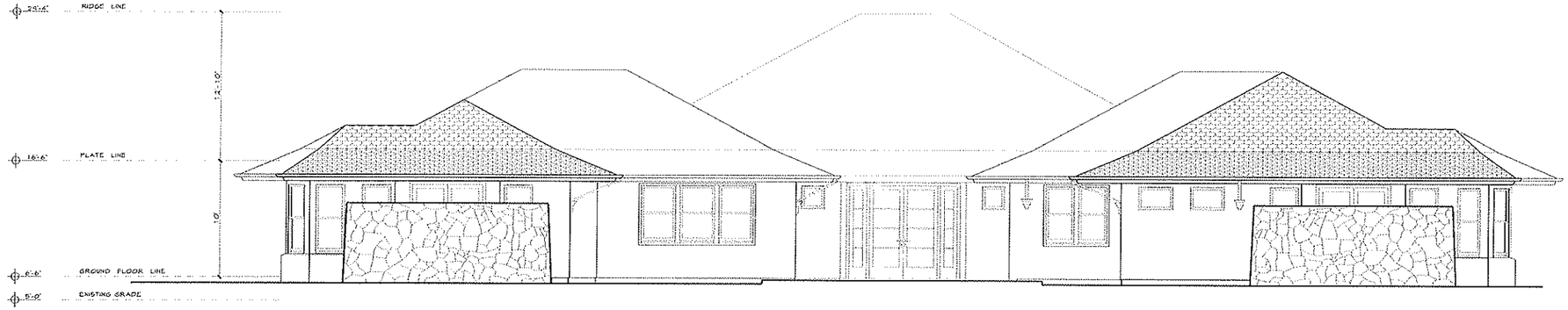
WINDOWS: MILGARD 'Ultra' - SAND COLOR W/ Gray Glass

DOORS: OHIA



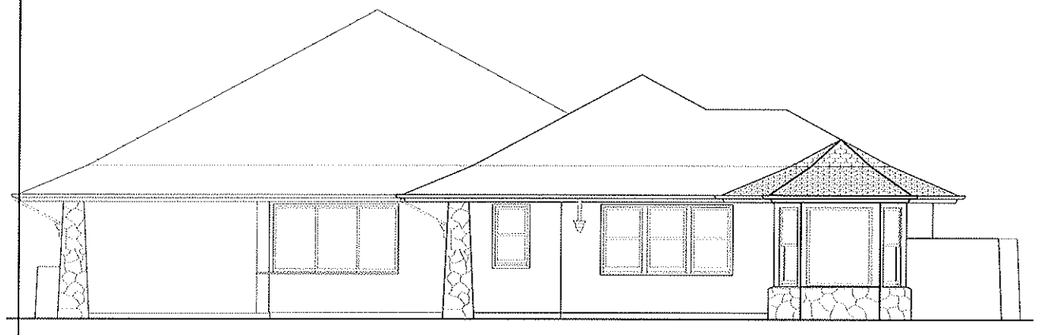
S O U T H

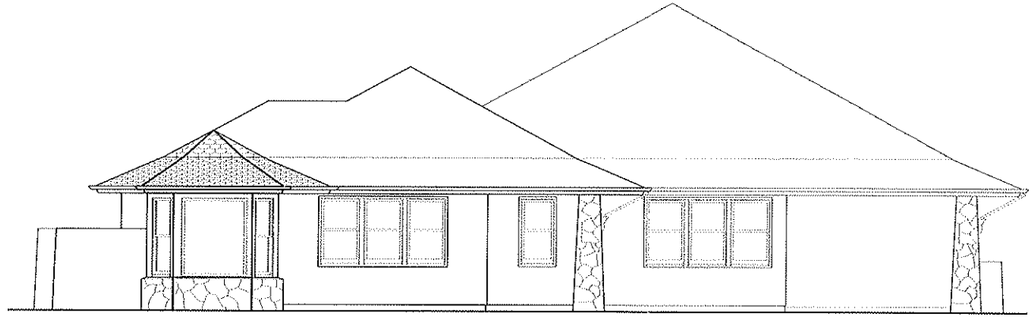
3/16" = 1'-0"



E A S T

3/16" = 1'-0"





RICHARD S. YOUNG
REGISTERED PROFESSIONAL ARCHITECT
No. 6143
HAWAII, USA

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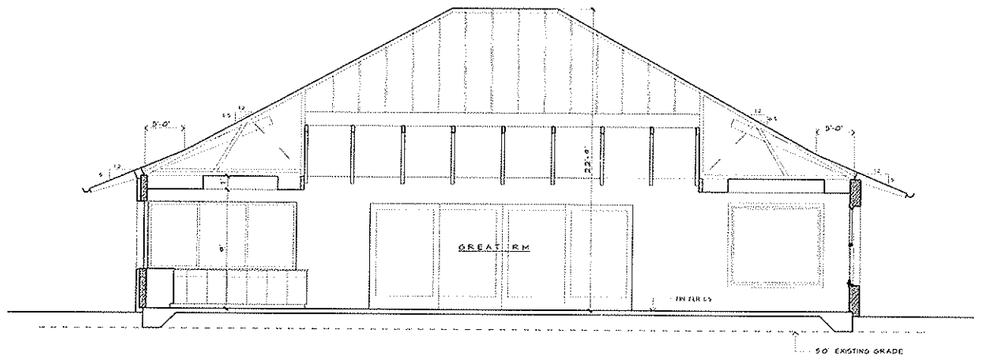
RICHARD S. YOUNG - ARCHITECT

HC-1 BOX 185, KAUNAKAKAI, MOLOKAI, HAWAII 96748

MARTIN RESIDENCE

PETER and DEBBIE MARTIN
OLOKALU, MAUI, HAWAII
TMK 4-8-03:46

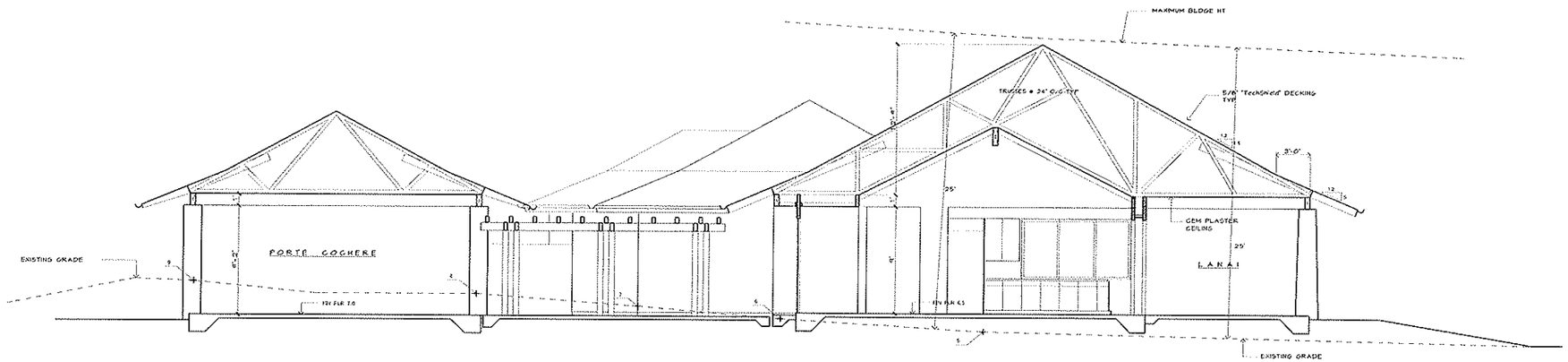
DATE 8-20-07
JOB NO 07-25
SHEET A-4



SECTION A-A
1/4" = 1'-0"

MATERIALS:

ROOF: NATURAL SLATE SHINGLES
FASCIA: PAINTED WOOD / COPPER GUTTER
WALLS: STUCCO / NATURAL CUT CORAL
WINDOWS: EAGLE W/ Suncool LOW-E GLAZING
DOORS: OHIA



SECTION B-B
1/4" = 1'-0"

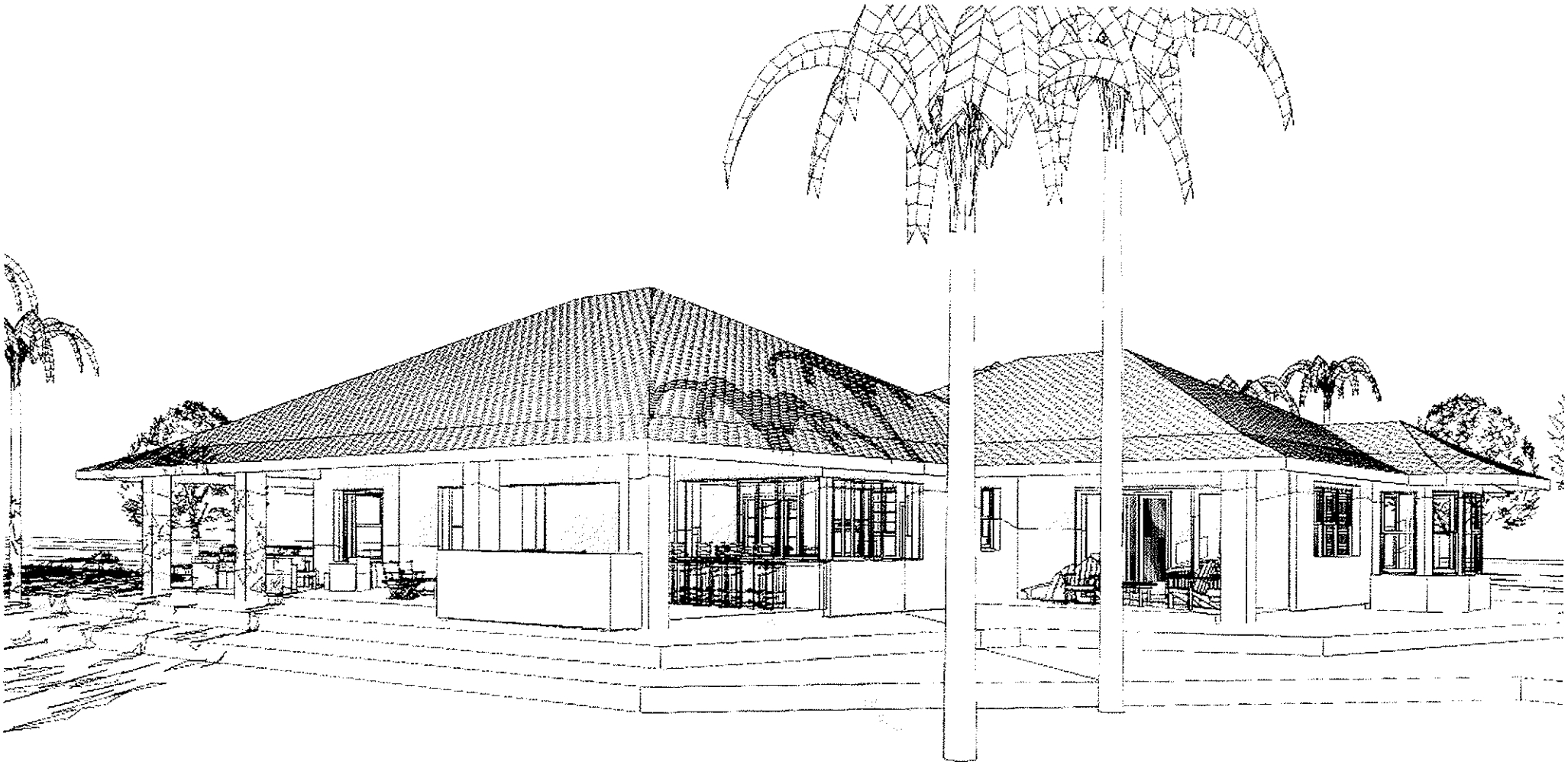
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION

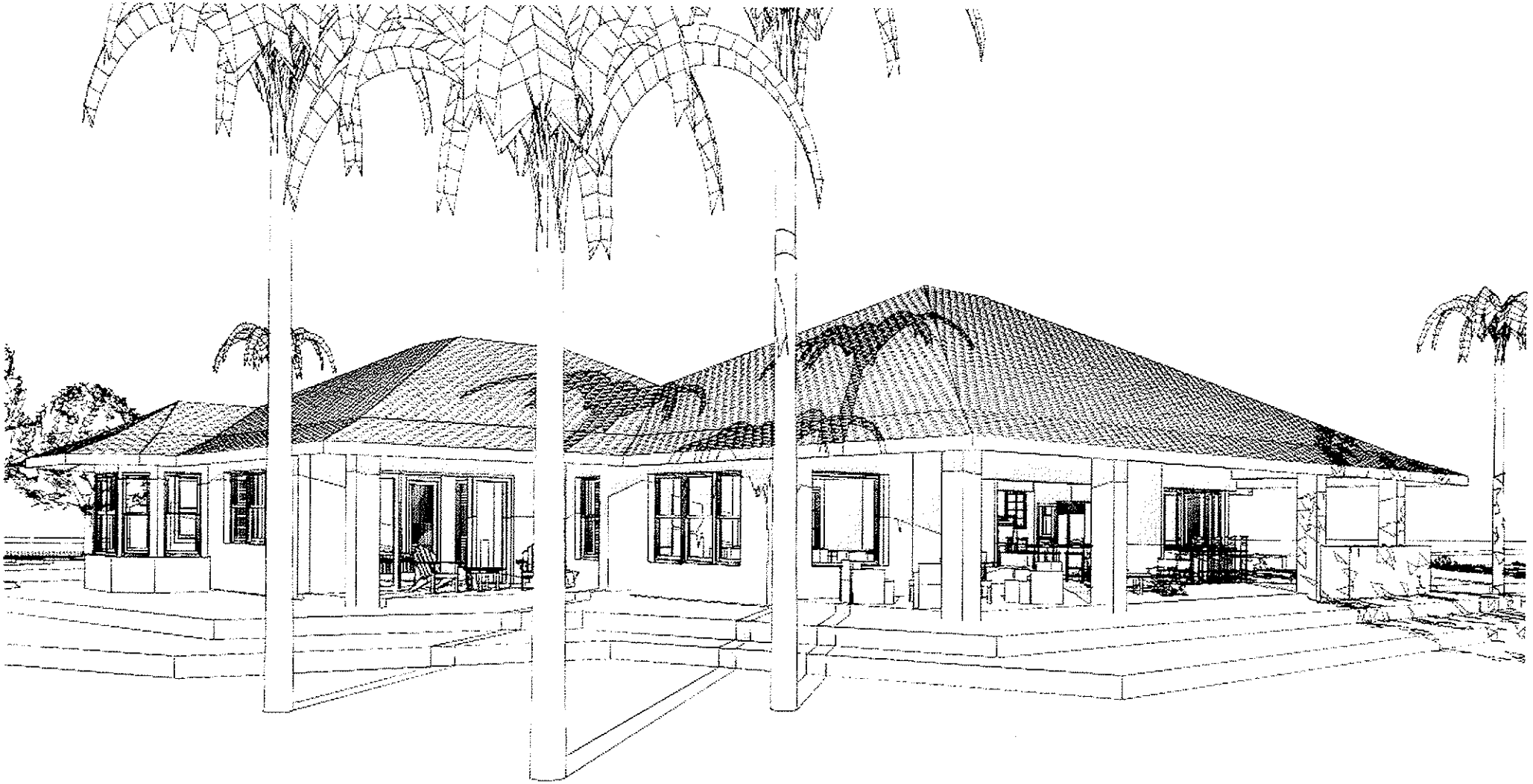
Supervision of construction to be as defined in Section 1-2, Chapter 10, Title VII, Professional and Vocational Licensing Division, Department of Regulatory Agencies, State of Hawaii.

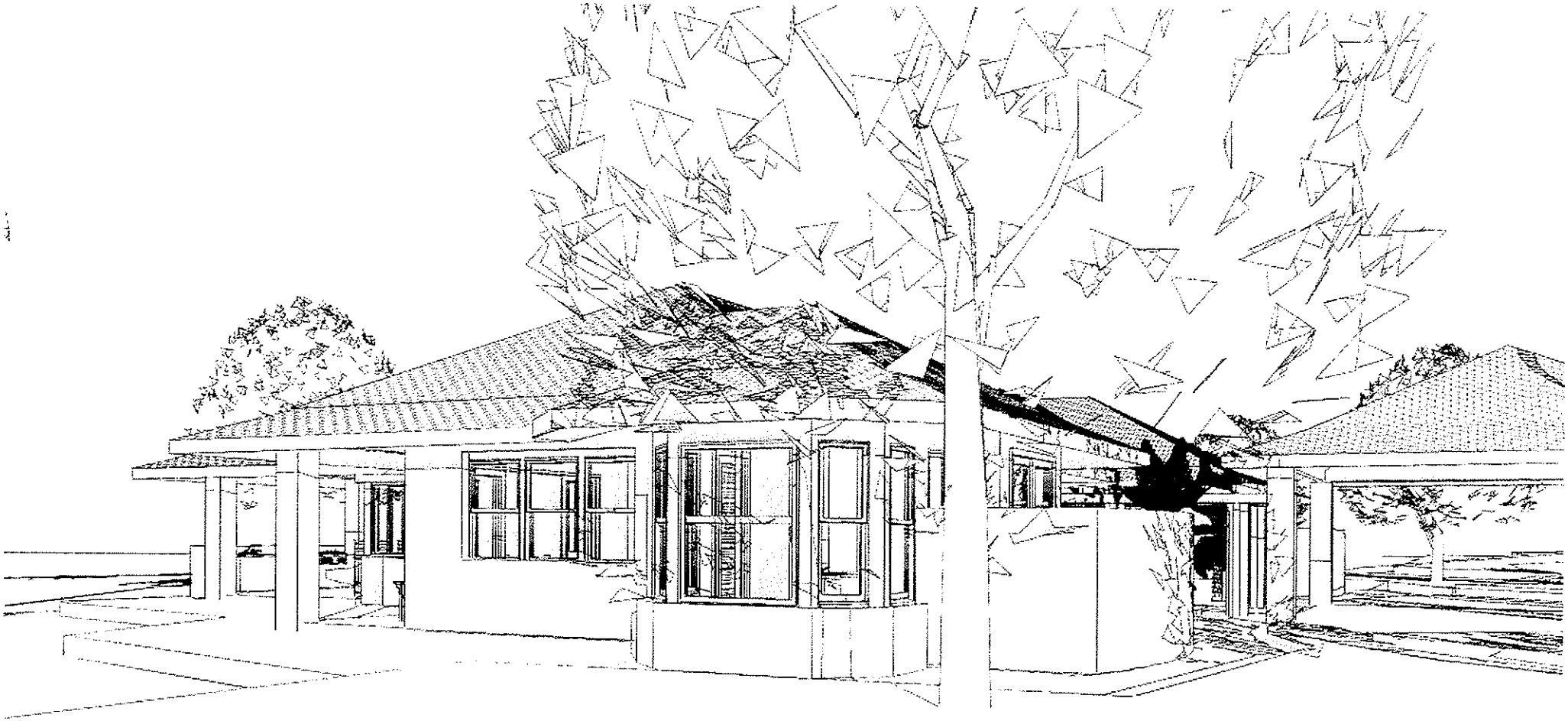
RICHARD S. YOUNG - ARCHITECT
HC-1 BOX 185, KAUNAKAKAI, MOLOKAI, HAWAII 96748

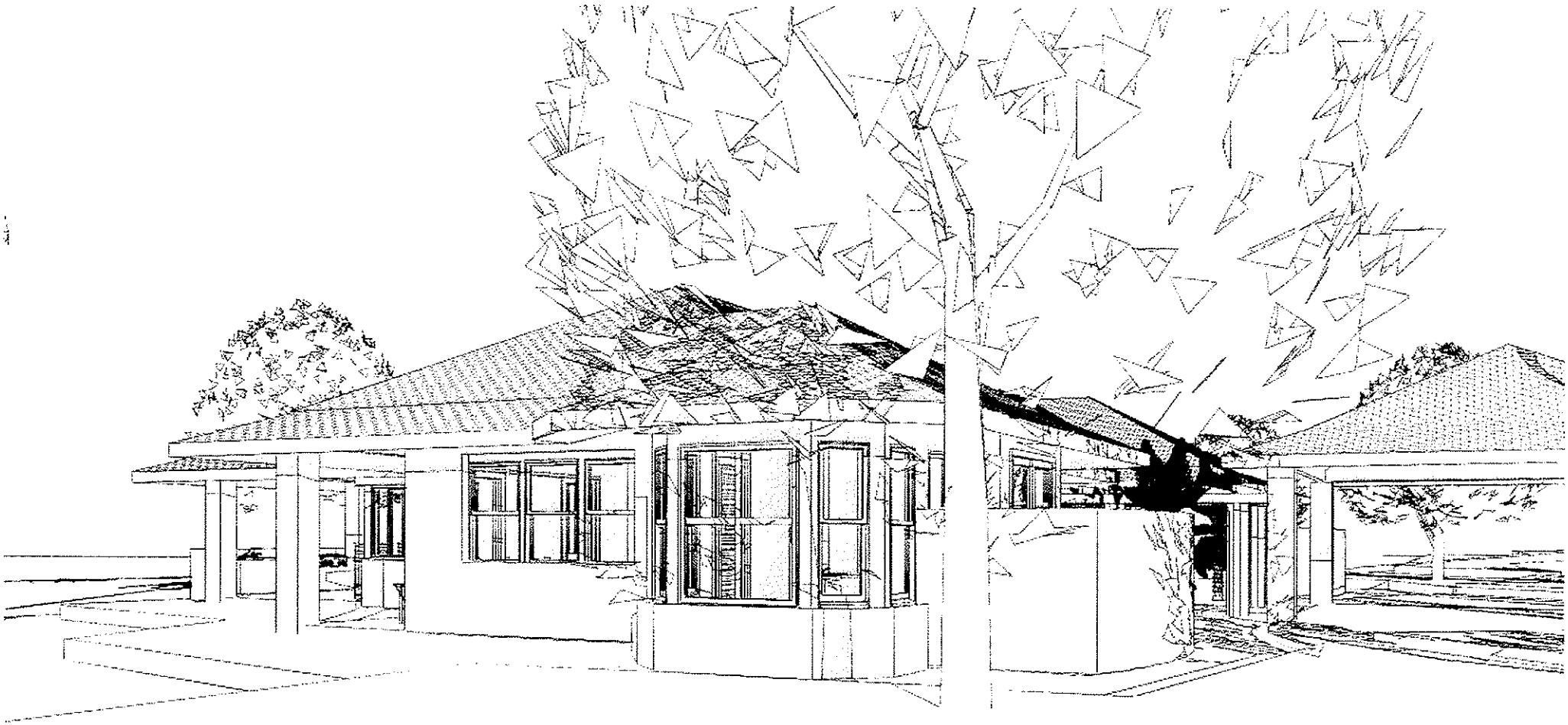
MARTIN RESIDENCE
PETER and DEBBIE MARTIN
OLOWALU, MAUI, HAWAII
TMK 4-8-03:46

DATE 8-20-07
JOB NO 07-25
SHEET A-5









APPENDIX D.

Archaeological Inventory Survey

ARCHAEOLOGICAL INVENTORY SURVEY OF *MAKAI* PORTION (Phase I) OF OLOWALU DEVELOPMENT PARCEL OLOWALU *AHUPUA`A*, LAHAINA DISTRICT, MAUI ISLAND (TMK 4-8-3: por. 5)

Prepared for:

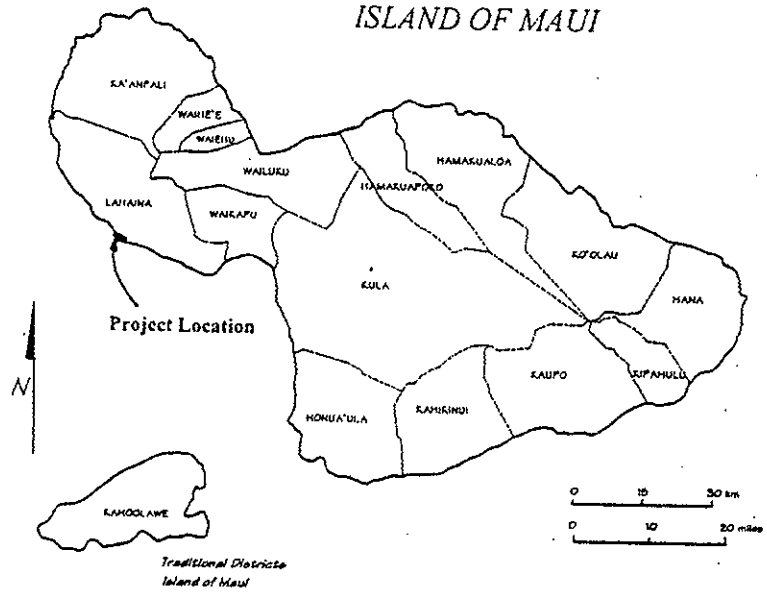
Olowalu Elua Associates
Kahului, Maui

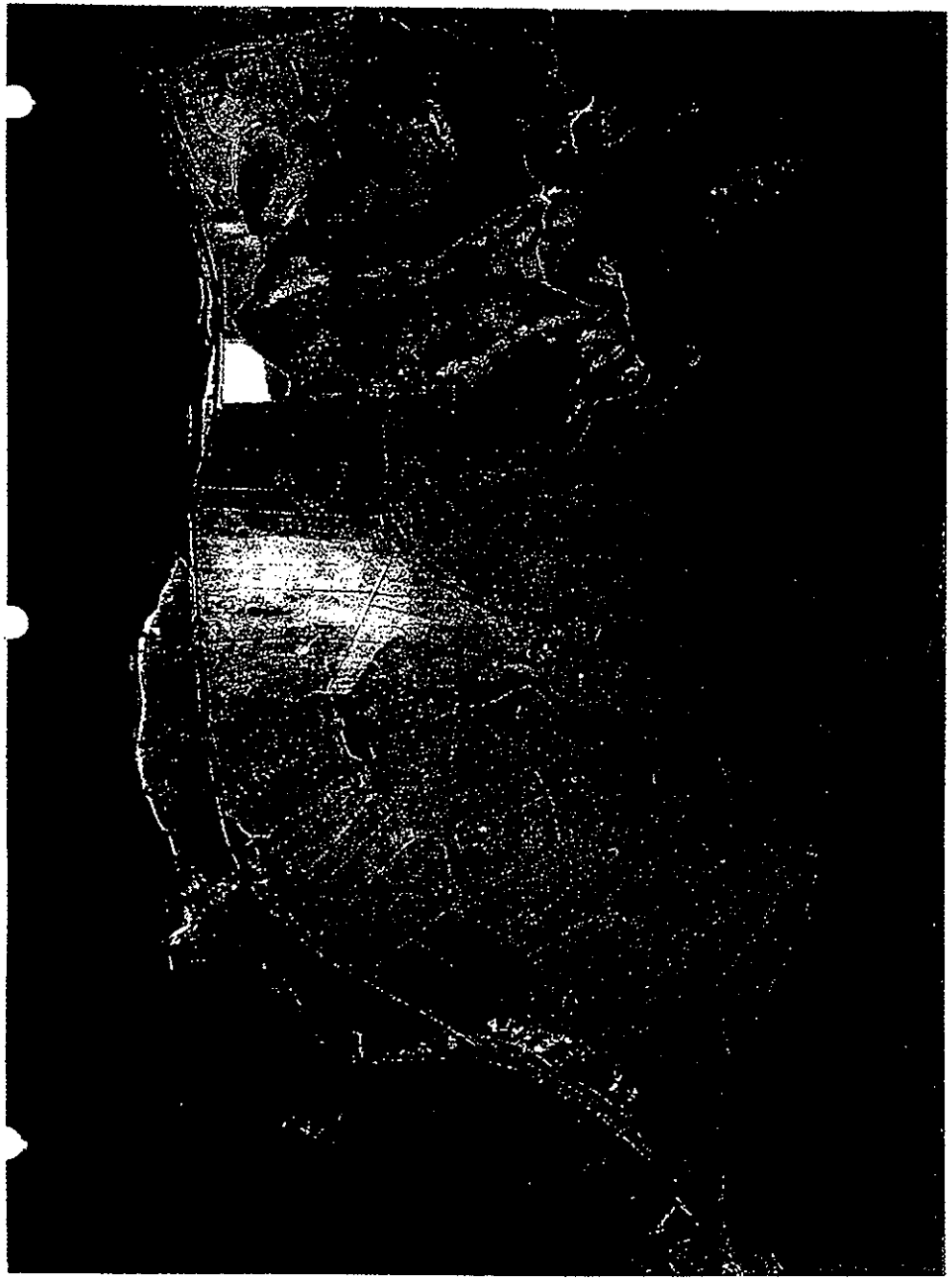
Prepared by:

Xamanek Researches
Pukalani, Hawaii

Demaris L. Fredericksen
Erik M. Fredericksen

January 28, 2000





ABSTRACT

Xamanek Researches carried out an archaeological inventory survey on the c. 73 acre *makai* portion of Olowalu *ahupua'a*, Lahaina District, Maui Island in late 1998 and early 1999. A total of 6 previously unrecorded sites were found during the survey. These were assigned SIHP Numbers 50-50-08-4693 through 4698. In addition, the ruins of the Olowalu Sugar Mill (Site 1602) also lie within the study area. Site 4693, a precontact burial ground, is considered to be the most significant cultural resource on the subject parcel. Other sites include a probable precontact wall remnant partially enclosing a habitation area (Site 4694); a probable post-contact sea wall (Site 4695); a remnant of the Old Government Road, which followed the route of the traditional Pi'ilani coastal trail (Site 4696); a probable early post-contact subsurface habitation deposit (Site 4697); and a late precontact subsurface habitation deposit (Site 4698). All of the above sites qualify for significance under Criterion D of the Federal and State historic preservation guidelines.

The Olowalu Sugar Mill (Site 1602) also is deemed significant under Criterion A. Finally, the Site 4693 burial ground qualifies for significance under Criterion E—for its traditional cultural value.

Preservation is the recommended mitigation for the Site 4693 burial ground, the Site 4694 structure, and the Olowalu Sugar Mill. Additional research is being conducted by an independent historic researcher contracted by Olowalu Elua Associates for and interpretative exhibit about the Sugar Mill. Sites 4695 and 4696 both lie in the Beach Reserve and are considered to be no longer significant. However, because of their location, they will not be affected by development plans. Proximity to the burial preservation area makes preservation for Site 4697 an appropriate mitigation. As well, the location of precontact habitation area (Site 4698) between the Manager's house and the Olowalu Mill ruins places it in an area with will not be developed, and thereby preservation will be accomplished. Archaeological monitoring of earth altering activities in the near-shore area between Hekili Point and the former manager's house is also recommended, because of the presence of sand deposits next to the Beach Reserve.

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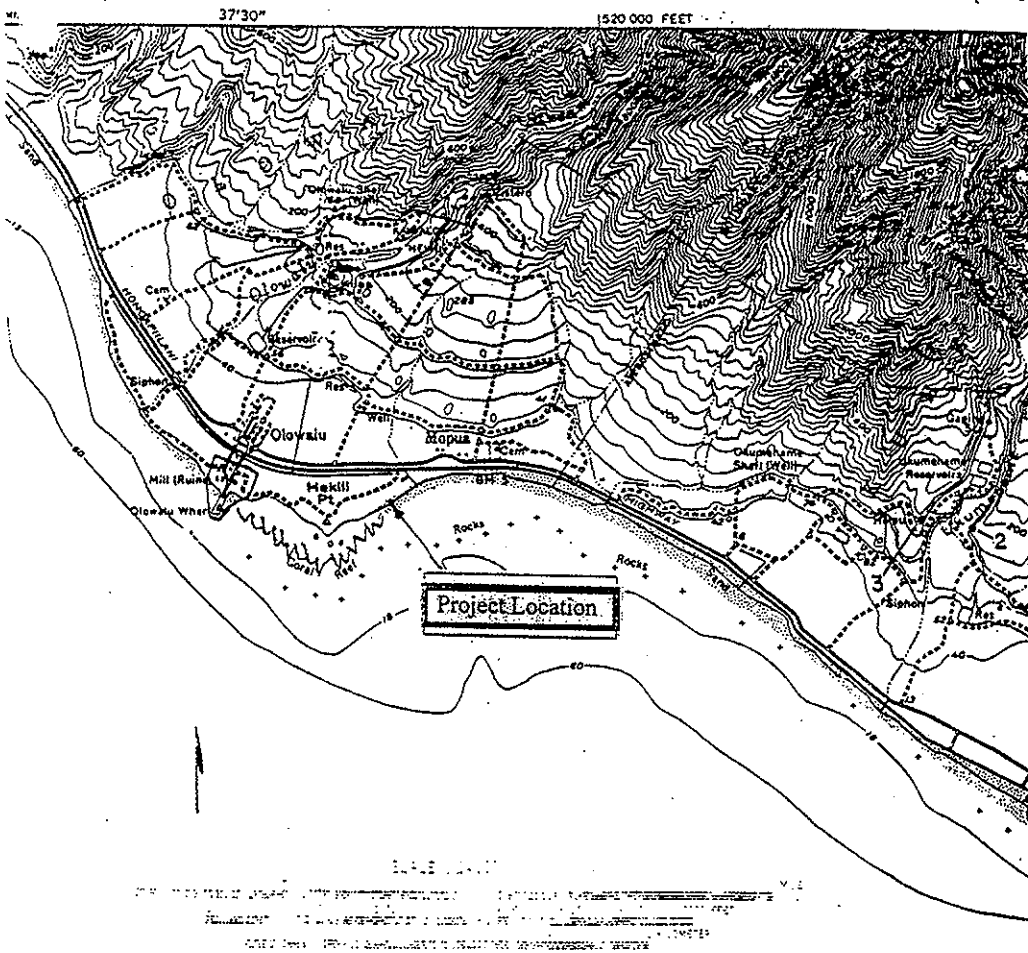
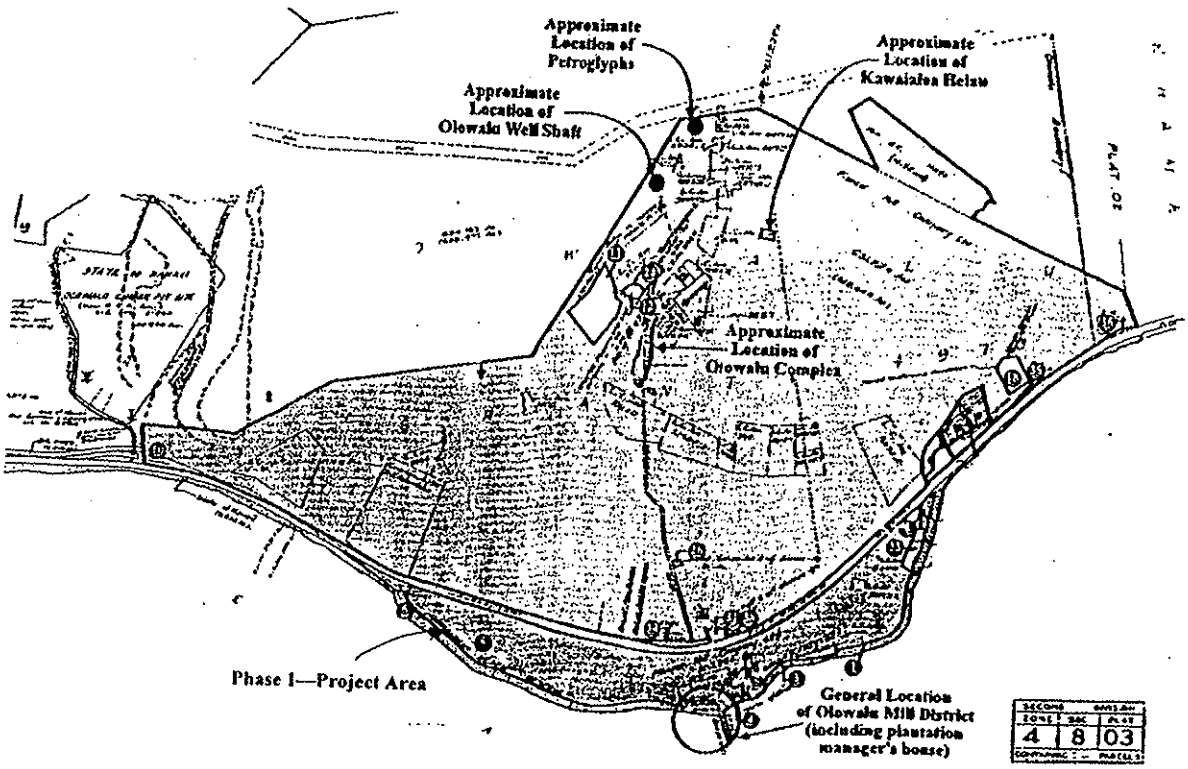
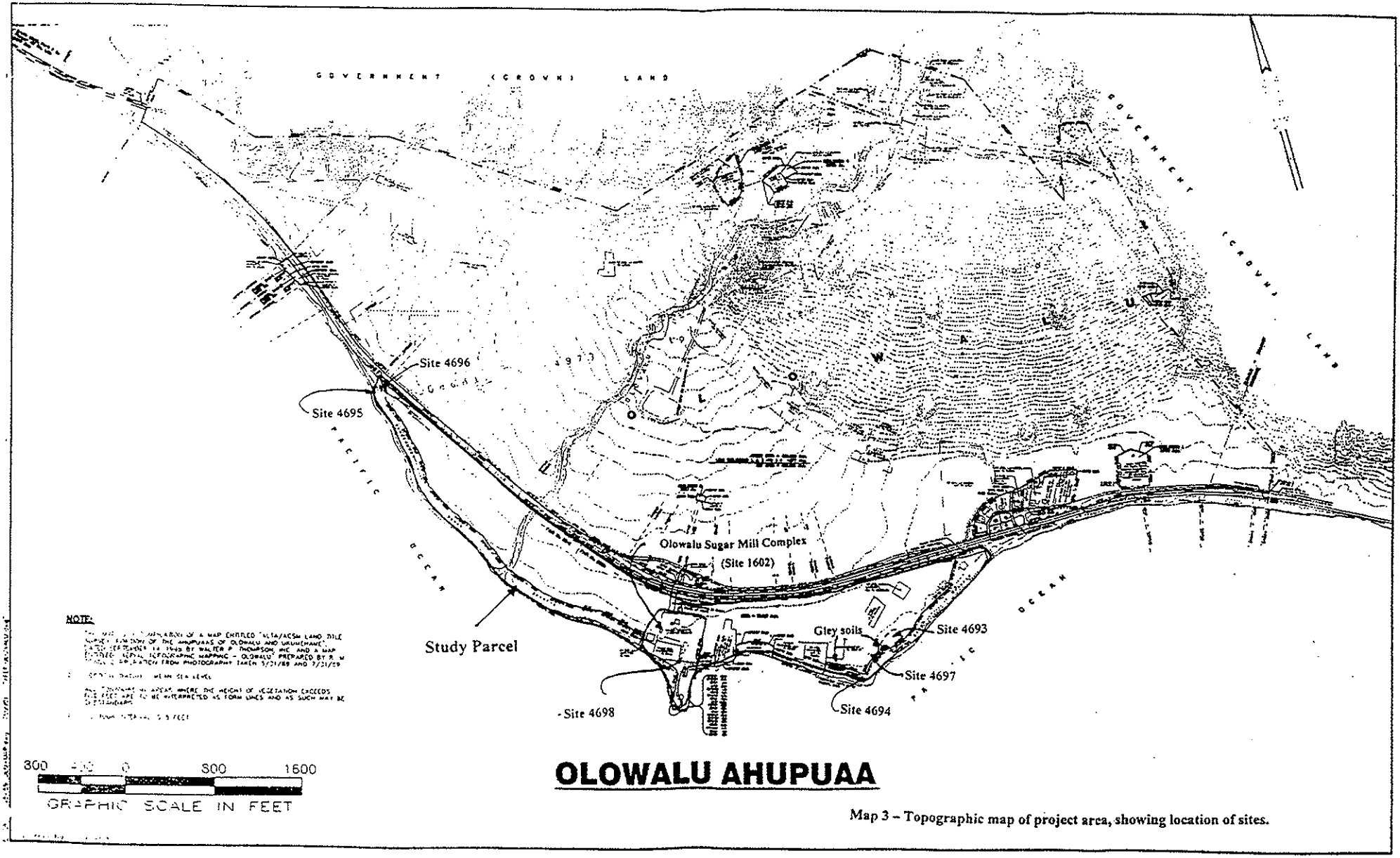
7.5 MINUTE SERIES (TOPO



Map 1 – U.S.G.S. Topographic Map, Olowalu Quadrangle, 1983.

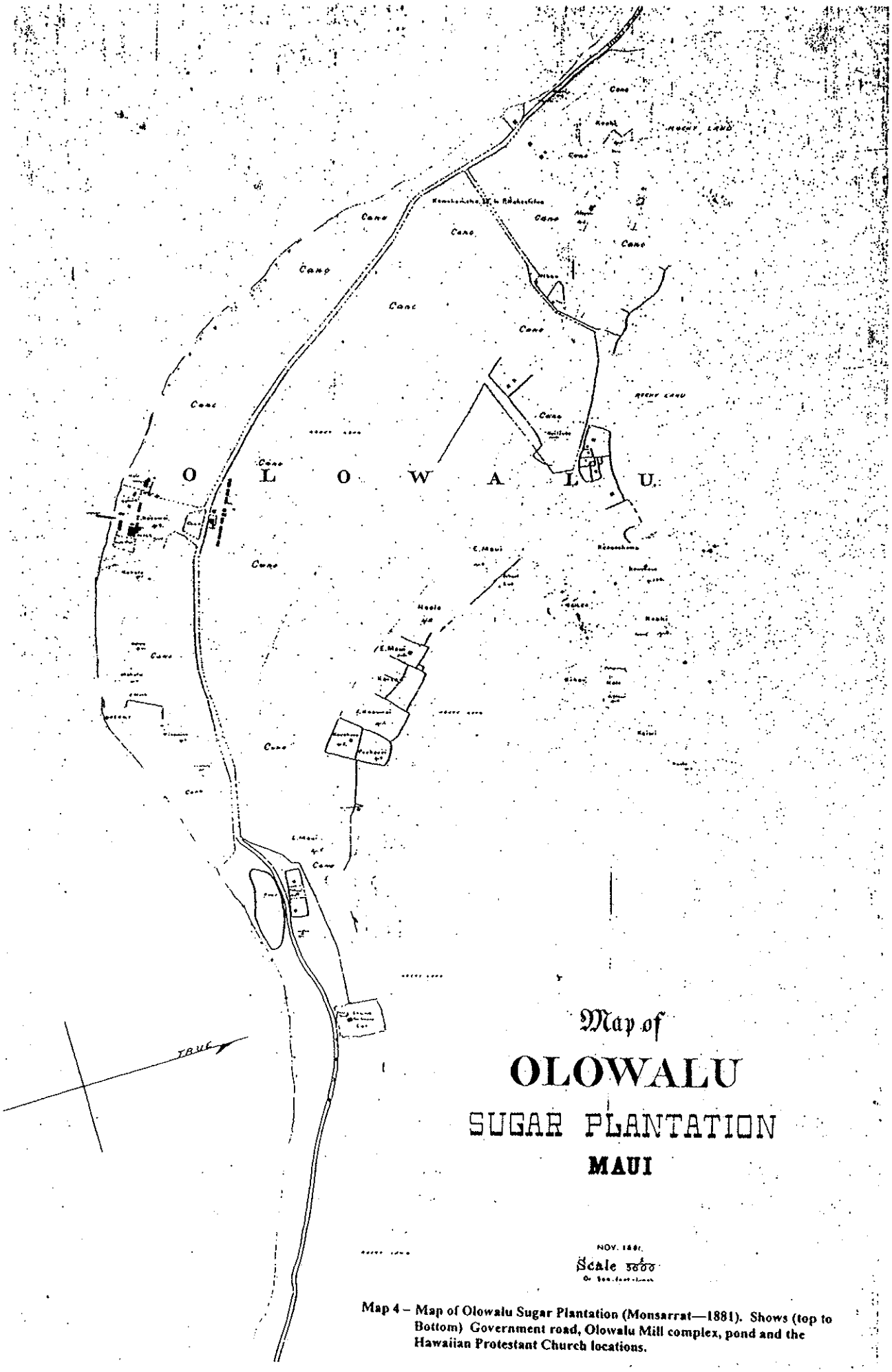


Map 2 – Tax Map, Zone 4, Section, Plat 3. State of Hawaii.



OLOWALU AHUPUAA

Map 3 – Topographic map of project area, showing location of sites.



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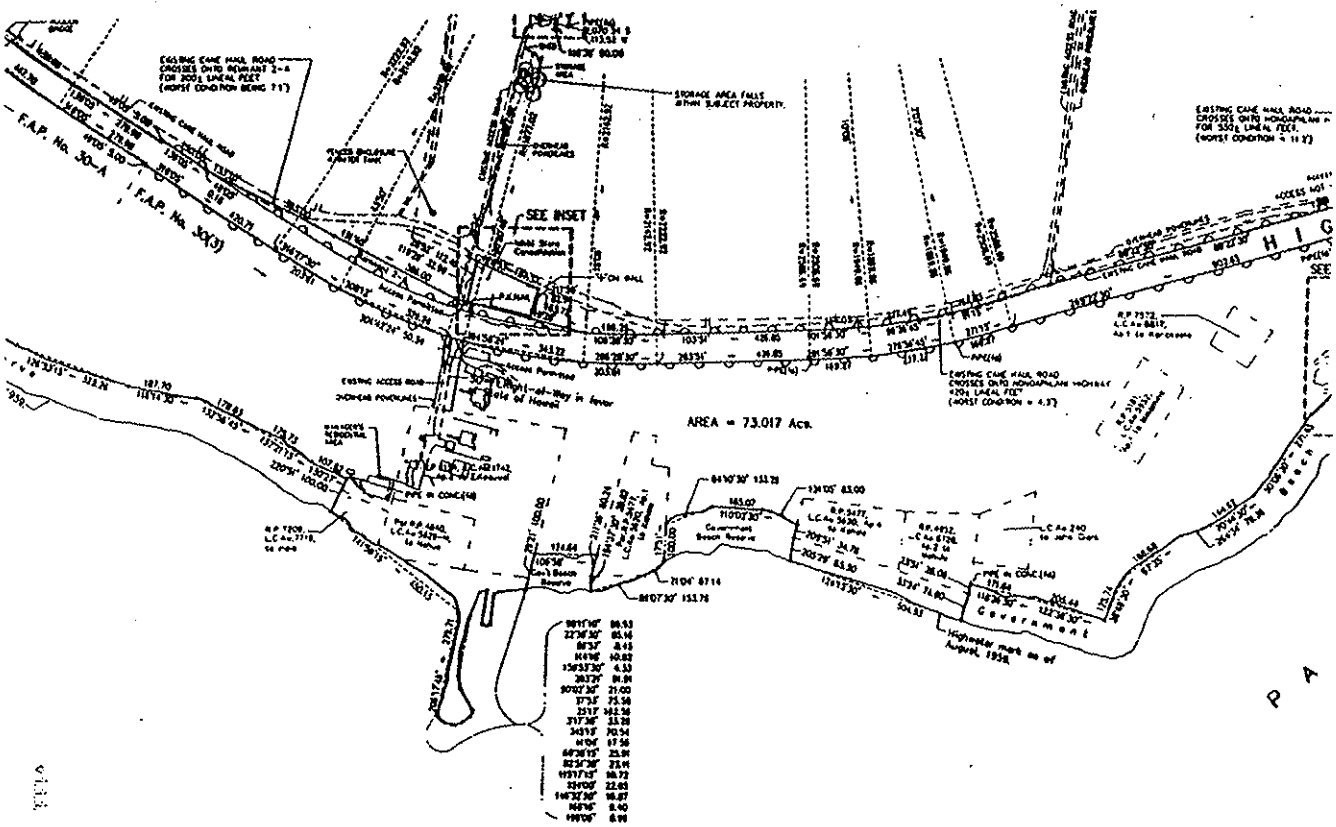
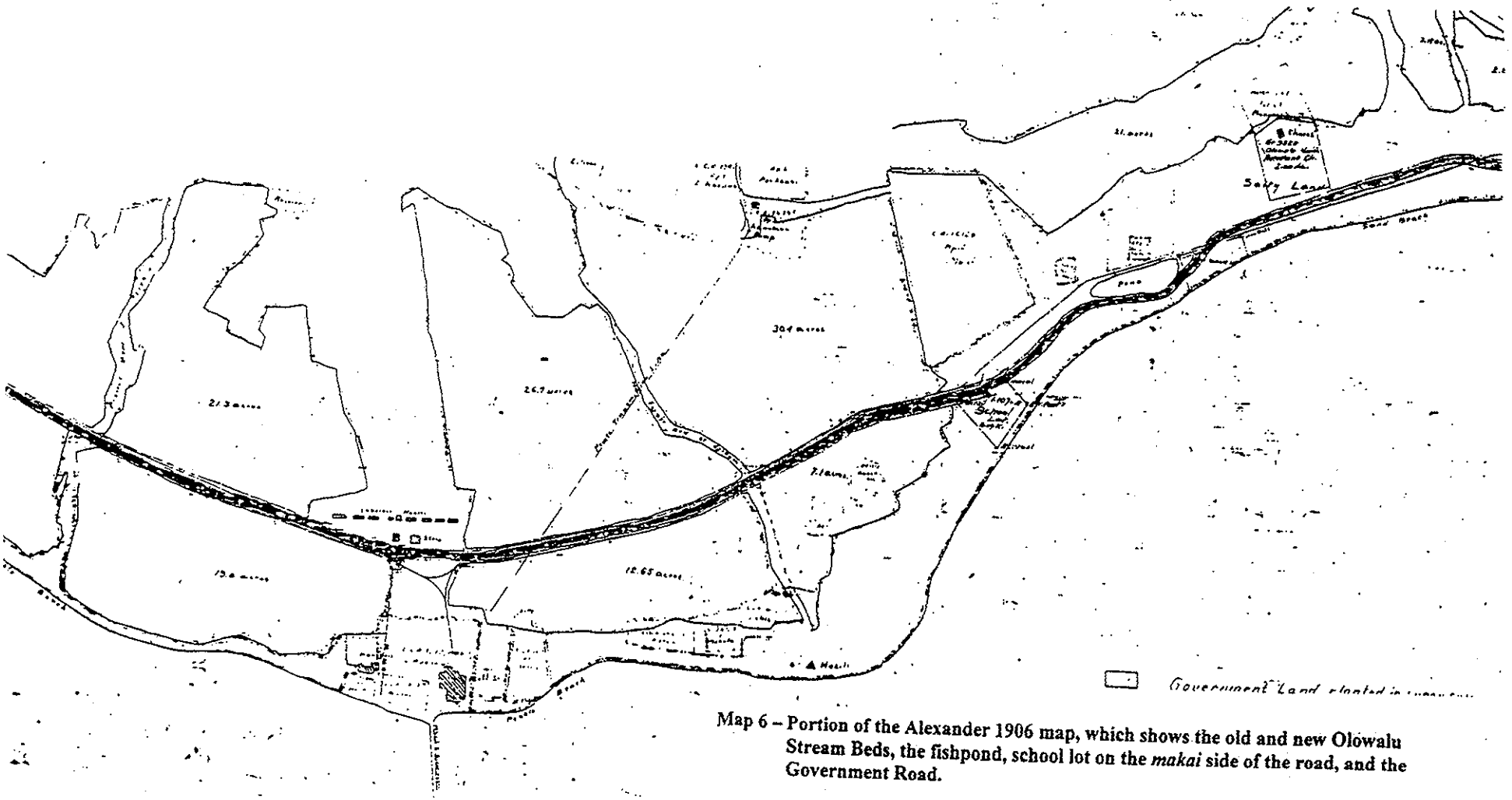


Map 5 – Location of Land Commission Awards present in study area.



Map 6 – Portion of the Alexander 1906 map, which shows the old and new Olowalu Stream Beds, the fishpond, school lot on the *makai* side of the road, and the Government Road.

The southeasternern section of the *makai* parcel, closest to shore, is identified as Jaucas sand (JaC). Typically such sands occur on 0 to 12 percent slopes. They are characteristically pale-brown in color, and more than 60 inches deep. Permeability is rapid, and runoff is very slow to slow. The major hazard is wind erosion in places where the surface vegetation has been removed (Ibid., p. 48). In the northwestern portion of the study area, in the vicinity around the present mouth of Olowalu stream, soils are classified as Pulehu clay loam (PsA). This series consists of well-drained soils on alluvial fans and stream terraces. They developed in alluvium washed from basic igneous rock. The soils are nearly level (0 to 3 percent slopes), permeability is moderate, runoff is slow. The surface is characteristically dark brown clay loam up to 20 inches thick, underlain by 40 inches or more of banded sandy loam, silt loam, etc. Beneath this is coarse, gravelly or sandy alluvium (Ibid., pp. 115-116).

Lying *mauka* of the Jaucas sands is a region of Pulehu silt loam (PpA) which is similar to Pulehu clay loam (0 to 3 percent slopes), but with a somewhat coarser texture. This soil is ideal for sugarcane. Stretching along the shore, *makai* of the Jaucas sands, is a strip of beach sand (BS). Beaches occur as sandy, gravelly, or cobbly areas. They are constantly washed and re-washed by ocean waves, and consist mainly of light colored sands derived from coral and seashells (Ibid., p. 28).

Observed vegetation on the project area is dominated by various alien species. *Kiawe* (Prosopis pallida) trees form the primary overstory vegetation in the coastal strip, along with scattered Opiuma trees (Pithecellobium dulce). At least 2 varieties of palm trees were observed in the landscaped area near the former plantation manager's house. Finally, a few *hau* trees (Hibiscus tilaceaus) and *milo* trees (Thespisia populnea) were noted north of the manager's residence. *Milo* is a native species, while *hau* is thought to be a probable Polynesian introduction. Various landscaping plants were also found in the plantation area. Finally, several salt tolerant species including Indian fleabane (Pluchea indica) were observed near the coast.

Much of the parcel was previously under sugar cane cultivation. While sugar cane is no longer cultivated on the *makai* project area, ratoon (wild, or volunteer) cane was growing on much of the parcel at the time of the survey.

The property is generally level to slightly sloping, and contains streambed deposits in many areas. In addition, marine sand deposits underlie much of the southeastern project area. Olowalu Stream empties into the ocean to the west of the manager's home. The *makai* project area contains approximately 2 miles of shoreline.

The entire study area occupies a large alluvial fan spreading from the mouth of Olowalu Valley to the ocean. It is bisected by Olowalu Stream, which took a more northwest-southeast path in the past. Olowalu Stream is one of 4 major waterways in the Lahaina District—the others being Ukumehame, Launiupoko, and Kaua'ula—which provided water for agricultural activity that supported a considerable precontact population.

E.S. Craighill and Elizabeth Handy (1972, p. 492) note:

"Lahaina District was a favorable place for the high chiefs of Maui and their entourage for a number of reasons: the abundance of food from both land and sea; its equable climate and its attractiveness as a place of residence; it had probably the largest concentration of population, with its adjoining areas of habitation; easy communication with the other heavily populated areas of eastern and northern West Maui, 'The Four Streams', and with the people living on the western, southwestern and southern slopes of Haleakala; and its propinquity to Lanai and Molokai."

Concerning Olowalu, they continue (Handy and Handy, 1972, p. 492);

"Olowalu, the largest and deepest valley on southwest Maui, had even more extensive lo'i lands both in the valley and below. Just at the mouth of the valley we found in 1934 a little settlement of five kauhale (family homes) surrounded by their flourishing lo'i. There are said to be abandoned lo'i far up in the valley. In and below the next valley, Launuipiko [sic.]*, there were no evidences of lo'i, and the people of Olowalu said there had never been any. But we think there must have been a few, although the land is, in general, dry and rough."*

While these observations were made in the earlier part of the 20th century, there is no doubt that Olowalu was an important agricultural area in precontact times. As long as water was available, the hot climate was ideal for producing taro. It was the ability to produce quantities of taro that contributed to a substantial population, and placed West Maui in a position of prominence throughout the island.

BACKGROUND HISTORICAL RESEARCH

Precontact to 1850s

Because Lahaina District had ample resources that supported a large population, it became a focal point in the struggle for power between important chiefs. One of the fiercest battles was between Maui chief Ka-uhi, and the chief of Hawaii, Alapa'i in the mid-18th century. Concerning this war, Samuel Kamakau relates the following:

A whole year Alapa'i spent in preparation for the war with Maui. It was in 1738 that he set out for the war in which he swept the country. What was this war like? It employed the usual method in warfare of drying up the streams of Kaua'ula, Kanaha, and Mahoma (which is the stream near Lahainaluna). The wet taro patches and the brooks were dried up so that there was no food for the forces of Ka-uhi or for the country people. Alapa'i's men kept close watch over the brooks of Olowalu, Ukumehame, Wailuk, and Honokawai . When Pele-io-holani[1] heard that Alapa'i was at Lahaina he gathered all his forces at Honokahua and at Honolua. At Honokawai an engagement took place between the two armies, and the forces of Alapa'i were slaughtered and fled to Keawawa. There Alapa'i heard that Pele-io-holani had landed at Honokahua and had an army stationed at Keawawa, and he disposed his forces, some on sea and some on land. Although Pele-io-holani had but 640 men against Alapa'i's 8,440 from the six districts of Hawaii, there were among them some famous warriors.... Pele-io-holani intended to unite his forces with those of Ka-uhi, but Alapa'i's men held Lahaina from Ukumehame to Mala on the north, and in attempting to aid Ka-uhi, Pele-io-holani became involved with the difficulty. The hardest fighting, even compared with that at Napili and at Honokahua in Ka'anapali, took place on the day of the attack at Pu'unene. Pele-io-holani was surrounded on all sides, mauka and makai, by the forces of Alapa'i, led by Ka-lani-'opu'u and Keoua. The two ruling chiefs met there again, face to face, to end the war and became friends again, so great had been the slaughter on both sides...." (Kamakau, 1992, p. 74).

At the end of this period of warring, Kamehameha-nui became the ruling chief of Maui. Alapa'i returned to Hawaii. There, following the death of Keoua, in 1752,

[1] Pele-io-holani was the ruling chief of Oahu. Maui chief Ka-uhi sent a present to him and requested his help in defending Maui (Kamakau, p. 74).

relations between Alapa'i and Ka-lani-'opu'u began to sour, because the latter felt that Alapa'i had some part in causing Keoua's death. Battles were fought between the two rivals, and eventually Ka-lani-'opu'u succeeded in establishing his rule over the entire island of Hawaii in 1754, after he "seized and cruelly put to death and baked" (Ibid., p. 78) the son of Alapa'i, Keawe-opala.

In the years from 1775 to 1779 there was constant warfare between Ka-lani-'opu'u and Kahekili, the younger brother of Kamehameha-nui. Ka-lani-'opu'u engaged in battles all around the island of Maui. At Waikapu, he was defeated and routed by the forces of Kahekili in 1776. Still nursing a fierce hatred for Kahekili for his defeat, Ka-lani-'opu'u launched another series of attacks—sailing to Kaupo, Lahaina, and on to Lanai, where his forces ravaged and slaughtered the citizens. When food ran out on Lanai, he moved on to Maui where food was abundant, and fed his soldiers on taro from Honokahua. After this he headed around West Maui for Ko'olau. Upon landing at Hamakualoa, he engaged in battle with Kahekili's forces, who put up such a fierce fight that Ka-lani-'opu'u fled in his canoes. When Ka-lani-'opu'u made landfall at Ko'olau "he slew the common people and maltreated the captives by urinating into their eyes" (Kamakau, p. 91).

Arrival of Europeans

It was toward the last part of this 4-year period of warfare, in January of 1778, that Captain James Cook sailed into the islands—and set in motion a wave of changes that would engulf the Hawaiian people in years to come.

Ka-lani-'opu'u returned to Hawaii from Maui in January of 1779, during Cook's visit in Kealakekua. When he saw how many women were prostituting themselves on board Cook's ship, he forbade the women from continuing to visit the vessel. He treated Cook hospitably, however, "giving him hogs, taro, potatoes, bananas, and other provisions, as well as feather capes, helmets, *kahili*, feather leis, wooden bowls beautifully shaped, tapa cloths of every variety, finely-woven mats of Puna, and some especially fine mats made of pandanus blossoms" (Kamakau, p. 101). The most desired trade items, as far as the Hawaiians were concerned, were guns, ammunition, and iron.

In the month of February, Cook sailed away, only to discover that a mast on one of his ships was defective and needed immediate repair. He put back to Kealakekua, where developing tensions between the Hawaiians and the *haoles* (foreigners) resulted in the theft of a longboat. When Cook went ashore to retrieve it, he and 4 of his crewmen were killed. The body of the slain Captain was delivered to Ka-lani-'opu'u, who offered it in sacrifice. Afterwards "they stripped the flesh from the bones of Lono. The palms of the hands and the intestines were kept; the remains (*pela*) were consumed with fire. Ka-lani-'opu'u was kind enough to give the bones to the strangers on board the ship, but some were saved by the kahunas and worshiped" (Kamakau, p. 103).

It was not until 1786, that foreign vessels again visited the Hawaiian Islands. The first ships were the King George, under Captain Portlock, and the Queen Charlotte, under

Captain Dixon. They landed at Kealakekua on May 26th, but found the "natives troublesome and no chief of apparently sufficient authority to keep them in order", so they left on the 27th (Fornander, 1996, p. 230). On May 28th, the notable French explorer, La Perouse, anchored near Lahaina on Maui, after having visited the southern part of the island that bears his name—La Perouse Bay. Other vessels followed, which were chiefly occupied in the fur trade on the Northwest Coast of America. Hawaii also became a stopover on the trade route to and from China. The most desirable trade items continued to be arms and ammunition, which were in high demand by the different chiefs. For the most part, trading was friendly. However, cultural misunderstandings sometimes led to tragic consequences. Such was the case that culminated in the infamous incident that occurred off Olowalu in 1790.

Olowalu Massacre

The ship Eleanora, under the command of Captain Metcalf, and a smaller schooner, Fair American, under the command of Metcalf's son, Thomas, arrived off Hawaii island in the winter of 1789, to engage in trade. In February 1790, the Eleanora proceeded to Honua'ula on Maui to trade there. The following is Fornander's recounting of what followed (pp. 232-234):

"The native accounts state that the captain was an irritable and harsh man, and liberal in his use of the rope's-end on trifling provocations; yet trade was continued and his ill-usage submitted to for the gain the common people thought they obtained in the barter of the commodities for those that the foreigner brought them.

Kalola, the widow of Kalaniopuu, with her new husband, Kaopuiki, and her family, were at this time living in the village of Olowalu[2], some fifteen miles from where Metcalf's vessel was anchored. Hearing of the arrival of the trading ship at Honuaula, Kaopuiki got ready a number of hogs and other produce, and started for Honuaula to trade for musquets, ammunition, and such other articles. It is not known that Kaopuiki received any bad usage from Captain Metcalf, although others did; but noticing that the ship's boat was left towing astern during the night, Kaopuiki formed the design of getting the boat into his possession. The following night the plan was carried into effect, the boat was set adrift from the vessel, the watchman, who had fallen asleep in her, was killed, the boat towed ashore and broken up for the sake of the iron fastenings, and Kaopuiki and his men returned to Olowalu.

When the loss of the boat and the death of the seaman were ascertained in the morning, Captain Metcalf fired on the people ashore, and took two prisoners, from one of whom belonging to Olowalu it is thought that he received information as to who the party was that had stolen his boat. In a day or two the vessel left her anchorage at Honuaula and came-to off Olowalu."

The account is continued by Kamakau (pp. 145-147):

[2] An informant, Ms. Adeline Rodrigues was told by her grandfather that their property was the location of Kalola's residence. See Maps 6 and 8.

"...in the morning Ka-lola declared a tabu restricting canoes from going out to the ship on pain of being burned to death if they disobeyed. 'Withered grass' (Mau'umae) was the name of this law. It belonged to Ka-lola alone and to her children and grandchildren; no other chief could declare such a tabu. It lasted three days. On the fourth the tabu was ended, and canoes in great numbers went out to trade with the foreigners. Many came from Lahaina as well as from Ka'anapali, Lanai, and neighboring places. The canoes gathered under the ship's sides, the men eager to procure iron, beads, looking-glasses, scissors, muskets for the constant warring going on at the time, red cloth and other foreign material. Little did they suspect the terrible carnage that was to follow, a carnage without any effort to apprehend and punish the offenders or any pity for the innocent. So these Christians murdered the Hawaiian people without any more mercy than cannibal Nukuhivans show, or people of pagan lands. Canoes that drifted toward bow or stern were compelled by a shower of stones to keep admidships, and when all were clustered together, the captain was pretending to trade, and the people were busily eyeing the objects they desired, just as Aka-kane and another man had climbed upon the deck, the ship opened fire and shot the people down without mercy, just as if they were creatures without souls. Even those who swam away were shot down. John Young was an eyewitness on board the ship and has testified to the great number who were killed at this time. At noon that day the Eleanor [sic.] sailed, and the people went out and brought the dead ashore, some diving down into the sea with ropes and others using hooks; and the dead were heaped on the sands at Olowalu. Because the brains of many were oozing out where they had been shot in the head, this battle with the ship Eleanor and her captain was called 'The spilled brains' (Kalolopahu). It was a sickening sight, as Mahulu and others have reported it; the slaughtered dead were heaped upon the sand; wives, children, parents, and friends came to view and mourn over their dead; and the sound of loud wailing arose."

Fornander relates the incident (pp. 233-234):

"But Captain Metcalf meditated a terrible revenge for the loss of his boat and the death of his seaman. As the canoes collected around the ship, he ordered the guns and small arms to be loaded, and the unsuspicious natives were ordered to keep their canoes off the waists of the ship, and when any strayed either under the bows or the stern, they were pelted with stones or other missiles until they rejoined the fleet of canoes lying off either broadside of the ship waiting for trade to commence. When all was ready, Captain Metcalf mounted on the rail and gave orders to open the ports of the ship, loaded with small shot and grapnel, and the musketry of the sailors, were fired in the crowd of canoes lying within easy range on both sides. The carnage was immense. Over a hundred natives were killed outright, and several hundred more or less seriously wounded. The confusion, the wailing, the rush to escape was indescribable.

After this cruel and wonton vengeance on an innocent multitude—for the main trespasser, Keopuiki [sic.], was not among the slain, and does not appear to have been afloat that day—Captain Metcalf lifted his anchor and proceeded to Hawaii to join his tender, the Fair American."

On the morning of March 17th the Fair American was captured off Kaupulehu in North Kona by Kameeiamoku, a great chief and supporter of Kamehameha. He had

suffered a beating at the hands of the elder Metcalf, and vowed vengeance on the next foreign vessel he could get aboard. The 18-year old captain, Thomas Metcalf, was thrown overboard and drowned, and the other members of the crew were killed. For some reason, the mate, Isaac Davis, was wounded, but his life spared. The vessel was taken ashore and the guns, ammunition and general cargo, along with the wounded Davis, were taken to Kamehameha at Kealakeakua.

The Eleanora was anchored there at Kealakeakua. The boatswain, John Young, and several other men had gone ashore. Young became separated from his fellow crewmembers, and was detained by Kamehameha, since the latter needed a foreigner to show him how to use the newly acquired guns and ammunition (Ibid., p. 235) The Eleanora waited for 2 days for Young to return. On the third day when he did not appear, Captain Metcalf sailed away, not knowing the fate of his son.

Davis and Young spent the remainder of their lives in the service of Kamehameha. Their knowledge of foreign technology proved extremely valuable to Kamehameha. One of the cannons which was taken from the Fair American, *Lopaka*, was used in the Battle of Kepaniwai, where Kamehameha defeated the warriors of Kahekili, in 1790. The Maui warriors were driven into Iao Valley, attacked with the cannon and other firearms, and slaughtered in great numbers. Those that escaped did so by climbing over the steep ridge and down into Olowalu Valley.[3]

Although his warriors were defeated on Maui, Kahekili still commanded a sizeable army on the island of Oahu. He was considered to be a very old chief when he was visited at Lahaina by Vancouver in March of 1793. Kamakau reports (1992, p. 165) that during this meeting Vancouver urged Kahekili to stop fighting and establish friendly relations with the chiefs of Hawaii. Kahekili said that it was not right for the chiefs of Hawaii to raid Maui "and rob and pillage without cause. Ka-hekili requested Vancouver, if he desired peace, to stay there all the time and guard him against further wars." Vancouver recognized that Kamehameha had superior numbers of chiefs and warriors, and they possessed firearms and the knowledge of their use. Sometime after Vancouver's departure for Oahu, Kahekili died.

With the great chief's passing, Kamehameha moved to bring Maui and Oahu under his rule. In 1796, following the battle of Nu'uanu, the southern islands were united under one chief for the first time.

Early 19th century

Foreign influence became more and more pervasive following the unification of the Hawaiian Islands under Kamehameha. These forces brought commercial, social and religious changes to Lahaina District, as well as to the other islands. Lahaina was the

[3] According to Handy and Handy (1972, p. 490), the overland trail provided a link between the Lahaina District and the north coast of West Maui, as well as allowing the exploitation of forest resources found at higher elevations. More specifically, this trail extended *mauka* into Olowalu Valley and over the summit at Mauna Kukui.

center for West Maui because of the favorable conditions for sailing craft that is found in the Lahaina Roads. The first whaling ships anchored off Lahaina in 1819, and the provisioning of these ships became a lucrative new venture. Following, a few years later, missionaries from New England were added to the mix, and the wheels of acculturation turned ever more quickly. By 1832, the missionaries conducted a census which gave the population of Lahaina as 4,028; Olowalu as 832; and Ukumehame as 573 (Schmitt, 1973).

At this time, Lahaina was considered the capitol of the Hawaiian Kingdom, primarily because Kamehameha III preferred to reside there rather than in Honolulu. However, by 1845, he agreed to move the capitol permanently to Oahu, although Lahaina was still the residence of many important people associated with the Kamehameha line.

Following the Mahele in 1848, there were 42 individual Land Commission Awards granted in the *ahupua'a* of Olowalu, between the years 1852 and 1855. The majority are in the upper reaches of the property, along Olowalu stream. The distribution of land awards, and the present route of the stream suggest that the steam was channeled in a general, straighter north-east direction sometime after the Mahele. This was probably done to controlled flooding of agricultural fields. The award plots run across the alluvial fan in a northwesterly-southeasterly direction. A 1906 map of the Olowalu Plantation, made by A. C. Alexander, shows the new, straighter route of the stream (Map 6).[4]

The land awards range in size from one *lo'i* on 0.047 acres, to a houselot and *kula* amounting to 8.638 acres. Most are *kuleana* associated with taro production, residences and surrounding lands. There are 9 LCAs on the *makai* portion of the study area. The earliest was a houselot granted to John Clark on August 22, 1849. The other 8 were granted between 1852 and 1855, and are scattered along the coastline. All are referred to as houselots. Map 5 shows the locations and Table 1 details these awards.

The remainder of the *ahupua'a* was crown land, that was originally granted to Kamehameha III. Kamehameha IV granted one 17.5-acre parcel of that crown land to Nahaolelua in 1858. Crown lands became government lands after the annexation of the Hawaiian Islands in 1893.[5]

[4] Refer to Appendix B for the complete list of LCA awards for the *ahupua'a* of Olowalu.

[5] A deed provided by Mr. Horcajo, of Olowalu Elua Associates, states that in conformity with the Land Act of 1895, all of the land "situate at Olowalu and Ukumehame in the District of Lahaina, Island of Maui" was "granted and confirmed unto Walter M. Gifford for the consideration of Thirty-seven Thousand Seven Hundred and Fifty Dollars" ($37,750.00). This was identified as Land Patent No. 4973, and was a cash purchase at public auction, which took place on July 9, 1906. Title was granted on July 23, 1906. The land area in Olowalu was 684.7 acres, exclusive of L.C.A.s, school lots and land sold by Kamehameha IV to Kahaulelio, all of which amounted to 96.4 acres.

TABLE 1

Land Commission Awards – *makai* parcel[6]							
TMK	Size in acres	Royal Patent	LCA Number	Year conveyed	Awardee	*Ili*	Nature of use
4-8-03: 41	.375	7209	7719	9/22/1853	Haia	Maomao	Houselot
4-8-03: 42	.825	4840	5829-H	11/1/1852	Nahue	Kaluanha	Houselot
4-8-03: 43	3.386	2154	1742: 2	9/26/1853	Z. Kaauwai	Kaluaaha	Houselot
4-8-03: 44	1.313	5477	5620: 1	3/6/1855	Kahele	Kaluaahu	Houselot
4-8-03: 45	.881	5477	5620: 4	3/6/1855	Kahele	Kaunukukahi	Houselot
4-8-03: 46	.913	4952	6728: 2	9/22/1953	Mahulu	Kaunukukahi	Houselot
4-8-03: 47	.597		240	8/22/1849	John Clark	Kaluakanaka	Houselot
4-8-03: 48	.792	5181	5952: 1	9/24/1853	Minamina	Kaunukukahi	Houselot
4-8-03: 49	.4	7572	8817: 1	9/24/1953	Kanakaole	Kamani	Houselot

Plantation Era

Olowalu Sugar Company

The Olowalu Sugar Company is said to have been an enterprise of King Kamehameha V, who reigned from 1863 to 1872. He began the operation sometime during his reign, under the name of the West Maui Sugar Company. It was incorporated as the Olowalu Sugar Company on May 6, 1881, and the agents were H. Hackfeld & Company. It was sold in 1877, and a reference states that in 1884, the agents were Macfarlane & Co (Wilcox, 1996, p. 5). From 1898 to 1910, W.G. Irwin & Company were the agents. This company was consolidated into C. Brewer & Co., and they assumed the agency until December 1931, when it was purchased by Pioneer Mill Company, Ltd. (HRHP, Wright, 1974).[7] Maps 4 and 6 show the Olowalu Sugar Company lands in Olowalu in 1881 and 1906 respectively. Figure 1 shows the water system for the plantation in 1916.

Additional information is sketchy. There are references to repairs made to the Olowalu wharf in 1884, with the costs being shared by the Hawaiian government and the sugar company. This wharf is shown on the 1881 map of Olowalu Sugar Plantation (Map 4). In 1915, new boilers were installed in the mill along with other improvements. The boilers replaced some that had been in operation for 35 years (Ibid.).

There is some information on the plantation railroad found in the Letter Books of the Hawaiian Kingdom dated October 31, 1881 (Conde and Best, 1974, p. 263):

[6] This information was provided by Mr. Robert Horcajo, coordinator for the Olowalu project, and came from the Royal Patents/Award Books, Bureau of Conveyances archives through Title Guarantee of Hawaii.
[7] The ruins of the Olowalu Sugar Company mill have been identified as Site 50-50-08-1602.

Messrs. H. Hackfeld & Co.
Agents Olowalu Comp'y

Gentlemen:

I am directed by the Minister of the Interior to acknowledge receipt of your favor of the 20th inst. Asking permission for the company to lay a narrow gauge railroad at Olowalu, and to inform you in reply that the company is hereby authorized to build a narrow gauge railroad for use of their plantation along the side of the Government road, upon express condition that the said railway shall in no wise interfere with the traffic on the Government road; and in such places where it may be found necessary to cross the Government road, proper guards or bridges shall be built for the safety of the public.

I have the honor to be
Your obedt. Servt.
J.S. Hassinger
Chief Clerk

With this, a 2-foot gauge railroad was built, and apparently the cars were pulled by mules until the latter part of 1889, when the Baldwin Locomotive Works engine—*Olowalu*—was ordered for plantation use (Ibid.)[8]. In 1882 the railroad was extended an additional 2 miles south to Ukumehame, making a total of 3 miles of track. In 1905, a second locomotive from Baldwin Works replaced the original machine. By 1918 another mile had been added, making it a 4-mile line.

The Olowalu Mill was probably constructed in the 1870s. A photograph is reproduced in Maui Remembers (Bartholomew and Bailey, 1994, p. 45), and is one of the few in existence.[9] It shows the iron pole, which still remains (Photo 21) that was probably used to guide cables or ropes, to boats tied to the pier. It may be part of a type of loading system that was used in the sugar industry at other mills.

The manager's house, which lies 100 meters to the northwest of the Mill, was built somewhere from 1910 to 1915. It is a one-story wooden structure with a sloping hip roof and ventilated gale ends. A front porch is seven bays long and is marked by a simple balustrade. Rafter ends are left exposed and the house is raised approximately 3 feet about grade (HRHP, Wright, 1974). There are also 3 other plantation houses located between the Mill and the highway, that may have built around the same time.

In 1931, when the Olowalu Sugar Plantation was bought out by Pioneer Mill Company, all of the railroad equipment transferred to that company. By 1933, the mill was being dismantled and the machinery sold to a company in the Philippines (The Maui News, June 15, 1933). Pioneer Mill Company grew cane on much of the study parcel until fairly recently.

[8] The 1881 map (Map 4) of the Olowalu Sugar Plantation shows the mule pen directly to the east of the Olowalu Sugar Mill (Site 50-50-08-1602).
[9] It is included in this report on page 46a.

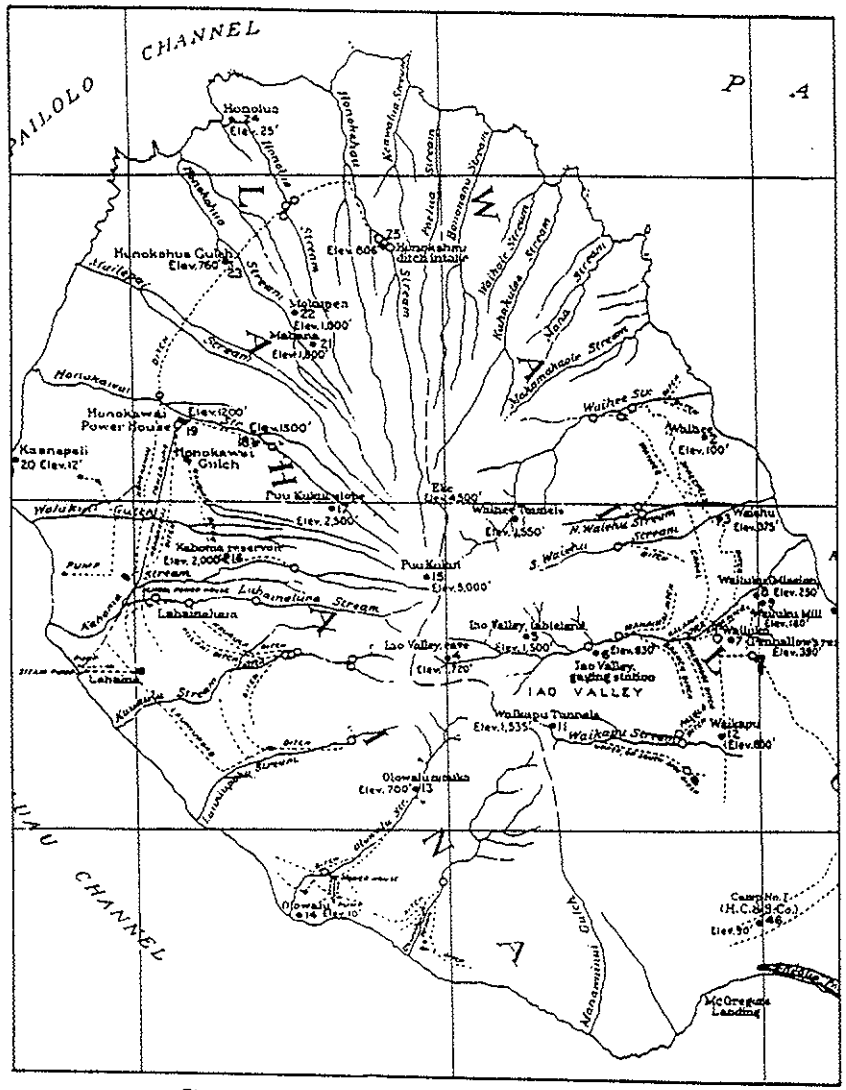


Figure 1 – 1916 U.S.G.S.drainage map (Wilcox , 1996, p. 123).

Of course, the sugar operations in Olowalu would not have been possible without a water system to irrigate the fields. The water system irrigated the upper cane fields of the watershed, and supplied drinking water to Olowalu Village. It was a rather small and crude system that had a capacity of 11 mgd and a median of 4.08 mgd (Wilcox, 1996, pp. 134-137). The 1913 drainage map (Figure 1) shows the ditch system at Olowalu (Ibid., p. 123).

Oral History Interviews

One of the individuals who is knowledgeable about Olowalu, interviewed by Erik Fredericksen, was resident, John Ka'aea. Mr. Ka'aea was born in 1917 in Ukumehame, and was baptized in 1918 at the Catholic Church, which was located just to the east of the *makai* study area. His father was a Japanese contract laborer for Olowalu Sugar Company, and arrived to work there in September of 1897. Mr. Ka'aea is one of 12 children in the Fujishiro family. He changed his name to Ka'aea, but did not specify when. He was educated at the Olowalu school which he said was on the corner lot next to the Adie (Adeline) Rodrigues' property.[10] Mrs. Mookini was his teacher. In 1930 the school closed, and Mr. Ka'aea continued his education in Lahaina. He moved to Olowalu permanently in 1948.

He started working for Pioneer Mill in 1933, and was a brakeman on field engines used to set portable wooden flumes in the fields. He worked in the sugar industry for 35 years. In 1940, there was a major effort to clear the fields of large rocks and boulders. Mr. John T. Moir was the supervisor, and the rock piles that exist today in the *mauka* portion of the property, were completed under his direction.[11]

He also talked about an old fish pond—Kaloko o Kapa'ike—which was located just *mauka* of the study parcel (Map 6). He remembered that the pond was filled in 1950 or 1951, when Honoapi'ilani Highway was constructed. He did not know how long it had been there, but assumed it was old.

According to another informant, Mrs. Adie Rodrigues, this pond was for the *ali'i* that lived on the same property where she now resides. Her grandfather indicated to her that their property had been the residence of Chiefess Kalola, one of the people involved in the tragic Olowalu massacre incident. Mrs. Rodrigues also said that no one had lived at Hekili Point after 1932.[12]

Mr. Ka'aea also mentioned the Kawasaki Store, which goes back to the late 19th century. Sometime shortly after World War II the Kawasaki Store went out of business and it became known as Olowalu Store—a landmark on the road between Wailuku and Lahaina.

[10] The Rodrigues' property is located *mauka* of the pond shown on Map 6. Within that property is LCA 8573, Apana 1 to Kailiula—a houselot. Apana 2 is located west of Olowalu stream between 75 and 85 feet AMSL. The Rodrigues' property is Lot 4 in the Olowalu Subdivision (Map 8).
[11] This clearing on the *mauka* portion of the property was done primarily with machinery.
[12] This would have been shortly after the purchase of Olowalu Sugar Company by Pioneer Mill Company.

PREVIOUS ARCHAEOLOGICAL STUDIES

There have been 4 other archaeological inventory surveys conducted near Olowalu in recent years. Prior to those studies, the only archaeological work had been the survey of *heiau* on the island of Maui that was conducted by Winslow Walker in 1929 to 1930, and the Statewide Inventory conducted in 1973-74. Both the Walker and State surveys documented significant sites in Olowalu *ahupua'a*.

Walker noted that there were two *heiau* structures on the *mauka* portion of the present study parcel. The larger structure is named Kawaialoa (Site 50-50-08-4). He described it as follows (1931, p. 108):

"Location: On the rising ground south of Kilea Hill above the ditch.

Description: A large walled heiau in good condition. It measures 156 x 110 feet. The walls range in thickness from 8 ½ feet on the west to 12 feet on the south and east where it is composed of two terraces. The highest part is 10 feet high. The north wall is lower and ranges from 5 to 8 feet thick. Several low terraces and enclosures are found inside. The low platforms in the western part are probably graves of recent date. The entrance evidently was at the north. At a point on the west wall and at two points on the south wall are piles of stones cone-shaped whose use or purpose could not be determined. Rough red vesicular basalt is the material used in the heiau construction and no coral is found. No artifacts were found there."

He goes on to mention a smaller *heiau* which is located in the cane fields below the ditch. It is described as measuring 40 x 60 feet. He reported that all of the interior structures had been destroyed, and he had not been able to find out what it had been named (Ibid.).

The Statewide survey relocated Kawaialoa *Heiau*, but was unable to locate the smaller, unnamed one. Another indigenous site that the survey documented was the Olowalu Complex (site 50-50-08-1200). The site lies about 0.5 mile *mauka* of Highway 30 (Hanaopi'ilani Highway) on the north side of Pu'u Kilea. The complex is made up of

2 features—the Olowalu Petroglyphs and a natural rock overhang at the base of the cliff, which was probably used as a shelter (HRHP, Connolly, 1973)[13].

The rock overhang was excavated by Elspeth Sterling in 1962. It was given a Bishop Museum site number—M-4. It is documented as follows (Sterling, 1998, pp. 26-27):

"Description: The main part of the sheltered bluff runs about 60 feet mauka-makai and forms about 12-15 feet from the wall to the irregular sloping edge. It is about 20 feet up on the side of the hill from the road. It appears the water has run through with enough force to leave the rock base floor and forming more and more shelter under the overhang. Although Olowalu receives very little rain, water has in some way run off the cliff and through the shelter.

Makai of the main area the bluff slopes down to a little open terraced area about 3' x 5' against the wall of the bluff. Makai and below this is another level somewhat protected area. Both of these produced no material except an occasional shell which had washed in.

On Tuesday December 11, Lyman Harada and Larry Windley accompanied me. We set up the grid which was rather extensive. This was with high hopes, not so much for the interior floor as for the outer edge.

We first sifted through the dirt dug out by a previous excavator. This produced some shell, kukui, ti or sugar cane leaf, obsidian, Hawaiian diamonds, etc. We then dug the disturbed area which is G-18 , G-19, G-10. This produced more of same material with addition of a coral file and konane pebble. The bone point was picked up in G-18, lying on the surface of excavated depression.

The F line marks more or less the interior floor of the shelter. This floor consisted of rock or gravel and occasional water worn stone. The material was not found generally throughout the floor but only in pits of ash which went down through the gravel to 12 inches.

We tried E-18 which is toward the outer edge. We had to dig through about 6 inches of soil until we reached ash where we found the same type of material although this appeared older. At the end of the third day we decided there was no reason to continue with the digging.

Our conclusion is that the area was not lived in but merely used as a camp site or resting place.

The bluff (at this time of year) affords shade from the sun until mid-afternoon. However, a light rain fell Wednesday night and the whole shelter was damp except for a small spot under the lowest overhand....

We believe the early campers camped on the outer edge and as the floor eroded away they were able to move further in. The material was not scattered throughout the floor which was rock and gravel... but found only in ashy fire pits which extended down 12 inches through the gravel.

The material continued to produce little variety and practically no artifacts, tools or variety in food remains.

[13] Subsequently the Olowalu rock shelter was given site number 50-50-08-1201.

There was no evidence of post-European occupation, which caused us to wonder if the shelter ceased to be used when the trail through Olowalu to Iao fell into disuse. Without the present trees there is probably a good view out over the plains. Perhaps army look-outs camped at the spot."

According to the HRHP short form (Connolly, 1973), the northern, sheer cliff face of Pu'u Kilea, is covered with over 70 petroglyphs in two areas. At the time of the Statewide survey the site had been turned into a small park next to the access road. A viewing platform had been erected in Area 1. Here the petroglyphs extended about 8 meters across, and were situated from 1 to 4.7 meters up the rock face. Area 2 lies about 15 meters south of Area 1, and is adjacent to the road. Here the petroglyphs extend along the cliff, and are placed on the large rocks in front of the cliff for about 60 meters. They extend up the cliff face from 0.5 to 3.3 meters. In Area 1 there are at least 41 figures, included human forms with stick and triangular bodies; animals (probably dogs and horses); circles; a sail, and other indistinct forms. They range in size from 2 x 2 cm. to 35 x 55 cm. In Area 2, there are at least 31 petroglyphs. The figures here include human forms with stick and triangular bodies, historic writing, animals including dogs and horses, a figure resembling a coffee pot, a large fish or whale, a figure with five lines radiating from the head, an outrigger canoe with sail, and many indistinct forms. These range in size from 4 x 6 cm. to 40 x 40 cm. One of the historic forms, early Hawaiian writing, measures 80 cm. by 10 cm.

It is noted in the 1973-74 survey that the petroglyphs had been vandalized. Some had been covered with paint, chalk, crayon and charcoal. Also modern graffiti and profanity, along with "poor attempts to imitate the early Hawaiian petroglyph forms" (Ibid.) had been added. This desecration was not mentioned in 1962, when the Bishop Museum undertook excavations in the adjacent rock overhang shelter.

The petroglyph site was given valuable status, for the State Registry, and a hand written note also indicated that it was a "National Register quality site", but it would have to undergo a cleaning program to remove the paint and other substances that have been recently added. It also recommended that complete and accurate data should be recorded on all petroglyphs at this site (Ibid.).

Two historic sites were also identified during the statewide survey—the Historic District associated with Olowalu Sugar Company mill (Site 50-50-08-1602) and the Olowalu Stone Church ruins at Mopua (Site 50-50-08-1603).

The Olowalu Historic District (Olowalu Sugar Company Mill site and associated residences) was discussed in the previous section. The Church ruins site (Site 1603[14]) is described as follows (HRHP, Wright, 1974):

[14] This church lies in the mauka study area of Olowalu (Phase 2). Additional information can be found in that report. Its location is shown on the historic map from 1881 (Map 4) of this report. It appears that the north arrow is point directly toward it.

"The general shore district of Olowalu was a small Hawaiian village of farmers and fishermen, located about half way between Lahaina and Maalaea, toward Wailuku. A mission station from Lahaina was established at Mopua in 1835, and in 1837 a small adobe and thatch roof church was built. Early in 1858, work began on the construction of a stone church and by May, 1859, the walls were completed. The exact date of the finishing of the church is not known. Originally it may have had a thatch roof, but a previously unidentified photograph, most likely taken about 1890, shows the church with a shingled gable roof and short square steeple.

Members of the church voted in 1868 to become an independent church, keeping that status until 1897 when again the church affiliated with the mother church in Lahaina. (The usual founding date of May 10, 1868, relates to this) At some time prior to 1930 the church was abandoned. Clearing and reconditioning work was done in 1960 by an ecumenical work group. ...

The church ruins stand on a slightly sloping plain with the mountains to the northeast forming a spectacular background. On the W side of the ruins are remains of a cemetery, heavily overgrown. The walls of the church are 30 by 60 feet, parts being collapsed, and the loose rock has been piled outside the S entrance. Three window openings are indicated for each side, with one at the N end, the altar end. Constructed of fieldstones set in mortar, with quoins of coral blocks cut from the reef off Hekili Point, the church once was a fine example of a Protestant mission church."[15]

Launiupoko

In 1990, Paul H. Rosendahl, Inc. (PHRI) conducted an archaeological inventory survey of a 440-acre parcel for a proposed golf course in Launiupoko *ahupua'a* (Graves and Goodfellow, 1991) which lies to the north of Olowalu. During the fieldwork, 47 sites consisting of over 70 component features were identified. The sites were placed in the following formal types: terrace, clearing pile, agricultural plot, rock pile, canal, retaining wall, flume, flaked boulder, alignment, rock shelter, C-shape, wall upright, L-shape, petroglyph panel, corral, fence, cairn, and road. They fell into the following functional types: agriculture, animal husbandry, habitation, temporary habitation, and marker.

The findings were presented in terms of functional categories. The agricultural complexes predominated, consisting of 60% of the sites identified. These formal feature types included terraces, agricultural plots, rock clearing piles, cleared areas, canals and retaining walls. The terracing is extensive in Lauinupoko. Much of it is interpreted as being historic, and connected with Pioneer Mill large-scale plantation agriculture. Other, smaller, agricultural plots found in the project area were probably used for horticultural activities, and consist of small dirt patches, enclosed by stacked-rock walls and windbreaks (Ibid., p. 10).

[15] It should be noted that in 1930, the shingled roof caught fire from a cane fire spark and burned. The Olowalu Sugar Company apparently agreed to provide the labor to replace the roof, if church members would supply the material. However, the changes that occurred when Pioneer Mill bought out Olowalu Sugar did not include the reconstruction of the church roof (THE MAUI NEWS, November 24, 1996).

The habitation sites comprise 19% of the sites, and consist of rock-filled terraces, uprights, overhangs, small C and L-shaped structures, and rock alignments. These sites often contain agricultural features within them. They tend to be larger, with a variety of features present (Ibid., p. 12). The rock overhang shelters are found primarily on the north and south sides of Launiupoko Gulch.[16] The sites classified as having an animal husbandry function, are historic, as are the roads.

The subsurface testing at habitation and agricultural sites yielded a series of radiocarbon dates that fell into a range from c. 1200 to 1650 AD. The authors conclude that many of the precontact sites were modified or destroyed by historic plantation and ranching activity. No doubt, the water system developed in precontact times was modified to suit the needs of sugarcane production, as was the extensive system of terraces.

In 1998, the site was revisited by PHRI after it was purchased by Launiupoko LLC. The report prepared earlier had never been submitted to SHPD for review. There were several unanswered questions that needed addressing, and 6 additional days of field work were carried out from December 1997 to March 1998 (Graves, Goodfellow, Haun, April 1998).

The authors conclude that the pre-contact population of Launiupoko *ahupua`a* was probably limited. This is supported by the lack of *kuleana* land claims made during the Mahele (Ibid., p. 9). They proposed that there probably had been permanent habitation settlements along the coast, while the alluvial plains and drainages were used for agriculture, and would have had temporary habitation sites associated (Ibid.).

This model of settlement had to be revised. They state (Ibid., p. 36):

"The model predicted that permanent settlement would be focused at the coast. The upper portion of the project area appears to be the lower extent of prehistoric settlement on the inland, better-watered portion of Launiupoko Ahupua`a. This settlement probably occurred between the 1200s and 1400s. Temporary habitation sites assosiated with agriculture were predicted by the model. The project results date temporary habitation sites to the 1400s and later, with three age ranges overlapping the late 1600s. ..."

Although the age ranges for two habitation sites extend to the 1900s, the absence of associated historic materials indicates the sites were probably not occupied later than the early 1800s. Thus, as predicted by the model, traditional sites were probably abandoned as people moved to new economic centers, in this case the coastal communities such as Lahaina."

Ukumehame

[16] Site 2672 is a modified rockshelter with a petroglyph panel and rock-filled terrace, quite similar to the Olowalu Complex (Sites 1200 and 1201). However, the petroglyphs are in the dripline of the overhang and have been significantly eroded over time (Graves and Goodfellow, p. 29).

On the southern side of Olowalu is the *ahupua`a* of Ukumehame. This is another large, alluvial fan which spreads out below Ukumehame canyon. It was surveyed in 1997 by Cultural Surveys Hawaii (Deveraux, et. al., 1997). There were 16 sites and site complexes identified within the 440-acre project area, most in higher elevations near the mouth of the canyon. They were grouped into class-types such as agricultural, habitation, *heiau*, petroglyphs, human graves, irrigation ditches, and a basalt quarry.

Two *heiau*, Hiki`i (Site 50-50-08-2), and Ukumehame[17] (Site 50-50-08-3) were previously noted by Walker in the 1930 survey. The latter was thought to contain human gravesites, and is in relatively poor condition. Hiki`i *heiau* has been recently reconstructed by volunteers connected to Ukumehame resident families.

Maui Electric Company's Lahaina to Maalaea Transmission Line

The transmission line is located between 0.9 and 2.0 miles *mauka* from the coastline. It extends through the *ahupua`a* of Waikapu, Ukumehame, Olowalu, Launiupoki, Polanui, Polaiki, Wainee, and Kuia. An archaeological inventory survey was conducted on the 14.7-mile long corridor in 1994, by Cultural Surveys Hawaii (Robins, Folk and Hammatt, 1994). A total of 34 archaeological sites were identified in the project area—all of which were evaluated as significant archaeological resources (Ibid., p. 109). Subsequently, and additional survey of access roads, and monitoring of the pole replacement process was contucted in 1996 and 1997—also by CSH (Devereaux, Colin and Hammatt, 1997).

At Olowalu the transmission line crosses the *mauka* portion of the study area at ca. 350 to 400 feet AMSL (poles 40-56). Specific reference to Olowalu is made in the discussion of restoration efforts to the areas that were impacted by access road construction and power pole excavations. The 2 poles mentioned in Olowalu are poles 31 and 34 (Ibid., p. 77), but these do not appear to be associated with Olowalu. The maps included at the end of the report show that there are 2 sites (Sites 3180 and 3172) which are present in the Olowalu stream area, beneath the power lines between poles 52 and 54 (Figure 2).

Site 3180 is identified as a cattle wall that has been attributed to ranching. Its condition is rated fair to good, and it occurs at 240-400 ft. AMSL. It is described as follows (Robins, Folk and Hammatt, 1994, p. 82):

"Site –3180 is a wall which is crossed by the preferred alignment just beyond the west side of Olowalu Stream. The wall extends along the mauka perimeter of the cane fields, and like Sites –3167 and –3170, was probably constructed to keep cattle outside of the cane fields and kuleana. The terrain is rocky and slopes moderately to the southwest.

The wall is stacked and vertically faced with basalt boulders. It measures an average width and height of 1.0 m. (3.3 ft.)."

[17] The name was given by DLNR archaeologists during the 1973 statewide survey (Deveraux, et. al., 1997, p. 36).

The report does not state its length.

Site 3172 is identified as a canal, associated with cane irrigation. Its condition is listed as excellent, and the linear extent was not determined. It was noted at the 200 foot elevation level. It is described as follows (Ibid., p. 78):

"Site -3172 is a historic ditch located on the southeast side of Olowalu Stream. The terrain southeast of the ditch descends steeply to the Olowalu stream bed. The stream bed was dry during the survey. Vegetation consists of an assortment of introduced fruit trees and grasses.

The ditch is constructed of cemented stone on its southeast side and concrete on its northwest side. It measures approximately 0.8 m. (2.6 ft.) by 0.5 m. (1.6 m.)[sic.] *deep and is currently used for cane irrigation."*

Settlement Patterns and Expectation of Findings

Precontact to 1850s

The *makai* and *mauka* portions of the study area represent the valley, alluvial fan and mouth of Olowalu Stream, and typically include several environmental zones. Archaeological studies in the stream gulches and colluvial slopes in both Ukumehame and Launiupoko *ahupua'a*, situated to the east and west of Olowalu, provide interesting comparisons. Evidence for the pattern of irrigated agricultural practice occurs in the stream narrow upper valleys and stream gulches in both cases. At lower elevations, on colluvial slopes, dry land cultivation—probably sweet potatoes—was practiced in Launiupoko. However, neither area was studied along the coast line.

No archaeological studies have been done in the coastal area that stretches from Ukumehame and Launiupoko. However, given the general settlement patterns associated with the *ahupua'a* system found elsewhere in the Lahaina District, one would expect to find traces of precontact permanent occupation near the shoreline (Graves, Goodfellow and Haun, 1998). These would typically be found at stream mouths, and would be habitation sites associated with activities concerned with marine resource exploitation, and possibly agriculture and aquaculture (i.e. taro pondfields and fishponds) as found in Lahaina. The features that might remain would take the form of stone house platforms, canoe *hale*, fishing shrines, rock alignments, and so forth. Subsurface features would likely be occupation floors and fire hearths, and burials. A probable fishpond is present in Olowalu, in the *mauka* portion of the study parcel, as shown on Maps 4 and 6. It is probable that this dates from precontact times. If such features were present in the *makai* study area, the subsurface manifestations would be in the form of gley soil deposits, behind sand berms near shore.

The distribution of Land Commission Awards in the *ahupua'a* show taro lands following the stream bed from the narrow upper valley floor, across the colluvial slopes

to the mouth of the stream (Map 6). The LCAs shown on the *makai* portion are all identified as houselots, some of which are connected, with taro lands in the upper valley. What might remain of these habitation sites would be stone walls, house foundations, etc. Subsurface indications could be midden deposits, house floors or occupation surfaces.

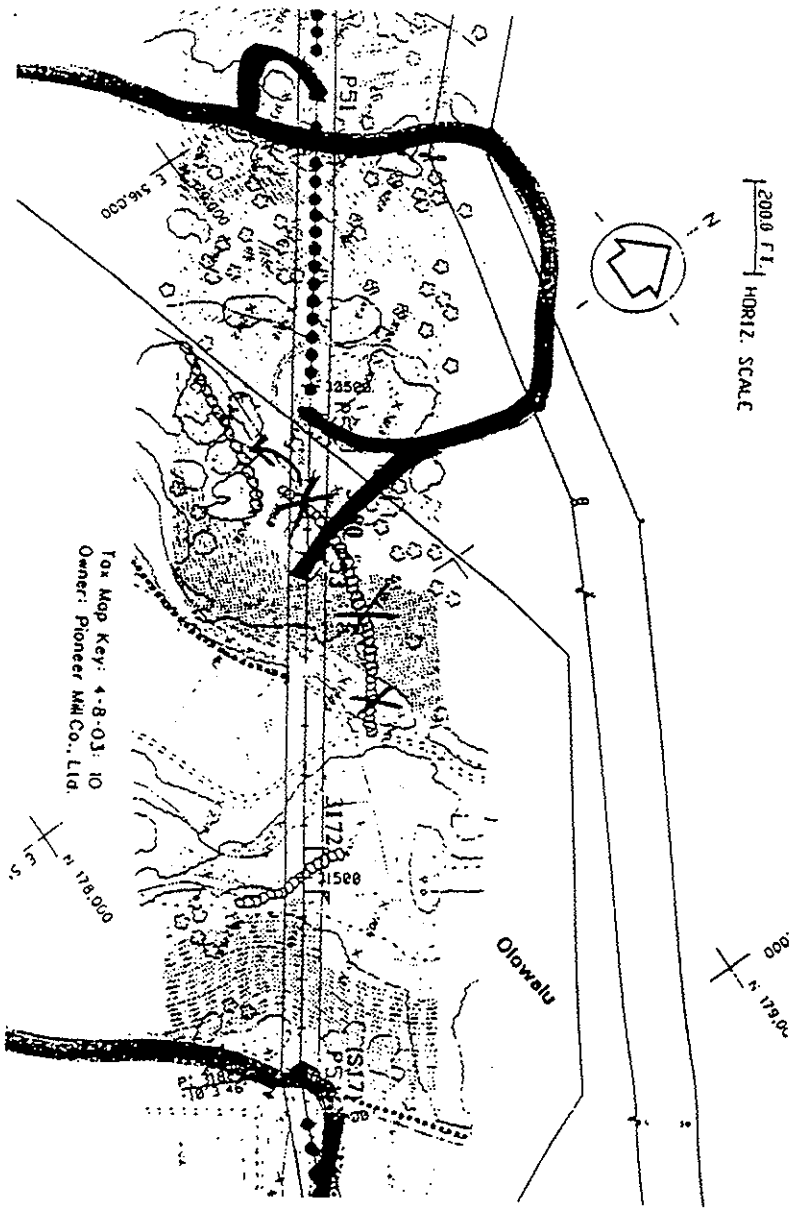


Figure 2 – Reproduction of map from Maui Electric report (Robins, Folk, and Hammatt, 1994) showing Olowalu sites.

Since most of the *makai* study area was cultivated for growing sugarcane, the likelihood of surface remnants seems unlikely. However, it is possible that remnants of such features could be present on the fringes of cultivated fields.

Plantation Era

The known sites on the *makai* study parcel are associated with the Olowalu Sugar Company complex. The mill itself was dismantled in the early 1930s, and only some of the stone foundations remain. The site was documented during the Statewide Inventory survey in 1973, and additional archival research is being conducted by Ms. Gail Bartholomew Ainsworth at the present time. A small settlement consisting of houses of plantation *luna* also exists on the parcel, along with cane fields, roads and a water delivery system.[18]

[18] The archival research on the Plantation era had not progressed very far at the time of the writing on this report. More detailed information on the Plantation era settlement pattern can be found in the Olowalu Mauka report (Phase 2) [Fredericksen and Fredericksen, February, 2000] of this archaeological inventory survey. Appendix C of that report contains more maps and photos, along with census information and a chronology of Olowalu School and plantation management.

ARCHAEOLOGICAL FIELD METHODS

Fieldwork was conducted by Xamanek Researches personnel during October, November and December of 1998. Research team members included Marcael Ball, Hugh Coffin, Mark Donham and Erik Fredericksen. Erik Fredericksen was the field director, and the overall project coordinators were Walter and Demaris Fredericksen.

The archaeological inventory survey was carried out in 2 phases. A pedestrian walkover of the c. 73-acre parcel was first conducted. Surface sweeps were oriented roughly N-S, using a 5 meter spacing between survey members. Ground visibility ranged from poor to good, depending upon vegetative cover. In general, about half of the beach strand area along the 2-mile coast was densely vegetated. In addition, portions of the abandoned sugar cane fields contained up to 2-meter tall ratoon (not cultivated) cane plants. Three surface sites were found during this phase of the inventory survey, in addition to the ruins of the Olowalu Sugar Mill (Site 1602). Descriptive notes were taken in the field and photographs were taken with color film.

Subsurface investigation, mapping and site evaluation formed the second phase of our inventory survey. Site maps were prepared with metric measuring tapes and hand help compasses. Representative backhoe trench profiles and all test unit profiles were recorded. It was not possible to closely inspect some trenches because of safety concerns. A total of 97 backhoe trenches (Figure 3), 3 backhoe scrapes, and 6 manual test units were utilized to investigate subsurface conditions on the project area.

The 6 1-meter square test units were excavated by stratigraphic layers, using 10 cm. levels in thicker strata. All soil was screened through 1/8-inch hardware cloth. Several bulk samples were collected and screened in the laboratory. All material culture remains were collected in the field for subsequent analysis. Laboratory work was conducted on Maui, and none of the cultural materials, except for 2 charcoal[19] samples, were transported off island. Common laboratory methods were used in the analysis of collected material.

[19] Charcoal radiocarbon samples were collected in the field in bulk, and separated for surrounding material by floatation. The charcoal was then dried and placed in aluminum foil and sent to Beta Analytic, Inc. for radiometric analysis.

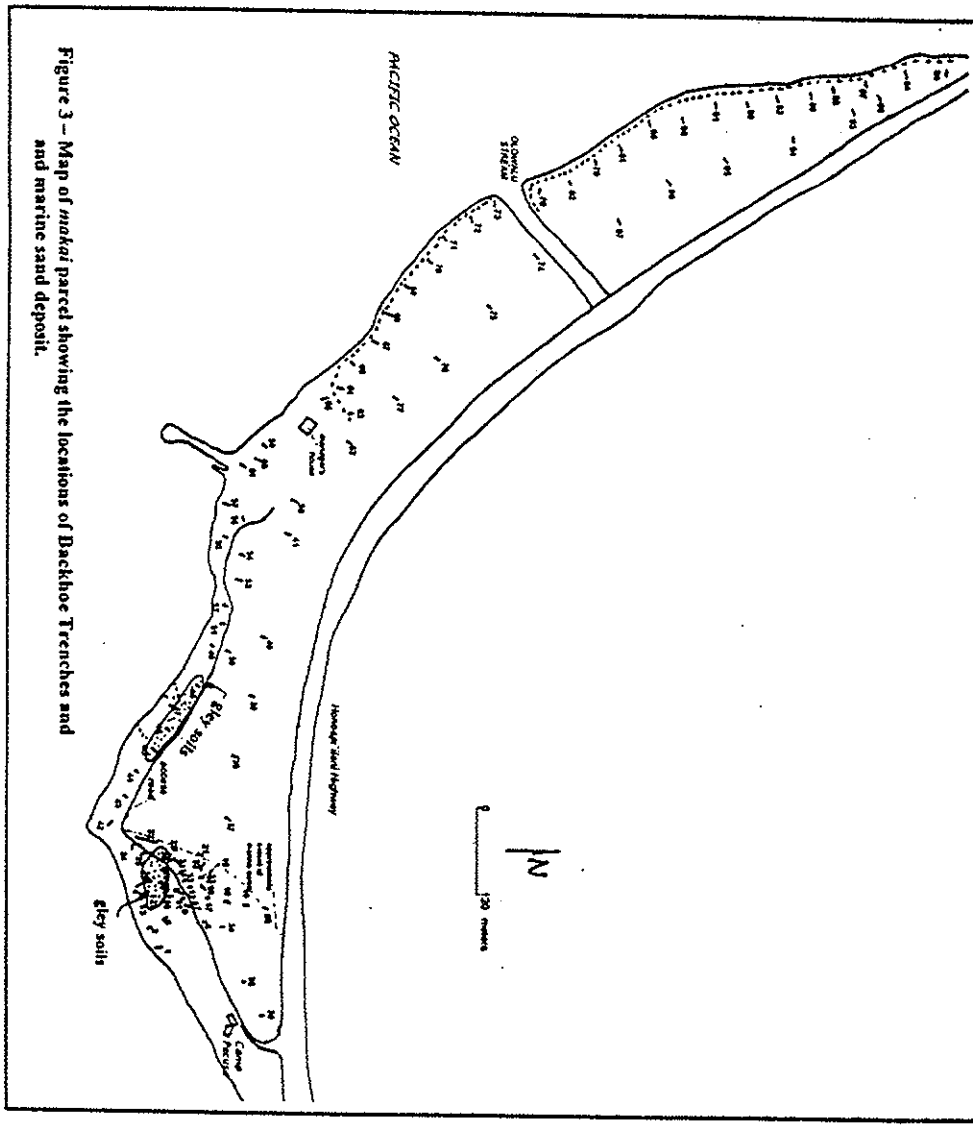


Figure 3 – Map of *makai* parcel showing the locations of Backhoe Trenches and and marine sand deposit.

ARCHAEOLOGICAL FINDINGS

A total of 6 previously unrecorded sites were located on the *makai* project area during the inventory level survey. These include 3 surface, 2 subsurface sites, and a burial area. Site 50-50-08-4693 is interpreted as a burial ground, probably dating from the precontact period. Site 4694 consists of a coastal rock structure with an associated subsurface cultural deposit. Site 4695 is a stone platform/terrace structure at the shoreline near the western end of the project area. Site 4696 consists of a segment of the old Government Road. Site 4697 appears to be an early post-contact habitation area that lies in the vicinity of the Site 4693 burial ground. The last site (Site 4698) located on the *makai* project area is interpreted as a late-precontact habitation area. In addition to the sites mentioned above, the project area also contains the ruins of the Olowalu Sugar Mill (Site 1602). Refer to Tables 2 through 7 for manual excavation results, Table 8 for backhoe trench results, and Table 9 for site significance assessments

Site 50-50-08-4693

This site lies near Hekili Point, within c. 50 meters of the existing coastline (see Photos 2 through 6). It is interpreted as a probable precontact burial ground. An existing, unpaved access road separates the abandoned sugar cane field to the north and the wooded coastal strand to the south (Figure 4). The general area *makai* of the access road is vegetated with salt-tolerant species such as Indian fleabane (Pluchea indica), salt bush, *kiawe* trees, opiuma trees, and various alien grasses. An unpaved access road cuts through the dense vegetation to the coast.

On 13 November 1998, human remains were located by Mark Donham and Erik Fredericksen. An informant, who wished to remain anonymous, had indicated on the previous day that there was an area where he recalled seeing "bones" in the past. Careful inspection along the *makai* berm of the cane access road yielded 3 cranium fragments and 1 femur shaft fragment. Subsequent inspection of the area yielded a surface scatter of previously disturbed human skeletal materials. Following consultation with Maui/Lana'i Islands Burial Council members, it was decided to conduct subsurface testing to determine the presence of burials.

A series of backhoe trenches were then placed in the vicinity of the surface scatter in order to assess subsurface conditions (Figure 5). Two backhoe trenches (BT 8 and 13)

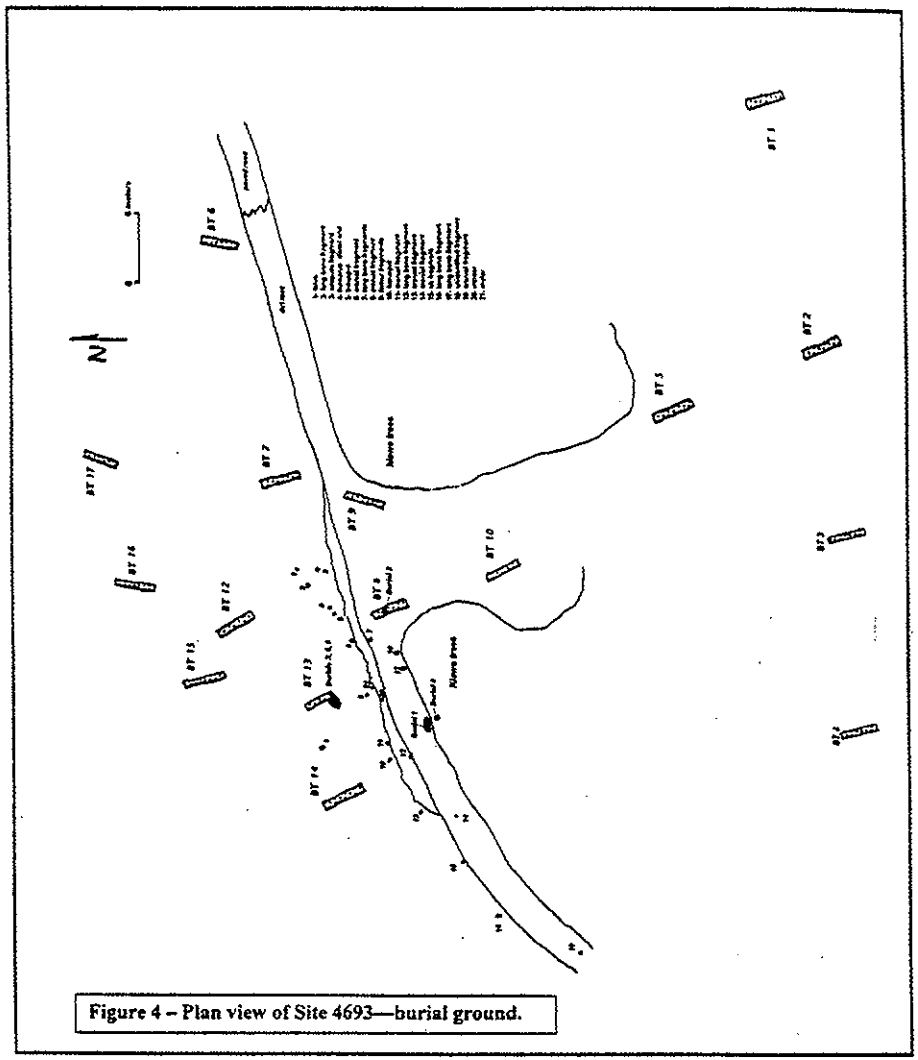


Figure 4 – Plan view of Site 4693—burial ground.

exposed *in situ* human remains. In addition, a single back-blade pass along the road located a heavily impacted *in situ* burial. Given the presence of these burials, we halted mechanical testing in the immediate area. Manual investigation was then undertaken on the burial in the road (Burial #1), and on the remains that were located in BT 8 and BT 13. Subsequent investigation yielded 3 additional finds of human skeletal remains.

Find #1 (Burial #1)

This first burial was found on 19 November 1998 by Hugh Coflin and Mark Donham during a single back-blade pass on the sugar cane access road. Burial #1 was located within 5 cm. of the existing surface of the graded road. This set of human remains has been heavily impacted over the years by activities associated with the maintenance of the road and by vehicular traffic. The remains were partially exposed and mapped (Figure 5; Photo 3).

While this burial has obviously been impacted by past activities, it is nevertheless, interpreted as remnant of an *in situ* burial. The presence of a partially articulated hand supports this interpretation. Further work on these remains was halted due to the deteriorated condition of the skeletal materials. Burial #1 was covered with screened sand and the road was blocked off with large tree branches.

Find #2 (Burial #2)

The second find was also made on 19 November 1998. Burial #2 was located by Hugh Coflin and Erik Fredericksen during the excavation of a stratigraphy trench (BT 8) [Figures 6 and 7; Photo 12]. The remains of an adult were found c. 80 to 85 cmbs., at ground water level. The backhoe bucket dislodged a portion of the burial when it broke through a large *kiawe* root. The inadvertently disturbed remains were subsequently recovered from the back dirt pile and from the trench floor.

This burial is located in a pit that was truncated by the backhoe when it broke through the root. Examination of the screened pit fill did not yield any post-contact material culture remains. Burial #2 appears to represent a precontact interment. The burial pit extended from a coarse, very pale brown (10 YR 8/2) marine sand deposit into the underlying very pale brown (10 YR 8/4) cemented marine sand deposit.

Find #3 (Burial #3)

This find was made in the abandoned cane field by Marcael Ball and Hugh Coflin on 20 November 1998. Backhoe Trench 13 was less than 30 cm. deep when human skeletal material was noted (Figure 8). Closer examination revealed pit-outline in the trench containing a cluster of metacarpals and phalanges, which appeared to be from the same individual. Manual excavation into the southeastern face of BT 13 located a right ulna and radius, along with a right femur and fibula. The ulna and radius lay below the plow-zone and apparently had not been disturbed.

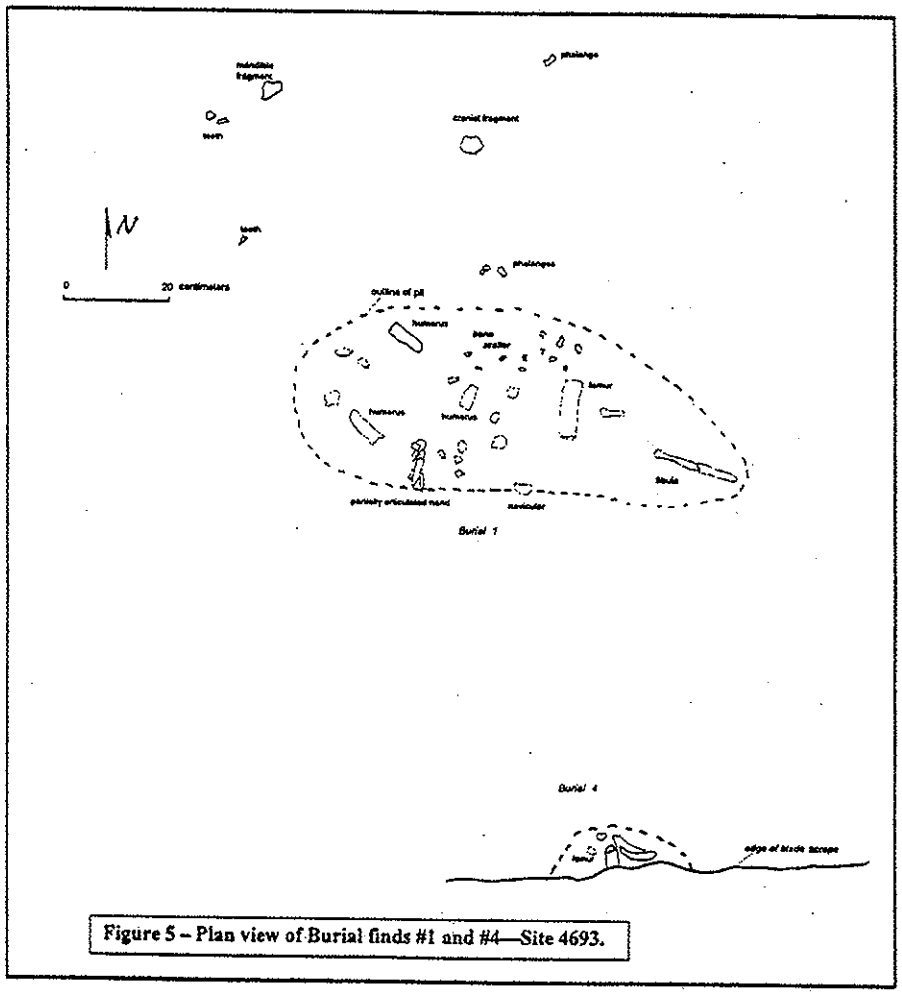


Figure 5 – Plan view of Burial finds #1 and #4—Site 4693.

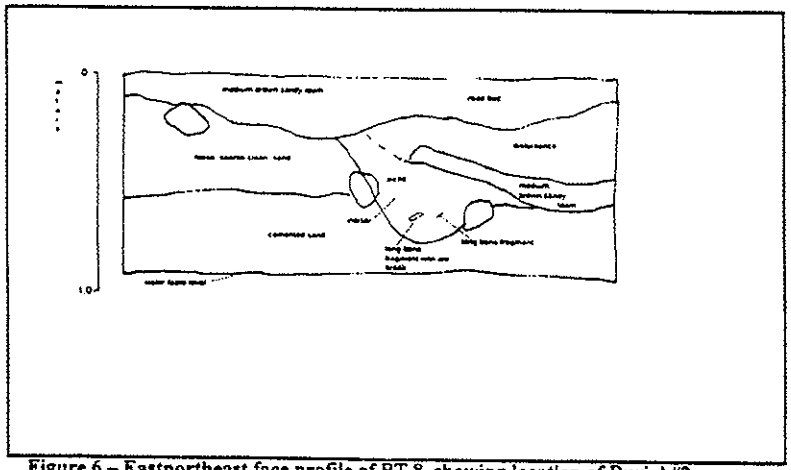


Figure 6 – Eastnortheast face profile of BT 8, showing location of Burial #2.

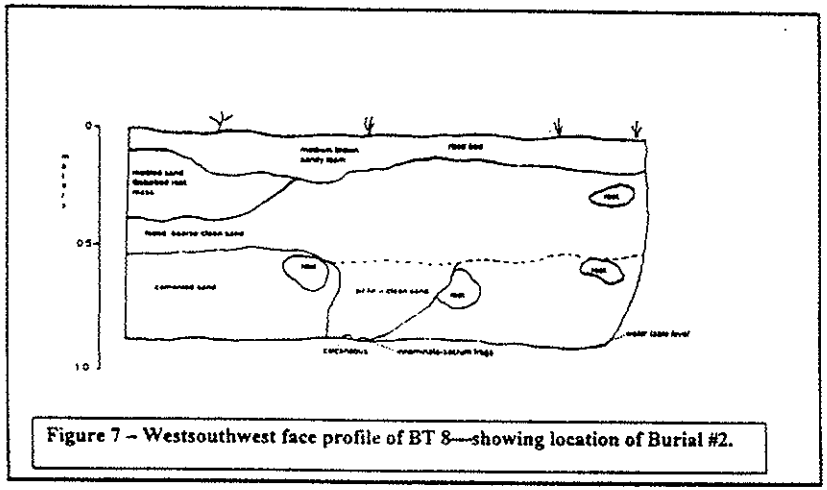


Figure 7 – Westsouthwest face profile of BT 8—showing location of Burial #2.

Find #4 (Burial #4)

This find was made by Mark Donham on 21 November 1998 as he was completing mitigation work on the Find #1 burial. Find #4 lies c. 1 meter south of Find #1 and is c. 40 cm. below the berm surface on the *makai* side of the access road (Figure 5). A clear pit outline was noted and only a small portion of the burial was exposed. No effort was made to further expose it because of a clear commitment from Ohowalu Elua Associates to create a burial preservation area on this part of the project area.

A small portion of a femur appears to have been shattered by past road maintenance activities. However, the overall condition of the remains appears to be good.

Find #5 (Burial #5)

Finds #5 and #6 were made by Mark Donham on 24 November 1998 while he was investigating Find #3 in BT 13. These finds also lie in the abandoned sugar cane field and have been disturbed by earlier plowing and cultivation.

Find #5 lies c. 2.5 m. to the west of Find #3. Much of this individual skeleton has been impacted by the plow zone, as it lies between 25 and 35 cm. below the existing surface. The lower vertebral column and much of the pelvis are articulated (Figure 8). The left radius, and the right ulna and radius were also found, along with several scattered hand bones and 2 articulated phalanges. A tine-mark imprint was clearly visible in the sand, indicating that the upper portion of the find was likely displaced by mechanical plowing. It is possible that the scatter to the north of Find #5 is part of the *in situ* individual.

A total of 4 lithic flakes were found resting directly on top of the lower arm bones on the *in situ* portion of Find #5 (Figure 8). These flakes ranged from 9 to 18 cm. in length and appear to represent single-use artifacts. The labor expended to produce these artifacts appears to have been minimal. It is interesting to note that none of the other long bones of this individual were located. It may be that the lithic flakes were used to separate the major long bones from the individual, and then discarded on what remained of the burial.[20] The absence of the long bones could be explained as well by the extensive disturbance the burial has sustained.

Find #6 (Scattered remains)

Find #6 was located c. 1.5 to 2 meters northwest of Find #5. This scatter contained a c. 18 cm.-long portion of a radius in addition to other unarticulated skeletal

[20] Human long bones were used as raw material for fishhook manufacture. Peter Buck (Te Rangi Hiroa) states: "Human long bones, particularly the thigh bone, were cut in lengths probably with sharp-edged pieces of stone flakes. The lengths were cut into rectangular pieces to correspond with the length and width of the proposed hook." (1957, Volume VII, p. 324) Again he states that when burying an individual "secrecy was observed, because it was feared that the bones might be stolen by an enemy to make fishhooks or to ornament slop bowls and so degrade the deceased and his family." (1957, V. XIII, p. 569).

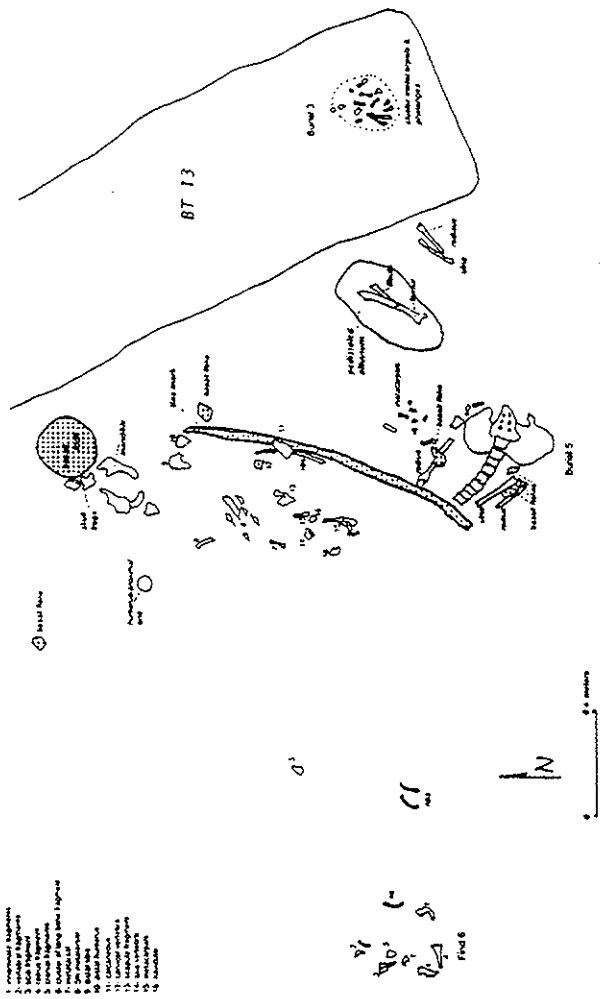


Figure 8 – Plan view of Burial finds #3 and #5, and Find #6 scatter.

fragments (Figure 8). This find was initially thought to represent a disturbed portion of an *in situ* burial. However, Find #6 is now interpreted as a scatter of human remains. The previously disturbed remains are located in the plow zone within 20 cm. of the existing surface.

Discussion

This portion of the project area contains relatively thick marine sand deposits which were probably exposed during precontact times. Subsurface investigation yielded articulated portions of at least 5 individuals. Find #6 is interpreted as scattered remains. Find #2 was the deepest of all subsurface finds and did not appear to have bee impacted by post-contact agricultural activities. Find #4 was much nearer to ground surface, but appeared to be intact. All other subsurface finds had been heavily disturbed.

The 6 subsurface finds appear to represent indigenous burials. Unfortunately, post-contact agricultural activities have severely impacted Finds #1, #3, #5 and #6. The other burials are more intact, and Finds #2, #3 and #4 were contained within pit features. Indigenous lithic tools were found in association with what remained of Find #5. No post-contact cultural materials were associated with any of the finds. Sex and age determination for the burials was not possible from the fragmented remains recovered, and the M/LIBC requested that no further excavation of *in situ* portions be undertaken. The borders of the burial preserve are based on the burial council's recommendations

The proximity of the disturbed finds to the existing surface, and the distribution of human remains on the surface of the sugar cane field, suggests that additional burials are likely to be present. Mr. Sonny Waiohu, a long-time employee of Pioneer Mill, remembers seeing "bones" in this part of the *makai* fields on several occasions. In addition, we located 3 of the finds with the partial excavation of 2 backhoe trenches and a single surface scrape. It seems quite probable that additional burials are located in the immediate area and in the vegetative undergrowth *makai* of the access road.

Site 50-50-08-4694

This site is located on Hekili Point (Photos 10 and 11). It rests c. 3-4- feet AMSL and lies within 20 m. of the existing high water mark in the Beach Reserve. Alien vegetation observed in the vicinity of Site 4694 included *kiawe* and opiuma trees, salt tolerant Indian fleabane, and various grasses and succulent weeds. The site consists of an L-shaped wall of waterworn basalt cobbles and a few small boulders (Figure 9; Photo 10). In addition, several coral cobbles were noted in the structure wall.

This structure ranges from 30 to 60 cm. in height and is up to 1.2 meters wide. It is c. 10 meters E-W by c. 9.5 meters N-S on the west leg. The northern portion of this leg appears to have been impacted by past bulldozing activities likely associated with the nearby abandoned sugarcane field. The eastern end of the site did not appear to have been mechanically damaged. The overall labor expenditure for the construction of this structure was moderate to high, and its overall condition is fair. However, a portion of

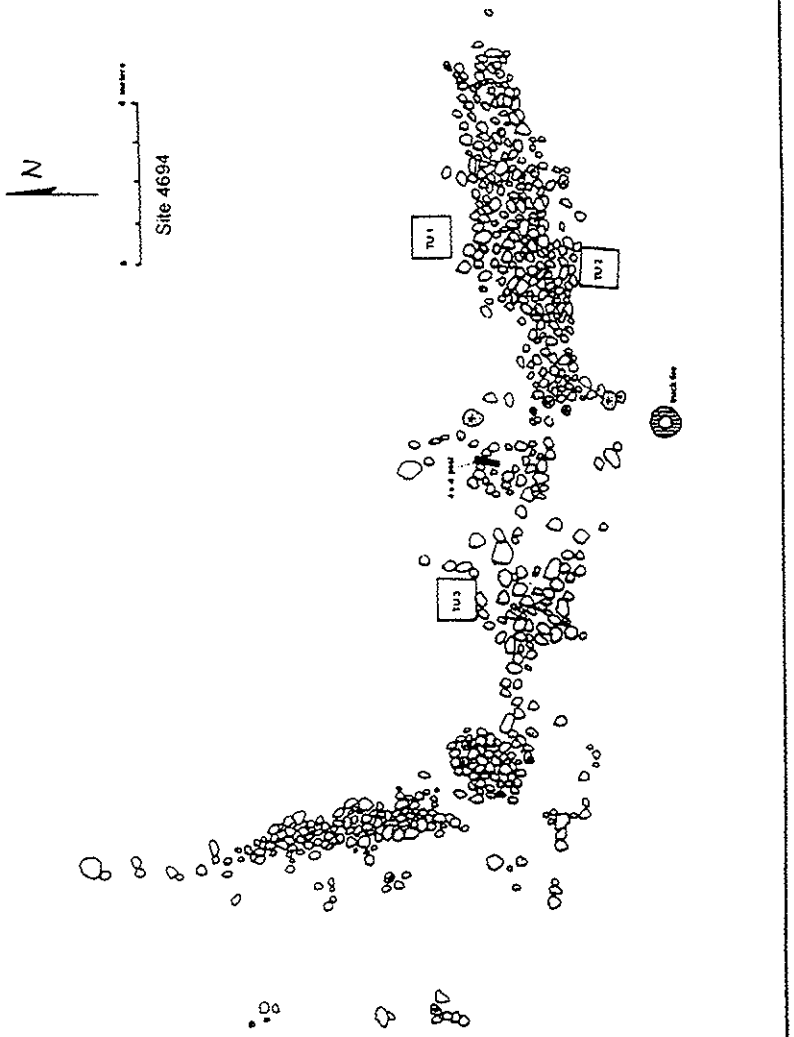


Figure 9 – Plan view of Site 4694.

this structure appears to have been impacted in the past 50 years. No post-contact material culture remains were noted in the structure of the site. However, a 4 x 4-inch timber was apparently placed in the rock structure in modern times. The dimensions (3 ½ x 3 ½ inches) of the post and its generally good condition suggest it was put there in recent times.

A total of 3 test units were utilized to investigate subsurface conditions. No subsurface features were encountered in any of the 1-meter square test units.

Test Unit 1

This first test unit was excavated on the north side of the structure. A relatively low amount of material culture remains were present in this c. 1 meter deep unit. Four layers were encountered before excavation of TU 1 was halted (Figure 10).

Layer I was 17 to 19 cm. thick and consisted of dark brown sandy loam (10 YR 3/3). This humus rich soil contained c. 30 waterworn pebbles, a few pieces of waterworn coral, scattered charcoal (7.9 g.), and a single *pipipi* (Nerita picea) shell. No other material culture remains were present in this loose dry stratum. The soil boundary with the underlying stratum was abrupt and clear.

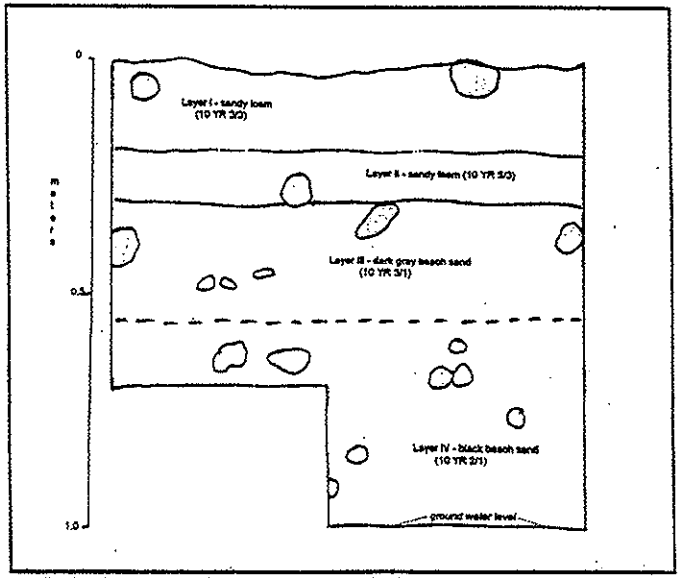


Figure 10 – North face profile of Test Unit 1—Site 4694.

Layer II was up to 10 cm. thick and extended to 29 cmbs. This brown sandy loam (10 YR 5/3) contained relatively large amounts of waterworn basalt cobbles and pebbles (c. 15 % by volume). In addition, over 80 pieces of waterworn coral were noted. Small amounts of shell midden were recovered, along with 3 flakes of volcanic glass (3.6 g.), 2 unworked basalt flakes (4.3 g.), a Maui "diamond" (0.1 g.) and a *puka* shell (0.1g.). This last item is interpreted as an ornament and has an enlarged hole. Floral remains were composed of 2.0 g. of scattered charcoal. The boundary separating this loose, dry stratum from the one beneath was clear.

Layer III is interpreted as a beach sand deposit. This very dark gray (10 YR 3/1) layer was up to 25 cm. thick. A low amount of material culture remains were recovered from this stratum, which included marine shell, unidentified mammal bone, and a *kukui* nut shell. In addition to the above materials beach basalt cobbles, pebbles and coral were found. The lower part of this stratum graded into a slightly darker beach sand deposit.

Layer IV was encountered at c. 52 to 55 cmbs. This black sand layer (10 YR 2/1) was essentially sterile. The southwestern quadrant of TU 1 was excavated to 1 meter below surface. The ground water table was encountered about 1 meter below surface, and excavation in the unit was terminated.

Test Unit 2

This second subsurface test was excavated on the *makai*, or south side of the structure. It was intended to gain information about the subsurface extent of the wall. Low amounts of material culture remains were found in this test unit, which contained 4 strata (Figures 11 and 12).

Layer I was up to 20 cm. thick and was composed of dark brown sandy loam (10 YR 3/3). This very friable soil contained large amounts of organic material. Numbers of waterworn pebbles and coral pieces were present throughout this layer. The stacked portion of the structure wall extended through Layer I. Small amounts of marine shell, a lead pellet, and 15.2 g. of charred *kiawe* wood were recovered. The soil boundary with the lower layer was clear and abrupt.

Layer II was a maximum of 10 cm. thick and reached a depth of 25 cmbs. This brown sandy loam (10 YR 5/3) yielded c. 30 waterworn pebbles and cobbles, a few waterworn pieces of coral, an unworked piece of coral, a small amount of marine shellfish remains, and 2.7 g. of scattered charcoal. Inspection of the northern profile of TU 2 revealed that Layer II did not extend into the structure wall (Figure 12).

Layer III beach sand deposit was encountered between 20 to 25 cmbs, and was up to 30 cm. thick. This very dark gray sand (10 YR 3/1) yielded low amounts of material culture remains consisting of marine shellfish, and 3.7 g. of charred *kukui* nut shell. In addition, fairly large amounts (c. 30% by volume) of waterworn beach cobbles and pebbles were present in this deposit. It was determined that the Site 4694 wall extended to c. 35 cmbs. Layer III graded into Layer IV between 50 to 54 cmbs.

Layer IV was composed of the common black sand (10 YR 2/1). This beach deposit did not contain any material culture remains, and excavation was halted at 60 cmbs.

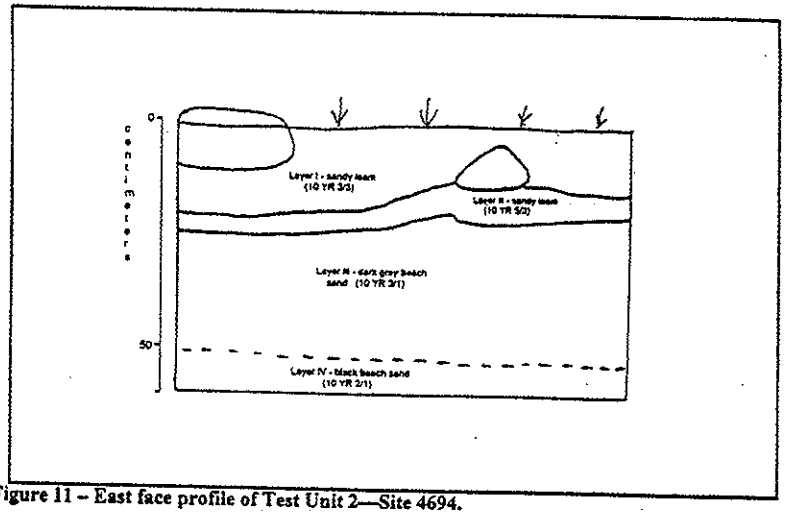


Figure 11 – East face profile of Test Unit 2—Site 4694.

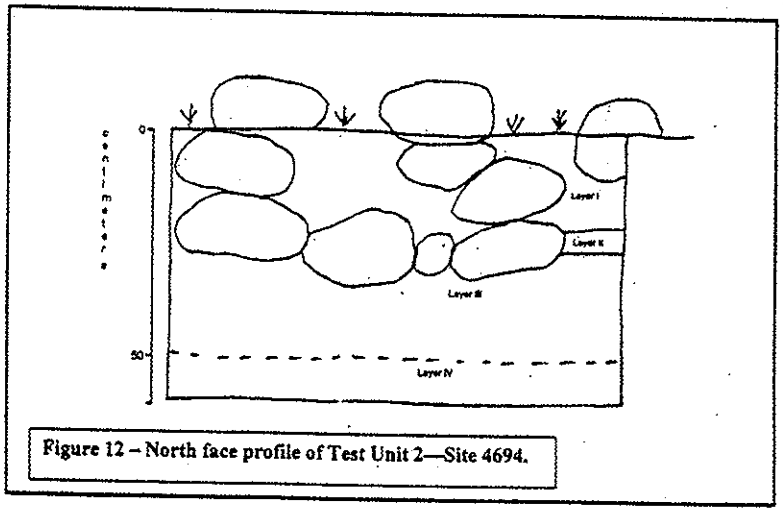


Figure 12 – North face profile of Test Unit 2—Site 4694.

This last unit was placed on the *mauka* or north side of the structure. Test Unit 3 was excavated in an attempt to recover a charcoal sample. A moderate amount of material culture remains were recovered. The same soil layers were present as were encountered in the other test units (Figure 13).

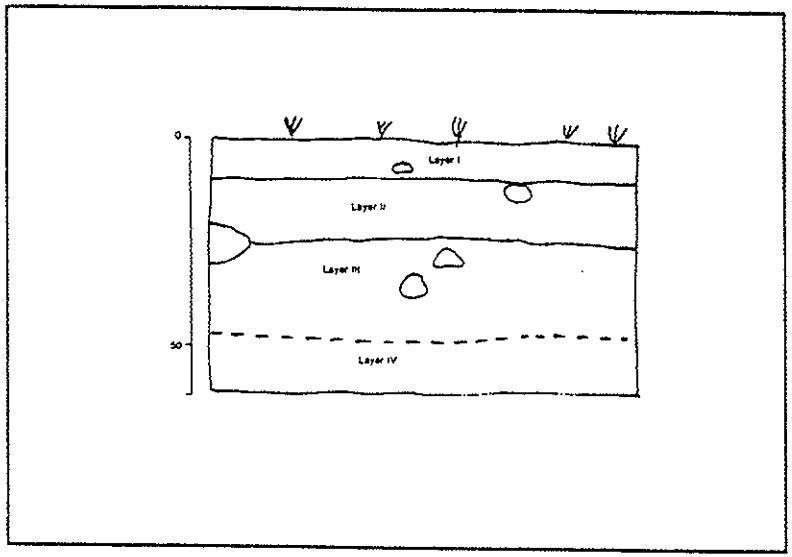


Figure 13 – East face profile of Test Unit 3—Site 4694.

Layer I was 8 to 10 cm. thick and was made up of the same dark brown (10 YR 3/3) sandy loam that was found elsewhere. A low amount (c. 5% by volume) of waterworn basalt cobbles and pebbles were present in this stratum, along with a few waterworn coral pieces. One cowrie shell (Cypraea sp.) was found in the layer, along with 0.7 g. of scattered charcoal, and 2 unworked basalt flakes.

Layer II deposit was somewhat thicker in this unit and extended up to 25 cmbs. The brown sandy loam (10 YR 5/3) contained low amounts of waterworn basalt cobbles and pebbles. Portable remains included 12.9 g. of marine shell, 1.6 g. of scattered charcoal, 7.9 g. of waterworn *kukui* nut shell, 1 unworked basalt flake, and 1 piece of unutilized coral.

Layer III was encountered between 22 and 25 cmbs. This very dark gray sand (10 YR 3/1) yielded low amounts of material culture remains and was up to 29 cm. thick.

Recovered portable remains included 30.4 g. marine shellfish, unidentified mammal bone, 2 unworked basalt flakes, and 2 pieces of unutilized coral. Finally, a rusted iron spike (42 mm. long) was recovered from the upper portion of Level 1 (22-32 cmbs.) This post-contact artifact was partially encircled by a *kiawe* root, and it appears possible that this spike could have been vertically displaced by the root. Water rounded cobbles, pebbles, and coral became increasingly common in the lower portion of the stratum. A probe was utilized to determine the depth of the Site 4694 wall below surface beyond the south face of TU 3. Structure rocks were detected to a maximum depth of c. 40 cmbs.

The black beach sand (10 YR 2/1) of Layer IV was encountered between 45 and 48 cmbs. This beach deposit yielded only waterworn marine shellfish remains and is interpreted as a culturally sterile layer. Excavation was halted at 60 cmbs.

Discussion

Investigation at Site 4694 yielded information on the subsurface extent of the rock structure itself and the 4 soil layers present. It appears probable that the structure was built on the upper portion of the Layer III deposit. Both Layers I and II appear to have formed after the construction of the feature. There was no clearly defined cultural layer located. No suitable charcoal samples were recovered to allow for radiometric dating. However, the material culture remains finds (volcanic glass, basalt flakes, *kukui*, food remains), though sparse, seem typical of precontact habitation sites. With little or no clearly associated post-contact remains present, it appears as if this is a habitation site with subsurface deposits, and what remains of a rock wall around it. The inland extent of this site has been obliterated by sugarcane cultivation activity.

Site 50-50-08-4695

This site lies near the northwestern extreme of the *makai* project area. Site 4695 is located at the high water mark. It is constructed of waterworn and angular basalt boulders and cobbles. Remnants of weathered concrete are present as well. It is c. 10 meters long on the N-S axis, by up to 4.5 meters wide. It is about 1.1 meter above the beach level (Figure 14). Much of this site is covered by dense *hau* growth. The overall condition of the site is generally poor. The construction style of this feature, i.e. the mixture of waterworn, angular rocks, and concrete indicate that it was built in post-contact times. It is important to point out that this site has been impacted by storm waves in the past, and the broken pieces of coral that were noted in between the feature boulders and cobbles were probably cast ashore by high surf.

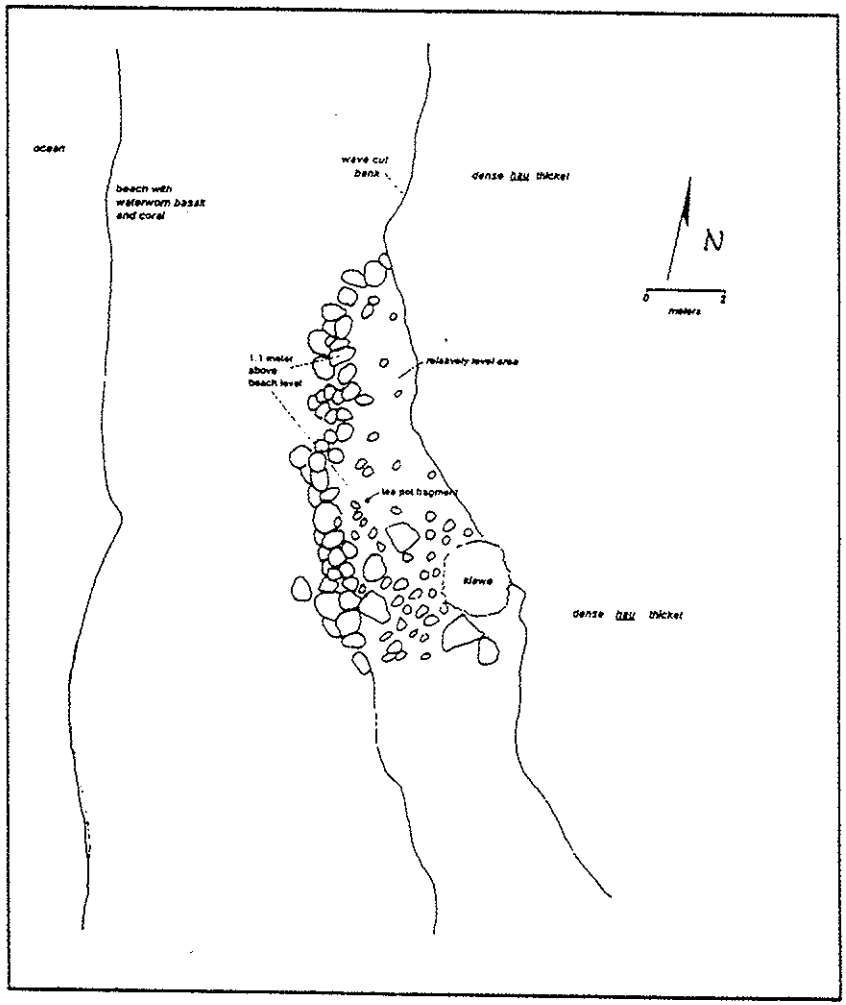


Figure 14 – Plan view of Site 4695.

Recently broken and unbleached coral pieces on the structure tend to reinforce the above interpretation. A few sherds of a blue on white porcelain tea pot were present on the surface of the feature. Site 4695 may represent some sort of retaining wall, possibly for a pull-off associated with a nearby section of the Old Government road. This site lies in the Beach Reserve and will not be impacted by development of the property. It has generally low research potential.

Site 50-50-08-4696

This site consists of Remnant 3 of the Old Government Road that is located on the topographic maps of the project area. It is c. 15 m. wide by 100 m. long and is oriented at c. 135 degrees. The old black-top road segment on the study parcel is covered by extensive *hau* growth and is in poor overall condition. It is truncated by the nearby Honoapi'ilani Highway. It lies within the Beach Reserve and is c. 15 to 18 meters northeast of coastal Site 4695. An old road that is shown on the 1881 Olowalu Sugar Plantation map is presumed to mark the course of the road, of which this site is a remnant (Map 4). The Old Government road followed a traditional trail that encircled the island in precontact times. Much of the Old Government Road was abandoned in the early 1950s when Honoapi'ilani Highway was constructed. However, the existing Pioneer Mill cane haul road continues to follow along much of the former road bed.

Site 50-50-08-4697

This is a subsurface site, which lies in the abandoned sugar cane field to the west of the Site 4693 burial ground. Site 4697 was encountered during the excavation of the 30-meter long BT 23. Portions of a dog skeleton were located near the 15.5 meter point of the long trench (Figure 20; Photos 8 and 9). Subsequently, charcoal flecking and a few pieces of marine shell were noted in the profile of BT 23. Two 1-meter square test units were utilized, in order to evaluate subsurface conditions near the 17-meter mark in BT 23.

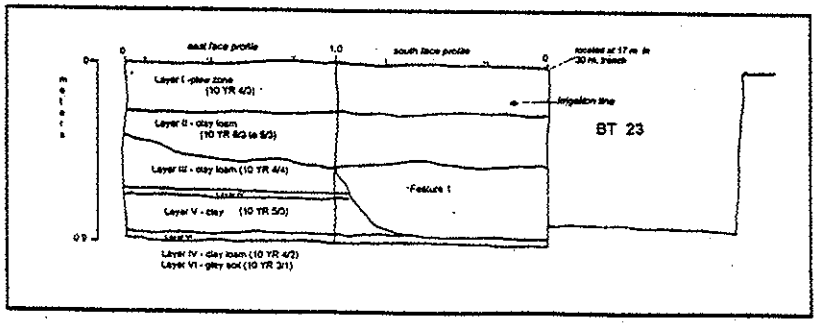


Figure 15 – East and south face profiles of Test Unit 1—Site 4697.

Test Unit 1

This unit was excavated on the eastern side of BT 23. It was placed c. 1.5 meters *mauka* or north of the area where the dog skeletal remains were previously encountered. This first test unit contained 6 soil layers (Figure 15).

Layer I was up to 25 cm. thick and was composed of the common brown (10 YR 4/3) sandy loam found elsewhere in much of the *makai* portion of the abandoned sugar cane field. This agriculturally disturbed layer contained 3.0 g. of scattered marine shell fish remains, 5.3 g. of echinoderm body parts, 2 pieces of white ceramic, and several sections of black plastic irrigation tubing. The soil boundary with the underlying stratum was somewhat indistinct.

Layer II was pale brown (10 YR 6/3) to brown (10 YR 5/3) and appeared to have been partially impacted by the overlying plow zone. This clay loam stratum was up to 16 cm. thick and contained 14.7 g. of scattered marine shell fish remains, 36.0 g. of urchin body parts, a dog tooth, scattered fish bone (0.4 g.) and a broken mammal tooth (non-human). In addition, 2 white ceramic pieces, an unidentified piece of plastic, a Maui "diamond" quartz, and a concentration of charcoal (10.7 g.) were encountered.[21] A plow scar extended through the bulk of Layer II to a maximum depth of 39 cmbs.

Layer III was encountered between 39 and 41 cmbs. This dark yellowish brown (10 YR 4/4) clay loam was about 10 cm. thick. It contained low amounts of material culture remains, including 5.8 g. of marine shell fish remains and 14.6 g. of urchin body parts. In addition, this damp clay loam contained a subsurface feature—Feature 1.1.

Feature 1.1

This feature made itself apparent at c. 48 cmbs. near the southern face of TU 1. It runs up to 80 cm. wide in TU 1, and extended into the unexcavated southern profile of the unit. This irregularly shaped pit was a maximum of 33 cm. deep (from c. 48 to 81 cmbs.). Test Unit 2 was excavated adjacent to TU 1, in order to investigate the feature more fully. Material culture remains in this feature were recovered from both test units. These consisted of 70.6 g. of marine shell fish, 48.1 g. of echinoderm parts, 0.5 g. of fish bone, 3 unworked coral pieces, and a small Maui "diamond" (0.3 g.).[22] An Asian-motif ceramic shard was located in the top few centimeters of Feature 1.1. Floral remains consisted of 11.9 g. of scattered charcoal. A radiocarbon sample was submitted to Beta Analytic, Inc. This sample returned a date of 120 +/- 70 RCYBP. The calibrated results put the date at between AD 1650 and 1950. The intercepts of the radiocarbon age with the calibrated curve fell at AD 1695, AD 1725, AD 1815, and AD 1920 (refer to Appendix A).

While a ceramic shard was found near the top of the feature, there were no other historic materials recovered. The radiocarbon date does not clearly indicate a time frame for Feature 1.1. This irregularly shaped pit truncated the Layer IV deposit.

[21] This charcoal concentration contained one of the ceramic pieces.

[22] Crystals of white quartz—some of gem quality (Macdonald, Abbott and Peterson, 1983, p.488).

Layer IV was present in the northern portion of TU 1. This thin dark grayish brown (10 YR 4/2) clay loam extended from c. 63 to 67 cmbs. No material culture remains were found in this slightly compact stratum. Layer V extended from 67 to 82 cmbs. This layer was a moist, compact brown clay (10 YR 5/3). No material remains were found in this stratum

Layer VI was composed of saturated very dark gray clay (10 YR 3/1). This gley soil appeared to be sterile. Excavation was halted at a maximum depth of 90 cmbs.

Test Unit 2

This unit was excavated adjacent to and *makai* (south) of TU 1, in order to more fully investigate Feature 1.1. Six similar strata were encountered in this 1-meter square unit (Figure 16). Layer I was a maximum of 37 cm. thick. The plow zone (10 YR 4/3) yielded 8.0 g. of scattered marine shell fish, 19.6 g. of urchin body parts, 2.6 g. of pig bone, and unworked basalt flake, 3 pieces of unworked coral, a piece of white ceramic, a green bottle glass fragment, and a piece of iron. In addition, plastic drip-line irrigation tubing was located just to the east of the test unit.

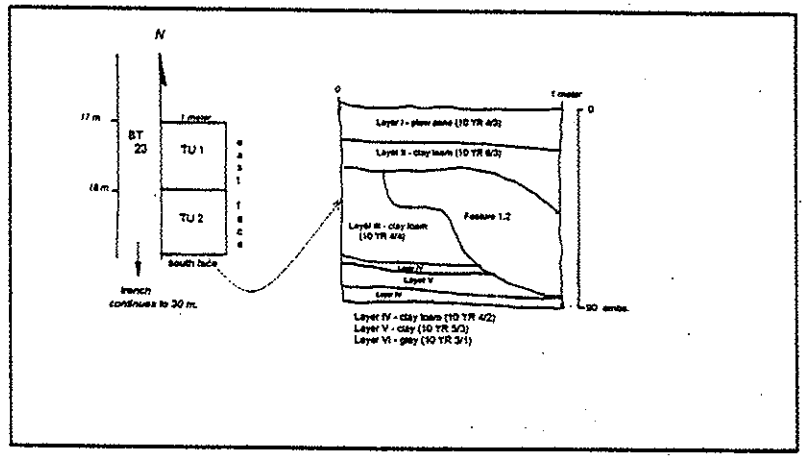


Figure 16 – South face profile of Test Unit 2—Site 4697. Figure on the left shows relationship of Test Units to Backhoe Trench 23.

Layer II was located c. 25 to 27 cmbs. and consisted of the common pale brown (10 YR 6/3) to brown (10 YR 5/3) clay loam. This somewhat compact layer yielded 58.4 g. of marine shell fish remains, 62.1 g. of echinoderm body parts, a dog tooth, 15.4 g. of

scattered charcoal, and a rusted iron spike (92 mm. long). This stratum appeared to be largely intact.

Layer III was encountered at 38 to 40 cmbs. Only a small portion of stratum was present in the eastern half of TU 2. Feature 1.1 extended into much of the dark yellowish brown (10 YR 4/4) clay loam. All material culture remains located in the Feature 1.1 pit were combined with those found in the TU 1 portion of the same feature.

Layer IV was encountered at c. 60 to 69 cmbs. and was a maximum of 6 cm. thick. This thin stratum was located only in the eastern portion of TU 2. No material culture remains were recovered from this dark grayish brown (10 YR 4/2) clay loam.

Layer V was encountered at c. 66 cmbs. and was a maximum of 12 cm. thick. This brown (10 YR 5/3) clay was somewhat compact and moist. This stratum was also sterile. The Layer VI deposit extended from 78 cmbs. to the bottom of TU 2 at 90 cmbs. This saturated gley soil was very dark gray (10 YR 3/1) in color and did not yield and cultural materials.

Discussion

A series of auger probes were made to determine the extent of this subsurface site. Beginning at the test units, the subsurface cultural deposit appeared to extend c. 6 meters northwest, and about 3 to 4 meters west, giving an area extent of c. 30 to 40 square meters to the west of the burial preserve. It may also extend to the east, but that area is within the burial preservation reserve itself, and was not further tested. No plan view drawing of the estimated area of the site was made.

Excavation at Site 4697 yielded a radiocarbon date that could fall into the late precontact or early post-contact period, although it was far from being definitive. The post-contact material items included bottle glass and ceramic sherds. There were 2 houselot *kuleana* awards in the general vicinity (LCA 8817:1 and LCA 5952:1). Site 4697 could be a remnant of activity associated with one of these. The radiocarbon calibrated date bracket was AD 1695 to 1950—with 4 intercepts, falling at AD 1695, AD 1725, AD 1815 and AD 1920.

Site 50-50-08-4698

This last site was located during backhoe testing near the ruins of the former Olowalu Mill (Site 1602). Backhoe Trench 59 was excavated just to the east of the landscaped area of the former manager's home. This backhoe trench lies within c. 25 m. of the existing shoreline. Charcoal flecking and scattered marine shellfish remains were noted in the profile and subsequently, a 1-meter square test unit was excavated to further investigate subsurface conditions.

Test Unit 1

This subsurface test was located in the western fact of BT 59. A total of 6 layers, including a cultural deposit (Layer III) were located (Figure 17). The uppermost layer consisted of dark brown (10 YR 3/3) clay loam that was humus rich. Angular and waterworn basalt cobbles were common in this loose, somewhat dry stratum. Material culture remains included modern refuse that was not collected. In addition, 12.8 g. of scattered marine shell fish remains, 5.9 g. of pencil urchin spine, a trace of crab shell, 14.9 g. of pig bone, 142.8 g. of cut beef bone, 6.5 g. of *kukui* nut shell, 3 pieces of unworked coral and a trace of charcoal. Layer I was about 30 cm. thick.

Layer II was up to 19 cm. thick and was composed of brown (10 YR 5/3) silty loam. This loose stratum contained low amounts (less than 5% by volume) of basalt cobbles and pebbles. A low amount of material culture remains were recovered from this

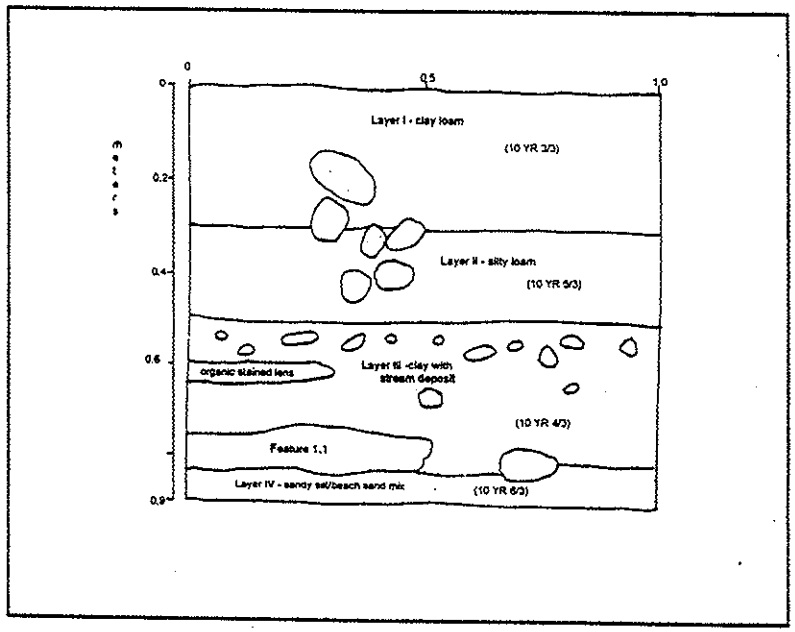


Figure 17 – West face profile of Test Unit 1—Site 4698.

layer. Portable remains included 2.2 g. of scattered marine shell fish, 4.4 g. of pencil urchin spine, a mammal tooth, and a trace of charcoal.

Layer III had a higher clay content than the overlying stratum. This lower layer was brown (10 YR 4/5) in color and contained an *in situ* cultural deposit. This moist, compact stratum contained stream gravel and sand deposits, material culture remains, and a subsurface feature. Portable remains in the c. 32 cm. thick layer included 61.2 g. of marine shell fish remains, 36.3 g. of echinoderm body parts, 17.1 g. of charcoal, 2 unworked basalt flakes, 2 flakes of volcanic glass (2.9 g.), and 5 pieces of unworked coral. The 2 volcanic glass flakes are of good quality. A feature was located in Level 2 (59 to 69 cmbs.) and extended to the bottom of Layer III.

Feature 1.1 is interpreted as a hearth remnant, and yielded 26.1 g. of charcoal. This feature was a maximum of 61 cm. wide and its lower section extended into the unexcavated western profile of the unit. The eastern part of the feature was truncated by the BT 59 excavation. A suitable charcoal sample was collected and sent to Beta Analytic, Inc. This sample returned a radiocarbon age of 230 +/- 70 RCYBP. This sample yielded a date range (at 2 sigma, 95% probability) of AD 1495 to 1950. The intercept data indicated that the intercept of the radiocarbon age and the calibration curve fell at AD 1665. This date is comfortably in precontact times. The latter date of 1950 is attributed to atmospheric testing. Given the lack of post-contact material culture remains, this site is interpreted as precontact.

The lower portions of Layer III contained less cultural material and Level 4 (79 to 83 cmbs.) was sterile. The soil boundary with the bottom-most stratum in TU 1 was abrupt and clean.

Layer IV consisted of dark yellowish brown (10 YR 4/4) sandy silt mixed with pale brown (10 YR 6/3) sand banding. This moist stratum extended to the bottom of TU 1 at 90 cmbs. Excavation was halted just above the ground water table.

Discussion

Excavation next to BT 59 yielded a precontact cultural deposit. It appears that the site might extend under the landscaped portion of the nearby Manager's house, but that area was not available for subsurface testing. Backhoe Trench 60 which lies 20 meters to the east did not contain any precontact cultural materials, indicating that the site did not extend beyond that point to the east. A series of auger probes, revealed that the site extended about 8 meters north of the test unit location, c. 3 meters to the south. The area to the east has been recently filled in. With this information, we estimate that the extent of Site 4698 to c. 35 to 50 square meters. No plan drawing was made of this site. Given its proximity to the ocean, it was probably a permanent habitation site, if one follows the traditional settlement pattern coastal zone model.

This subsurface site lies between the ruins of the old Mill and the Manager's house, both of which are not going to be disturbed. This area will be part of a planned Olowalu Mill Complex interpretative center.

Site 50-50-08-1602

The ruins of the old Olowalu Sugar Mill lie on the *makai* side of Honoapi'ilani Highway, approximately 20 meters from the shore (see Photos 14 through 21). The historic and archaeological material on this site was presented earlier in this report—in the section deals with background information. The reader is referred to that section. In addition, historic background research is being pursued by Ms. Gail Ainsworth, who has been contracted by Olowalu Elua, LLC to collect information which can be used in an interpretative exhibit. Additional research on our part was viewed as a duplication of effort. Pertinent historical information on the Mill and surrounding plantation

community will be included in the companion report dealing with the Olowalu *Mauka* (Phase 2) portion of this inventory survey. The reader is referred to that report for additional information on the Olowalu Mill complex.

A rough sketch map was included in the short data form completed during the 1974 statewide inventory of historic places. A map of the ruins, as they are today, was prepared by Mark Donham for the present inventory survey (Figure 18). The buildings associated with the Mill include the manager's house, which was probably built around 1910. There are 3 other dwellings that were the residences of other managerial personnel connected with the plantation. These lie *mauka* between the remnants of the mill foundation and the highway. On the ocean side of the mill is the remnant of a boat-landing ramp and pier, which was used to load sugar onto cargo ships that would transfer it to market (Photo 21). A longer, more substantial breakwater or jetty, located on the Lahaina side of the ramp, extends c. 50 meters into the ocean, perpendicular to the shoreline. This creates a relatively calm basin leading up to the boat ramp.

The foundations of the mill are overgrown with alien vegetation. A large opiuma tree is growing out of an area between two brick walls at the *makai* end of a large cement slab (Photos 19 and 20). This may have been a boiler area, where sorghum was reduced to sugar in the refinement process. Other areas are completely covered with *kiawe* and opiuma trees and debris (Photo 18). The stable area is located on the east side of the site. Mules were kept for working in the fields, and hauling cars along the railroad tracks around the turn of the century.

The historic photo on page 50 (Figure 18a) shows the Mill in the latter part of the 19th century. A boardwalk appears to be extending onto the jetty. Directly behind is the smokestack that would have extended from the brick structures that made up the boiling room at the *makai* end of the large concrete slab. We were not able to find anyone who had knowledge about the specific designation of the various parts of the remaining ruins. It is hoped that this information with be forthcoming with Ms. Bartholomew's continuing research.

The Olowalu Sugar Company mill between 1870 and 1890.

(Bartholomew and Bailey, 1994, p. 45)

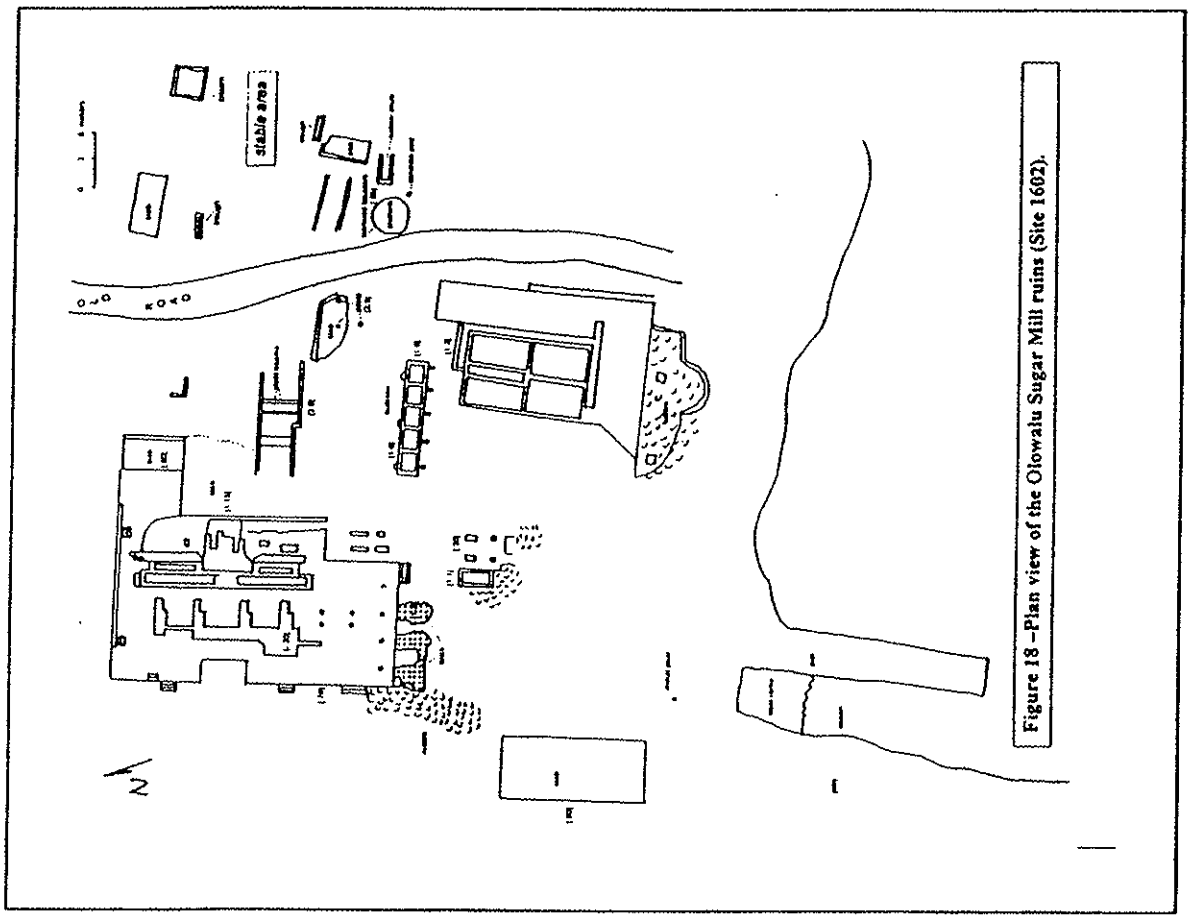


Figure 18 – Plan view of the Olowalu Sugar Mill ruins (Site 1602).

Backhoe Trenches

A total of 97 backhoe trenches were excavated on the *makai* portion of the Olowalu project area (Figure 3). Trenches were excavated past the ground water table, except in locations where subsurface conditions proved to bee too unstable or where human skeletal remains were encountered (BT 8 and BT 13). The majority of the backhoe trenches were c. 5 meters in length by c. 0.9 meters (the width of the backhoe bucket) in width. In general, depths ranged from 1 to 3.5 meters. The bulk of the trenches were closely inspected. It was not possible, however, to inspect several of the trench profiles due to unstable subsurface stream deposits. Refer to Table 8 for subsurface results for each of the backhoe trenches.

The scope of our sampling methodology was broadened after the Site 4693 burial ground was located to the northeast of Hekili Point. The area near the burial ground was more extensively sampled, in order to obtain a clearer understanding of the extent of the burials, and the subsurface marine sand deposit and apparent marsh deposit.

After the initial discovery of human remains in the sandy area, it was deemed prudent to systematically test areas where sand was either observed on the surface, or suspected to occur in subsurface deposits. It remains possible that additional burials might be present in these sandy areas along the coast of the study property. No additional human burials were located elsewhere in our inventory survey. The backhoe trenches did, however, provide valuable information on subsurface cultural deposits (Sites 4697 and 4698), and on the geology of the project area.

Subsurface results indicate that the former bed of the Olowalu Stream entered the ocean near Hekili Point on the eastern portion of the project area.[23] An extensive and course sand deposit was located to the east of the former stream bed. This sand was determined to be a marine deposit and was found to extend across much of the eastern project area and onto the portions of the *mauka* study area.[24] The marine sand deposit was exposed at the surface in the vicinity of the Site 4693 burial ground and was capped by up to 1 meter of alluvium elsewhere on the eastern portion of the study area (refer to Figure 3).

Further testing to the west of Site 4693 yielded thinner marine sand deposits and thicker gley soil deposits. In addition, stream deposits were noted in several trenches (BT 16, 17, 20) in this area as well. The presence of stream deposits in several test trenches indicates that the old Olowalu stream bed crossed this part of the project area before it was channelized to its present location, sometime around the turn of the century.

Saturated gley soil deposits were located in numbers of backhoe trenches. These gley soil deposits were high in organic content and are interpreted as former marsh

[23] These findings are corroborated by a 1906 survey map of Olowalu Sugar Plantation, drawn by A. C. Alexander. This map shows the former stream bed and the new channelized stream.
[24] Human remains were found associated with this marine deposit (Site 4693). This marine sand was probably deposited within the last 2000 years.

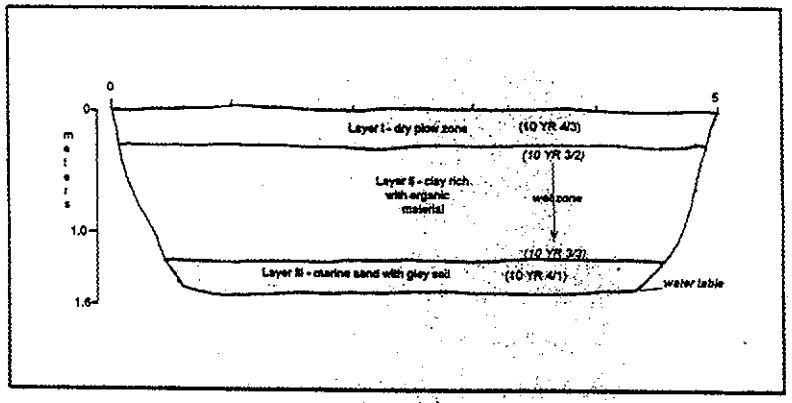


Figure 19 – West face profile of Backhoe Trench 21.

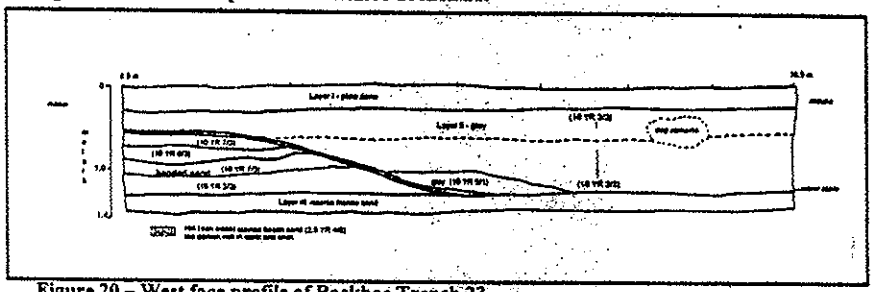


Figure 20 – West face profile of Backhoe Trench 23.

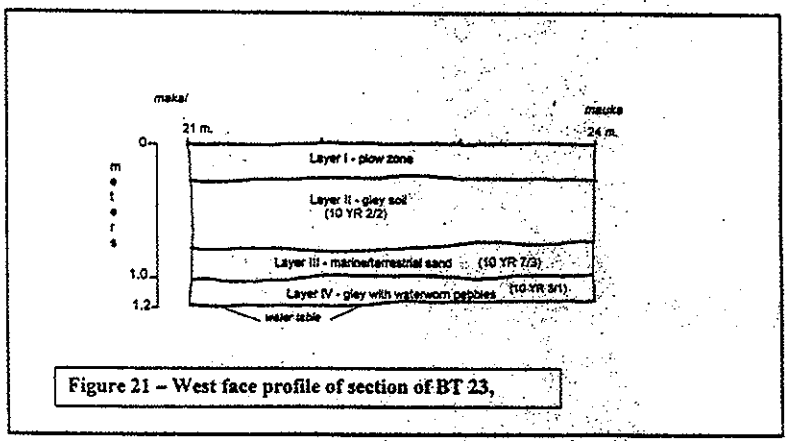


Figure 21 – West face profile of section of BT 23,

deposits. It appears plausible that a coastal berm of the previously noted marine sand partially dammed the Olowalu stream flow sometime in the past 2000 to 5000 years, when the sea level was higher than at the present time. Direct evidence of such a berm and the resultant marsh deposits that would have formed behind it, was exposed in BT 23.[23] We did not attempt to date the marsh deposits, as this was beyond the scope of our inventory survey.

Backhoe Trench 23 was 30 meters long and was excavated in an effort to locate the extent of the Site 4693 burial ground, and determine the edge of a possible marsh and a marine sand berm, if possible. Trench orientation was essentially N-S. Trench stratigraphy included the common brown (10 YR 4/3) plow zone which was underlain by alluvial deposits and what is interpreted as marsh deposits. Examination of the trench profile revealed a marine sand deposit that appears to have built up in the area where the former mouth of Olowalu Stream was likely located. This deposit of very pale brown (10 YR 8/3) marine sand was impacted by the plow zone in the southern most portion of BT 23. A sand berm which slopes down into alluvium and the underlying very dark gray (10 YR 3/1) gley soil deposit, was visible in the 7 to 10 meter section of the 30 meter long trench. The rest of BT 23 running *mauka* or north of this sand berm area did not contain any marine sand deposits. Rather, this subsurface test yielded gley soil and stream deposits which indicate a coastal lagoon marsh environmental setting.

Stream deposits became more common in the stratigraphy west of Hekili Point, and continued to the western end of the project area. In the coastal area particularly, mixing of beach sand with terrestrial sand was noted in several trenches excavated between Hekili Point and the old Olowalu Mill. Trenches within this zone of mixing included BTs 41, 43, 54 and 58). Stream deposits were present in nearly all of the trenches west of the former manager's house (BTs 62 through 97). However, 3 trenches in the vicinity of the existing shoreline in that area yielded more recent beach deposits (BTs 63, 66 and 67). Backhoe Trench 83 contained what appeared to be a storm wave beach sand deposit (Figure 23). All other trenches in this area yielded stream deposits of various grades from fine terrestrial sands through waterworn gravels, pebbles, cobbles and small boulders. Backhoe Trench 71 provides a representative profile for the bulk of the trenches with stream deposits.

Briefly touching on the results from other backhoe testing, we note that BT 21 (Figure 19) shows shallow, low turbidity deposit relationship going from stream deposit to marine and terrestrial sand mixing with clay and gley soil. In BT 32 and 33, large chunks of coral were found mixed with soil, which may indicate storm surge deposits as

[23] These types of marsh deposits can be seen along Honoapi'ilani Highway between Ukumehame and Olowalu today. The combination of being at sea level and behind a beach sand berm which blocks drainage, causes water to pool in low areas after heavy rains. As the stagnant water evaporates, salt crystals form on the surface. Such conditions would not have been conducive to the cultivation of taro. However, according to Dr. Ross Cordy (SHPD Doc. No: 0001RC11, January 11, 2000), "...stream fed 'coastal lagoonal marsh' lands could be used for fishponds and could have paleoenvironmental information on Hawaiian history (e.g., pollen record showing clearing of trees as signs of human settlement and charcoal dating that period). It is clear that these marsh soils must be studied further in the mitigation phase of this project—with trenching/coring, pollen studies, and dating."

appeared to be the case in BT 83. Backhoe Trench 59 (Figure 22) revealed a thin cultural layer, while BT 60 uncovered 19th century historic debris. Backhoe Trench 75 indicated a heavy water-flow area, by the presence of a high density of waterworn pebbles and cobbles. Backhoe Trench 97 had a 50%-50% marine and terrestrial sand deposit at the very bottom of the trench, which may indicate another possible tributary section, where during high tide, the marine-terrestrial sand mixing occurred.

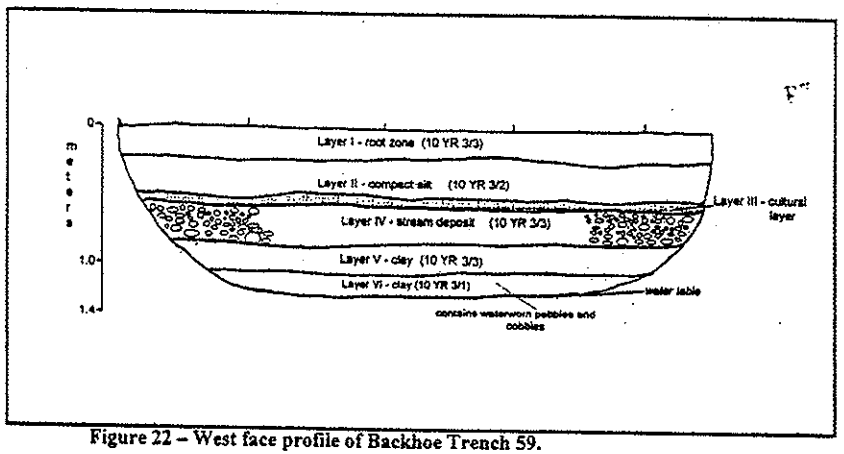


Figure 22 – West face profile of Backhoe Trench 59.

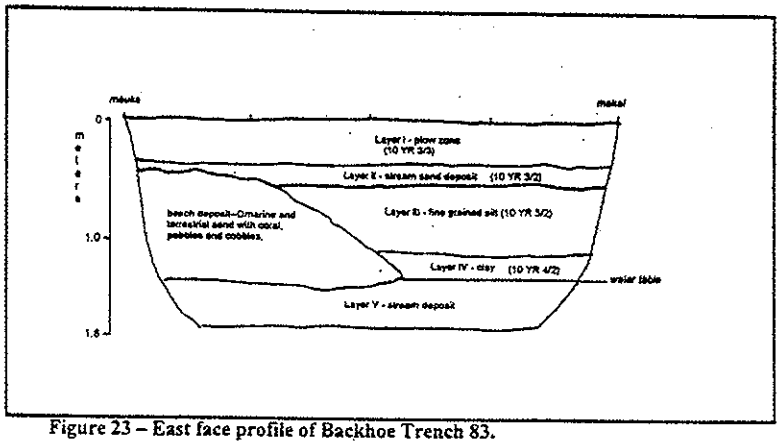


Figure 23 – East face profile of Backhoe Trench 83.

In general all of the backhoe tests were dug to the water table, which occurred as shallow as 70 cmbs. in some areas. The average depth at which the water table occurred was between 1 and 2 meters, however. Marine sand was distinguished from terrestrial sand from the nature of its color and content. Marine sand was typically lighter in color, and mixed with bits of waterworn shell, coral and pebbles. Terrestrial sand was generally darker and made up of basalt and olivine crystals. The action of tidal fluctuations, bringing sea water laden with marine sand into an area of sand deposited by stream erosion, would cause the kind of mixing that was observed in many of the backhoe tests.

Only 4 backhoe trenches located cultural materials. Backhoe Trenches 8 and 13 uncovered human remains, while BTs 23 (Figures 20 and 21) and 59 (Figure 22) indicated cultural layers. The only radiocarbon dates from the inventory level subsurface survey, were obtained in test units which examined the cultural layers found in BTs 23 and 59.

Radiometric Dates

There were 2 radiometric dates obtained during our inventory survey on the *makai* portion of the Olowalu project area. One was from subsurface Feature 1.1 in Site 4697. It yielded a conventional radiocarbon age of 120 +/- 70 RCYBP. The calibrated result at 2 sigma (95% probability) is AD 1650 to 1950. A series of intercepts of the radiocarbon age with the calibration curve fell at AD 1695, AD 1725, AD 1815, and AD 1920. Cultural material in this feature was not definitive—there were no indigenous artifacts found. However, there was marine shell fish midden present. A few sherds of ceramic ware were found on the surface of the feature. These factors appear to suggest an early post-contact date. There were several LCA parcels located to the west, which indicate that there were *kuleana* homesteads in this coastal area well into post-contact times.

The second radiometric date was obtained from a sample recovered from a subsurface feature at Site 4698, located in the vicinity of the old sugar mill. A subsurface cultural deposit was exposed in BT 59 in this area. When this deposit was explored further in a 1 x 1 meter square test unit, a concentration of carbon was collected and sent to Beta Analytic, Inc. for analysis. This sample returned a conventional radiocarbon age of 230 +/- 70 RCYBP. The calibrated results (2 sigma, 95% probability) provided a date range from AD 1495 to 1950. The intercept of the radiocarbon age and calibration curve fell at AD 1665. There were no historic materials found in the cultural layer, which tends to corroborate a late precontact time frame.

SUMMARY AND CONCLUSIONS

A total of 6 previously unrecorded archaeological sites were identified during this inventory level survey of the *makai* c. 73 acre study area. In addition, the Olowalu Mill ruins (Site 50-50-08-1602) were mapped. The previously unidentified sites were assigned SIHP numbers 50-50-08-4693 through 4698.

Site 4694 appears to be the remnants of a habitation site with what remains of a rock wall around it. Sites 4695 and 4696 lie near the western boundary of the *makai* project area. Site 4695 seems to represent a coastal retaining wall of post-contact construction. Site 4696 consists of a segment of the Old Government Road that was constructed in 19th century and probably followed a traditional coastal trail. Both Sites 4697 and 4698 consist of fairly localized subsurface occupation deposits. Site 4697 probably represents post-contact habitation activity, possibly associated with one of the houselots present in the area. The last site (Site 4698) is interpreted as a temporary habitation area.

Precontact to 1850s

The 2 precontact sites (Sites 4694 and 4698) are consistent with the expected settlement patterns previously discussed in this report—that is, permanent coastal habitation. Expected features such as walled enclosures, subsurface cultural deposits, and associated burials might be expected. While it was not possible to directly date the Site 4693 burial ground, it is considered to be a precontact burial area probably associated with house sites that go back to c. AD 1500. There was no evidence of habitation sites in the western portion of the property. Those we found are on the eastern side of the property, near the mouth of Olowalu Stream in earlier times. Activities associated with the sugar plantation have directly impacted all of the precontact cultural resources located in the inventory survey, and very well may have eliminated others.

Marine sand deposits around the former mouth of the stream on the eastern portion of the study parcel are older than the stream deposited materials that dominate the western portion of the property. The most significant cultural finds were located within these marine sand deposits. While gley soils were present in a few of the backhoe trenches, we were not able to ascertain if they were associated with taro pondfields or fishponds. However, because none of the LCAs stipulated taro lands or fish ponds in the *makai* study area—only houselots—it seems more likely that the soils are associated with seasonal lagoonal features. However, these soils may contain important paleoenvironmental information on Hawaiian history in the area, and are considered to be significant finds.

No direct archaeological evidence was found associated with the Mahele period. The Site 4697 post-contact subsurface cultural deposit could possibly be associated with activity during time period, given the range of radiocarbon dates, however.

Plantation Era

The Olowalu Mill Complex remains are remnants from the Plantation era, as are the series of cane fields and associated roads, and the water delivery system. As stated before, the activity of the Plantation era has heavily impacted and/or obliterated remains of precontact and Mahele times.

Site Significance Evaluations

All of the above sites, including the Olowalu Mill (Site 1602) are deemed significant under Criterion D of the Federal and State historic preservation guidelines. These sites are considered to be important for the information content they have yielded or are likely to yield. Further, Site 1602 is considered significant under Criterion A as well—associated with events that have made important contributions to the broad patterns of Hawaiian history.

Site 4693 also qualifies for significance under Criterion E for its cultural value. It appears to be a precontact burial ground that has been extensively impacted by sugar cane cultivation. The remains of at least 5 individuals were found, and it is very probable that additional burials are present in this area of marine sand deposits.

Site 4694 consists of a remnant of a relatively large rock structure. A portion of the site has been impacted by sugar cane cultivation. The overall integrity of the site is altered, although the remaining portion of it is in generally fair condition. It lies in the Beach Reserve area.

Both Sites 4695 and 4696 lie in the Beach Reserve of the western portion of the project area. Site 4695 appears to have been built in post-contact times, and is tentatively identified as a shoreline erosion wall that may have been associated with Site 4696. The site is in generally fair condition. Site 4696 is in poor condition and is part of the Old Government Road that is shown on an 1881 map (Map 4). This Government road was probably built in the mid-1800s, and followed the route of the traditional trail that encircled the island of Maui.

Site 4697 is interpreted as a post-contact habitation area. Site 4698 represents a late-precontact habitation area.

It is also noted that the gleyed soils located near the former mouth of the Olowalu Stream are considered to be important under Criterion "D"—for their information content.

Mitigation Recommendations

We are recommending that 5 sites be preserved—Site 4693 (Burial ground), 4694 (coastal habitation site), and 1602 (Olowalu Mill), habitation sites 4697 and 4698. The gleyed soils are recommended to undergo archaeological data recovery. Two sites—Sites 4695 and 4696—are considered to be "no longer significant" and do not require further work.

Site 4693 is the most significant site in the study area for its traditional cultural value. Permanent preservation is the recommended mitigation for this site.

Site 4694 lies on Hekili Point to the southwest of Site 4693. This structure is within the Beach Reserve. Preservation is the recommended mitigation for this cultural resource.

Site 4697 seems to represent an early post-contact habitation area. Since its location near the Burial Preserve will not allow future development, preservation will take place.

Site 4698 is interpreted as a precontact temporary habitation area. This site also lies in an area that is not planned for development. The owners have agreed to place it into passive preservation.

The area of gleyed soils should undergo data recovery at some point in the future, in order to gather information relating to climate and ecology, and a chronology of human settlement in Olowalu.

The Olowalu Mill complex (Site 1602) is recommended for interpretive preservation.

The discovery of the Site 4693 burial ground has heightened the cultural sensitivity of the *makai* portion of the development project. In an effort of alleviate concerns within the Hawaiian community, archaeological monitoring appears to the appropriate mitigation during any ground altering activities between Hekili Point and the former manager's home. Sand deposits are present, and while no burials were found in

this area during our inventory level testing, the possibility exists that human remains may be located in the area near the Beach Reserve boundary.

No commercial or residential development of any kind is recommended for the area that contains the Site 4693 burial ground and the marine sand deposits on the eastern portion of the *makai* project area. Passive preservation, such as a park is deemed the most appropriate mitigation for this portion of the project area.

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Table 2

Inventory Level Significance Evaluations

SIHP Site # 50-50-08	Significance Criterion	Components /Features	Status[26]	Condition[27]	Age[28]	Proposed Mitigation
4693	D and E	Burials (5 minimum)	A	G-P	I	Preservation
4694	D	Structure and deposit	A	F	I	Preservation (in Beach Reserve)
4695	D	Wall / terrace	A	F-P	H	No longer significant[29] (in Beach Reserve) No further work
4696	D	Old Gov't. Road	A	P	H	No longer significant (in Beach Reserve) No further work
4697	D	Cultural deposit	A	F-P	H	Preservation
4698	D	Cultural deposit	A	F	I	Preservation
1602	A, D	Olowalu Mill complex	A	F	H	Interpretive preservation
Gleyed soils	D	Subsurface			I	Data recovery

[26] A=altered; UA=unaltered
[27] G=good; F=fair; P=poor
[28] I=indigenous; H=historic
[29] No longer significant because adequate information has been collected.

TABLE 3

Summary of Subsurface Results at Site 4694 – Test Unit 1

LAYER/LEVEL	I/1	I/2	II	III/1	III/2	III/3	IV/1
GASTROPODA							
Cellana sp.			0.5				
Conus sp.					2.2		
Cypraea sp.			0.6		0.7		
Nerita picea	0.1		1.6	2.4	0.5		
Planaxis				0.7	0.2	0.2	
Operculum			0.5				
Strombus sp.			5.5	2.3			
Vermetidae				0.5			
Unidentified			2.8		1.7	0.5	
TOTALS							
BIVALVIA							
Isognomon sp.							
Brachidontes sp.				0.1		0.1	
Unidentified			0.4		0.5	0.6	0.2
TOTALS							
ECHINOIDEA							
Pencil urchin							
Sea urchin			0.3	0.5	1.0		
TOTALS							
CRUSTACEA							
Crab			0.7	1.3	0.1		0.1
BONE							
Dog tooth							
Fish							
Unidentified				2.4			
TOTALS							
FLORAL							
Charcoal	7.9	5.2	2.0				
Kukui nut				3.7			
Volcanic Glass debitage		(1) 0.1	(3) 3.6				
UNWORKED BASALT FLAKES (pieces)			(2) 4.3				
UNWORKED CORAL (pieces)	(1) 0.1		(3) 4.9				
WATERWORN PEBBLES (pieces)	(1) 122.0		(1) 71.3				
Maui "Diamond"			(1) 0.1				

Weight in grams

TABLE 4

Summary of Subsurface Results at Site 4694 – Test Unit 2

LAYER/LEVEL	I/1	I/2	II/1	III/1	III/2
GASTROPODA					
Cellana sp.				0.6	1.1
Conus sp.					0.7
Cypraea sp.					2.3
Granula sandwicensis		0.1			
Nerita picea	0.5		0.5	0.7	1.7
Nerita sandwichensis					
Operculum	0.1		0.1		
Unidentified					
TOTALS					
BIVALVIA					
Isognomon sp.					
Brachidontes					0.1
Unidentified	2.7		2.7	0.2	0.2
TOTALS					
ECHINOIDEA					
Pencil urchin					
Sea urchin				0.4	0.2
TOTALS					
CRUSTACEA					
Crab					0.4
BONE					
Dog tooth					
Fish					
TOTALS					
FLORAL					
Charcoal	3.2	12.0	2.7		
Kukui nut shell				2.8	0.9
UNWORKED BASALT FLAKES (pieces)					
UNWORKED CORAL (pieces)	(1) 0.2		(1) 0.2		
WATERWORN PEBBLES (pieces)					
Historic artifacts					
Lead pellet		(1) 1.0			

Weight in grams

TABLE 5

Summary of Subsurface Results at Site 4694—Test Unit 3

LAYER/LEVEL	I/1	II/1	II/2	III/1	III/2	III/3	
GASTROPODA							
Cellana sp.				0.1			
Conus sp.				22.0			
Cypraea sp.	3.9					1.7	
Granula sandwicensis		30.8					
Nerita picea		0.1	0.5	1.6	3.2	0.7	
Nerita sandwichensis							
Operculum		0.4		1.8		1.1	
Planaxis				0.2			
Strombus sp.					1.5	0.5	
Turbo sandwicensis				1.5	0.8		
Unidentified		0.8				0.2	
BIVALVIA							
Isognomon sp.						0.5	
Brachidontes				0.1			
Periglypta reticulate			0.2				
Unidentified			0.1			0.2	
ECHINOIDEA							
Pencil urchin							
Sea urchin				0.1			
CRUSTACEA							
Crab			0.3	0.5		0.1	
BONE							
Dog tooth							
Fish							
Unidentified					0.5		
FLORAL							
Charcoal	0.7	1.4	0.2	0.4		0.2	
Kukui nut shell		7.9		8.7	10.8	3.2	
UNWORKED BASALT FLAKES (pieces)	(2) 6.7		(1) 0.1	(2) 0.9			
UNWORKED CORAL (pieces)	(24) 4.3		(1) 0.1	(19) 6.1	(2) 0.9		
WATERWORN PEBBLES (pieces)							
Historic artifacts							
Rusted iron spike				(1) 8.3			

Weight in grams

TABLE 6

Summary of Subsurface Results—Site 4697

	TU 1 Layer I[30]	TU 1 Layer II[31]	TU 1 Layer III[32]	TU 1 & 2 Feature 1.1	TU 2 I/1[33]	TU 2 II/1	TU 2 II/2
GASTROPODA							
Cellana					0.2		
Conus sp.	1.6	8.8		10.2	0.7	2.9	
Cypraea sp.	0.8	2.7		44.6	2.0	18.5	2.5
Nerita picea	0.6	2.9	1.1	2.1	1.7	3.5	0.4
Planaxis		0.3		0.1	0.2	0.9	
Strombus sp.			3.7			0.8	
Turbo sandwicencis							11.5
Vermetidae						2.8	
Unidentified			0.8		3.2	2.3	
TOTALS							
BIVALVIA							
Brachidontes				0.3			
Isognomon sp.							
Tellinidae						3.3	
Unidentified		0.4	0.2			0.1	
TOTALS							
ECHINOIDEA							
Pencil urchin	5.0	33.8	14.3	36.5	14.6	50.7	3.5
Sea urchin	0.3	2.2	0.3	11.8	1.3	2.5	3.3
Unidentified					3.7	0.1	
TOTALS							
CRUSTACEA							
Crab		0.8		0.2			
BONE							
Dog teeth		1.2				0.5	
Dog							
Fish		0.4		0.5			0.4
Pig					2.6		
Unidentified		1.1		0.2		15.4	
TOTALS							
FLORAL							
Charcoal		10.7				13.4	
UNWORKED BASALT FLAKES (pieces)				(1) 122.3	(1) 2.7		
UNWORKED CORAL (pieces)				(4) 20.7	(3) 1.8		
WATERWORN PEBBLES (pieces)		(1) 2.2					
Maui "Diamond"		(1) 0.4		0.3		1.9	
Historic artifacts							
Ceramics	(2)white 12.0	(2)white 2.4		(1)yellow 0.2	(1)white 1.9		
Glass					(1)green		
Plastic		(1) 5.0					
Metal					(1) 8.2	Spike 64.2	

[30] 0 to 25 cmbs.
[31] 25-40 cmbs.
[32] 40 to 50 cmbs.
[33] 0-25 cmbs.

TABLE 7

Summary of Subsurface Results—Site 4698

Test Unit 1 Layer/Level	I/1	I/2	I/3	II	III/1	III/2	III/3
GASTROPODA							
Cellana sp.		3.8	0.2	0.3			
Conus sp.					1.5		
Cypraea sp.	5.1			0.5	7.1	0.4	7.0
Granula sandwicensis	0.2						
Littorina pintado							
Nerita picea	0.4	1.8	0.3	0.3	2.8	0.6	0.4
Nerita sandwichensis							
Planaxis	0.2				2.1	0.1	
Operculum							
Strombus sp.					0.8		
Trochus intextus							
Turbo sandwicensis					27.4		
Unidentified	0.8			1.1	0.6	0.2	1.1
TOTALS							
BIVALVIA							
Isognomon sp.							
Periglypta reticulata						9.1	
unidentified							
TOTALS							
ECHINOIDEA							
Pencil urchin		2.7	3.2	4.4	4.3	16.4	1.5
Sea urchin					5.1	7.3	1.7
TOTALS							
CRUSTACEA							
Crab			0.2				
BONE							
Mammal tooth				0.4			
Fish			1.1				
Bovine		66.4	76.4				
Unidentified mammal bone	14.9						
TOTALS							
FLORAL							
Charcoal		0.1	0.1	0.1	1.2	15.9	
Kukui nut	6.5						
UNWORKED BASALT FLAKES (pieces)					(1) 10.5		(1) 8.4
VOLCANIC GLASS DEBITAGE (pieces)					(2) 2.9		

TABLE 8

Summary of portable remains from inventory survey
Subsurface testing (*Makai* portion)

	BT 15 Site 4693	BT 29	BT 30	BT 31	BT 33	BT 61	BT 63
GASTROPODA							
Cellana sp.							3.6
Conus sp.			8.1				54.2
Cypraea sp.	21.9			2.0			10.0
Granula sandwicensis							
Littorina pintado							
Nerita polita							3.3
Periglypta reticulata	31.6						
Strombus sp.		126.2[34]					
Unidentified	0.7						12.7
TOTALS							
BIVALVIA							
Isognomon sp.							
Unidentified							2.8
TOTALS							
ECHINOIDEA							
Pencil urchin		12.0					
Sea urchin							
TOTALS							
CRUSTACEA							
Crab							
BONE							
Dog							
Fish							
Unidentified mammal					62.4	11.5	2.6
TOTALS							
FLORAL							
Charcoal							
UNWORKED BASALT FLAKES (pieces)							(1) 23.6
UNWORKED CORAL (pieces)							
WATERWORN PEBBLES (pieces)							

[34] This could possibly be a portion of a conch-shell trumpet, although no signs of alteration were visible on this large fragment.

TABLE 9

Indigenous Artifacts Recovered

TEST UNIT	LAYER/LEVEL FEATURE	ARTIFACT NUMBER	ARTIFACTS	L x W x H (mm)	WEIGHT (g)
BT 23	TU 1-Layer II	1	Fish bone pick	29.5 x 30.0 x 2.0	0.1
Site 4696		2	Shark tooth	16.5 x 16.5 x 4.0	0.5
		3	Basalt fishing sinker	38.0 x 24.5 x 13.5	18.3
	TU 2-HF 2 Level 1	4	Worked basalt flake	70.5 x 35.0 x 8.5	30.1
		5	Coral abrader	37.0 x 14.5 x 12.0	3.0
	TU 2 -HF 2 Level 3	6	Coral abrader	53.0 x 41.0 x 14.5	28.5
Site 4694	TU 1-Layer II	7	*Puka* shell ornament	17.0 x 14.5 x 7.0	1.0
BT 59 Site 4697	TU 1-Layer III, Level 3	8	Fish bone awl	28.5 x 4.0 x 4.0	0.2

TABLE 10

Summary of Backhoe Trenches

BT #	Dimensions	Orientation [33]	Stratigraphy	cmbs [34]	Remarks
1	5 m. x 0.9 m. 1.0 m. deep	345	Layer I-reddish cinder pavement Layer II-medium brown mottled sandy loam Layer III-black sand	0-20 20-90 90-100	Water table at 1.0 m. Layer I is recently deposited fill in the cleared area.
2	5.0 m. x 0.9 m. 1.0 m. deep	345	Same as for BT 1		
3	5.5 m. x 0.9 m. 1.2 m. deep	340	Layer I-med. brown sandy loam Layer II-black sand	0-40 40-120	Water table at 1.2 m. Surface 10 to 15 cm. recently disturbed. Waterworn material increases with depth in Layer II.
4	4.5 m. x 0.9 m. 1.1 m. deep	344	Layer I-med. brown sandy loam Layer II med. brown clay loam	0-40 40-100	Water table at 1.0 m. Surface to 20 recently disturbed.
5	5.0 m. x 0.9 m. 1.2 m. deep	335	Layer I-medium brown sandy loam Layer II-black sand	0-60 60-120	Water table at .85 m.
6	4.5 m. x 0.9 m. 1.1 m. deep	20	Layer I-plow zone Layer II-compact med. dark brown loam	0-30 30-110	Water table at 1.1 m.
7	5.0 m. x 0.9 m. 1.0 m. deep	345	Layer I-plow zone Layer II-compact med. brown loam Layer III-stream deposit	0-20 20-60 60-100	Water table at 1.0 m.
8	5.0 m. x 0.9 0.9 m. deep	346	Refer to Figures 4 and 5.	0-90	Burial 2 encountered at c. 0.9 mbs. Pit extended below the water table.
9	4.0 m. x 0.9 m. 1.0 m. deep	20	Layer I-med. brown loam/root zone Layer II-medium brown loam Layer III-pebbly, cobbly dk. brown loam	0-40 40-60 60-100	Water table at 1.0 m.
10	4.6 m. x 0.9 m. .95 m. deep	330	Sandy alluvial soil. Surface zone 5 YR 2.5/2 grading to 5 YR 2.5/1 toward bottom.	0-30 30-100	Soil becomes wetter with depth to water table at 0.95 m.
11	5.4 m. x 0.9 m. 1.0 m. deep	324	Layer I-cane road push (5 YR 8/1) Layer II – waterworn cobbles and pebbles (5 YR 5/1) Layer III- sandy clay (5 YR 3/2) Layer IV-undulating beach sand	0-40 40-60 60-95 95-100	Partially in cane road. Water table at 1.0 m.
12	4.8 m. x 0.9 m. 1.2 m. deep	310	Layer I-agricultural push (10YR3/2) Layer II-banded marine sand deposit (10 YR 8/3 to 4/1)	0-15 15-110	Marine sand deposit with shell, coral and stream sand integrated toward water table at 1.1 m.
13	4.0 m. x 0.9 m. 0.5 m. deep	312	Agricultural push mixed with marine sand (10 YR 4/3)	0-35	Located in cane field. Human remains found @ 0.35 m. at *mauka* end of trench.
14	4.5 m. x 0.9 m. 1.0 m. deep	315	Layer I-ag. zone (10 YR 4/3) Layer II-banded marine sand	0-30 30-100	Water table at 1.0 m. 2cm. shell band at 55 cmbs.
15	5.5 m. x 0.9 m. 1.2 m. deep	350	Layer I-ag. zone (10 YR 4/3) Layer II-thin shell band Layer III-banded marine sand (10 YR 4/1)	0-30 50-60 60-120	Water table at 1.1 m.
16	5.0 m. x 0.9 m. 1.25 m. deep	14	Layer I- plow zone (10 YR 3/2) Layer II-silt (10 YR 5/3) Layer III-silty clay (10 YR 3/2) Layer IV-sandy silt (10 YR 4/3) Layer V-dark clay (10 YR 3/2) Layer VI-marine and stream sand (10 YR 7/1)	0-50 50-65 65-80 80-95 95-110 110-125	Water table at 1.15 m. Sediment layers are fine grained. Layer I is dry and powdery.

[33] Given as compass bearing in degrees—magnetic.
[34] Centimeters below surface.

17	5.0 m. x 0.9 m 1.3 m. deep	180	Layer I-plow zone (10 YR 3/2) Layer II-stream deposit (10 YR 5/2 to 3/2)	0-50 50-130	Stream deposit with high density of waterworn cobbles and pebbles. Water table at 1.3 m.
18	5.0 m. x 0.9 m. 1.45 m. deep	15	Layer I- ag. zone (10 YR 4/3) Layer II-sandy loam (10 YR 6/3) Layer III-sandy clay loam (10 YR 5/4 Layer IV-marine and stream sand (10 YR 6/3 to 5/3) Layer V-white marine sand (10YR8/2)	0-30 30-60 60-78 78-137 137-145	Water table at 1.4 m. Layer V contains scattered waterworn shell and coral.
19	5.0 m. x 0.9 m. 1.5 m. deep	180	Layer I-plow zone (10 YR 4/3) Layer II-graded sand (10 YR 8/6) Layer III-coarse marine sand (10 YR 8/2)	0-40 40-140 140-150	Water table at 1.4 m.
20	5.5 m. x 0.9 m. 1.6 m. deep	15	Layer I-plow zone (10 YR 4/3) Layer II-banded erosional deposit (10 YR 4/2 to 4/3) Layer III- stream deposit (10 YR 4/2 to 4/3)	0-40 40-90 90-160	Water table at 1.6 m. Layer II has alternating fine-coarse sand and silt deposits. Layer III contains waterworn pebbles near top grading to coarse marine sand at water table.
21	5.0 m. x 0.9 m. 1.5 m. deep	180	Layer I-plow zone (10 YR 4/3) Layer II-clay rich organic soil (10 YR 3/3 to 3/2) Layer III-marine sandy clay (10 YR 4/1)	0-38 38-125 125-150	Layer II is wet and becomes more organic with depth. Water table at 1.5 m.
22	4.5 m. x 0.9 m. 1.3 m. deep		Layer I-plow zone (10 YR 4/3) Layer II-clay rich organic soil (10 YR 3/2 to 3/3)	0-40 40-130	Layer II becomes more organic with depth. Water table at 1.25 m. Marine sand under water table.
23	30.0 m. x 0.9 m. 1.3 m deep	4	Layer I-plow zone Layer II-gley (10 YR 2/2) Layer III-marine/terrestrial sand (10 YR 7/3) Layer IV-gley soil with waterworn pebbles (10 YR 3/1)	0-30 30-80 80-90 90-130	Water table at c. 1.0 m. Refer to Figure . Site 4696--Radiocarbon date from TU 1, Feature 1.1—120 +/- 70 RCYBP
24	4.5 m. x 0.9 m. 1.6 m. deep	290	Layer I-disturbed (10 YR 4/4) Layer II-clayey soil (10 YR 2/2) Layer III-marine and terrestrial sand (10 YR 3/1)	0-30 30-80 80-160	Water table at 1.6 m.
25	4.0 m. x 0.9 m. 1.4 m. deep	280	Layer I-disturbed (10 YR 4/4) Layer II-clayey soil (10 YR 2/2) Layer III-red-stained sand (10 YR 4/6) Layer IV-sand w/clay (10 YR 3/1)	0-30 30-60 60-67 67-140	Water table at 1.4 m.
26	4.5 m. x 0.9 m. 1.1 m. deep	325	Layer I-plow/root zone (10YR3/4) Layer II-ashy clay (10 YR 2/1) Layer III-gleyey soil (10 YR 4/3) Layer IV-compact marine sand (10 YR 5/2) Layer V-silty sand (10 YR 6/1)	0-40 40-43 43-70 70-80 80-110	Water table at 1.1 m.
27	4.0 m. x 0.9 m 1.2 m. deep	325	Layer I-push zone (10 YR 3/4) Layer II-banded sand and silt (10 YR 4/3 to 4/2) Layer III-gley soil (10 YR 4/1)	0-30 30-65 65-120	Layer II represents alternating episodes of deposition. Water table ranged from 65 to 120 cmbs.
28	4.0 m. x 0.9 m. 1.0 m. deep	240	Layer I-push/root zone (10 YR 3/4) Layer II- gley (10 YR 2/1) Layer III- marine sand (10 YR 8/4)	0-20 20-60 60-100	Water table at 1.0 m.
29	5.0 m. x 0.9 m. 1.6 m.	300	Layer I-plow/root zone with sand banding (10 YR 4/4) Layer II-sandy silt (10 YR 4/3) Layer III-partially cemented marine sand (10 YR 6/2) Layer IV-sandy gley soil (10 YR 3/1)	0-20/40 20-30/110 30-60/160 60-160	Water table at 1.6 m. Surface not level.
30	4.0 m. x 0.9 m 1.1 m. deep	315	Layer I-plow zone (10 YR 3/2) Layer II-silty gley (10 YR 4/2) Layer III-gley (10 YR 3/0)	0-30 50-80 80-110	A few human bone fragments found in Layer I. Water table at 1.1 m.
31	18.0 m. x 0.9 m. 1.2 m. deep	49	Layer I-plow zone (10 YR 3/2) Layer II-sandy silt (10 YR 4/2) Layer III-marine sand (10 YR 7/4 to 6/4)	0-50 50-100 100-120	Water table at 1.2 m. Dug at right angle to BT 30 to investigate human remains find.
32	13.0 m. x 0.9 m. 1.3 m. deep	90	Layer I-plow zone (10 YR 3/2) Layer II- sandy silt (10 YR 6/2) Layer III-clay (10 YR 6/2) Layer IV-marine sand (10 YR 7/4 to 6/4)	0-25 25-80 80-90 90-130	Layer IV has some coral and shell concentrations.

33	15.5 m. x 0.9 m. 1.5 m. deep	94	Layer I- plow zone (10 YR 3/2) Layer II-clay (10 YR 3/1) Layer III-silty sand (10 YR 4/4) Layer IV-marine sand (10 YR 6/3 to 3/1)	0-60 60-90 90-120 120-150	West end of trench has only Layer I and Layer II. Water table at 1.5 m. May represent edge of a coastal lagoon.
34	5.0 m. x 0.9 m. 1.4 m. deep	180	Layer I-plow and root zone (10 YR 3/3) Layer II-silty sand (10 YR 6/3) Layer III- marine sand (10 YR 7/3)	0-50 50-70 70-140	Water table at 1.4 m.
35	4.0 m. x 0.9 m. 1.1 m. deep	345	Layer I-plow/root zone (10 YR 3/3) Layer II-dark silt (10 YR 3/2 to 2/2) Layer III-sandy silt (10 YR 3/1)	0-60 60-80 80-110	Water table at 1.1 m.
36	5.0 m. x 0.9 m. 1.1 m. deep	180	Layer I-plow zone (10 YR 3/1) Layer II-marine deposit (10 YR 8/4)	0-30 30-110	Water table at 1.1 m. Layer II very coarse shell and coral-rich sand deposit.
37	4.0 m. x 0.9 m. 2.4 m. deep	5	Layer I-plow zone (10 YR 3/1) Layer II-stream deposit (10 YR 3/2)	0-50 50-240	Water table at 2.4 m. Layer II contains c. 80% waterworn cobbles and 20% silt, with heavier materials at bottom.
38	4.0 m. x 0.9 m. 2.5 m. deep	5	Layer I-plow/root zone (10 YR 3/1) Layer II-stream deposit Layer III-clayey material (10 YR 3/2) Layer IV-marine/terrestrial sand (7.5 YR 5/0)	0-45 45-80 80-170 170-250	Water table at 2.5 m. Layer II contains high density of small cobbles and pebbles. Layer IV is a 50-50 mix of land and marine sand.
39	3.0 m. x 0.9 m. 2.7 m. deep	3	Layer I-plow zone (10 YR 3/1) Layer II-clayey material (10 YR 3/2) Layer III-gley soil (7.5 YR 3/0) Layer IV-marine/terrestrial sand mix (7.5 YR 4/0)	0-50 50-190 190-210 210-270	Water table at 2.7 m. Layer IV is c. 35% marine sand.
40	5.0 m. x 0.9 m. 2.9 m. deep	10	Layer I-plow zone (10 YR 3/1) Layer II-clayey material (10 YR 3/2) Layer III-sand mix (10 YR 4/0)	0-50 50-230 230-290	Water table at 2.9 m.
41	5.0 m. x 0.9 m. 2.9 m. deep		Layer I-plow zone (10 YR 4/1 to 3/1) Layer II-silty clay (10 YR 3/2) Layer III-stream deposit (10 YR 2/1) Layer IV-clayey soil (10 YR 3/1) Layer V-gley soil and marine sand (7.5 YR 6/0 to 5/0) Layer VI- marine/terrestrial sand	0-75 75-120 120-130 130-230 230-260 260-290	Water table at 2.9 m.
42	4.6 m. x 0.9 m. 1.4 m. deep	325	Layer I-root zone (10 YR 2/2) Layer II- clayey soil (10 YR 2/2 to 2/1) Layer III-sandy clay (7.5 YR 3/2 to 3/0)	0-30 30-115 115-140	Water table at 1.4 m. Layer II becomes more compact and contains more organic material with depth. Material is very wet 20 cm. above water table.
43	4.5 m. x 0.9 m. 1.3 m. deep	20	Layer I-root zone (10 YR 2/2) Layer II-fine-grained sand (10 YR 3/2) Layer III-silt/clay sand (10 YR 3/1) Layer IV-marine/terrestrial sand (7.5 YR 3/0 to 2/0)	0-50 50-70 70-100 100-130	Water table at 1.3 m.
44	4.2 m. x 0.9 m. 0.9 m. deep	25	Layer I-root zone (10 YR 2/2) Layer II-sandy silt (10 YR 3/2 to 3/4) Layer III-marine/terrestrial sand (7.5 YR 3/0 to 2/0)	0-40 40-60 60-90	Water table at 0.9 m. Layer II has waterworn cobbles and pebbles at bottom of layer, along with gley material. Layer III is 25% marine and 75% terrestrial sand.
45	4.0 m. x 0.9 m. 1.3 m. deep	25	Layer I-silt with sand (10 YR 4/2) Layer II-terrestrial sand (10 YR 3/1) Layer III-gley soil (10 YR 3/2 to 2/0)	0-90 90-110 110-130	Water table at 1.3 m. Layer II contains olivine crystals—lower portion has waterworn pebbles and cobbles.
46	5.0 m. x 0.9 1.4 m. deep	20	Layer I-root zone (10 YR 2/2) Layer II-compacted clay (10 YR 3/2) Layer III-gley soil (7.5 YR 4/0 to 3/0)	0-40 40-100 100-140	Water table at 1.4 m. Layer II contains abundant pencil urchin spines and shell debris. Also random waterworn pebbles and coral.
47	4.0 m. x 0.9 m. 1.2 m. deep	25	Layer I-root zone (10 YR 2/2) Layer II-terrestrial sand (10 YR 3/2) Layer III-coarse terrestrial sand (10 YR 3/2)	0-50 50-80 80-120	Water table at 1.2 m. Layer II is fine-grained olivine-basalt sand. Layer III is coarse grained, pebbley olivine-basalt sand.
48	4.5 m. x 0.9 m. 2.1 m. deep	18	Layer I-root zone (10 YR 2/2) Layer II-compact clay (10 YR 4/4) Layer III-gley (7.5 YR 4/0 to 3/0) Layer IV-waterworn rocks	0-50 50-75 75-190 190-210	Water table at 1 m.
49	4.5 m. x 0.9 m. 0.7 m. deep	40	Layer I-clay (10 YR 2/2 to 4/4) Layer II-banded sand (10 YR 5/6 and 10 YR 3/1)	0-40 40-70	Water table not reached.
50	5.0 m. x 0.9 m. 2.2 m. deep	18	Layer I-plow zone (10 YR 4/1) Layer II- silty clay (10 YR 4/3) Layer III-sandy clay (10 YR 6/1 to 5/1)	0-30 30-180 180-220	Water table at 2.2 m. Layer II is relatively compact, with more pebbles toward bottom of layer.

51	4.0 m. x 0.9 m 0.95 m. deep	8	Layer I-plowroot zone (10 YR 4/1) Layer II-sandy, clayey silt (10 YR 3/1)	0-40 40-95	Water table at .95 m. Pebbles and cobbles occur at water table level.
52	4.0 m. x 0.9 m. 0.65 m. deep		Layer I-pebbly root zone (10 YR 4/1) Layer II-terrestrial sand (7.5 YR 3/0)	0-50 50-65	Water table at 0.65 m.
53	4.5 m. x 0.9 m 1.1 m. deep	180	Layer I-dk. Brown pebbly sandy clay Layer II-dk gray-brown clay Layer III-terrestrial sand	0-60 60-70 70-110	Water table at 1.1 m. Layer I was 50% clay, 25 % sand and 25 % pebbles. No Munsell readings recorded.
54	3.0 m. x 0.9 m 1.2 m. deep	17	Layer I-dry root zone (10 YR 4/2) Layer II-marine/terrestrial sand (10 YR 5/6 and 3/1)	0-100 100-120	Water table at 1.2 m. Layer I made up of stream material containing cobbles and pebbles. Layer II is a 50-50 mix.
55	4.0 m. x 0.9 m 1.4 m. deep	7	Layer I-silty stream deposit (10 YR 3/2) Layer II-stream deposit	0-120 120-140	Water table at 1.4 m. Layer II has abundant pebble and cobble mix, along with silty sand.
56	4.0 m. x 0.9 m. 1.5 m. deep	85	Layer I-root zone (10 YR 4/2) Layer II-stream deposit (10 YR 2/2)	0-70 70-150	Water table at 1.5 m. Layer II stream deposit has rock graded by size—larger at the bottom of the layer.
57	4.0 m. x 0.9 m. 1.6 m. deep	5	Layer I-root zone (10 YR 3/1 to 5/1) Layer II-stream deposit (10 YR 2/2)	0-90 90-160	Water table at 1.6 m. Layer I contains historic materials such as brick, slag, ash, mill debris.
58	4.5 m. x 0.9 m 2.5 m. deep	12	Layer I-plow zone (10 YR 4/1 to 3/1) Layer II-compact silt (10 YR 5/3 to 3/3) Layer III-marine/terrestrial sand (10 YR 7/4 and 7.5 YR 4.0)	0-60 60-180 180-250	Water table at 2.5 m. Layer II bisected by a 10 cm. lens of water deposited sand. Layer III is a 70% marine, 30 % terrestrial medium to coarse sand mix.
59	4.5 m. x 0.9 m. 1.3 m. deep	30	Layer I-pebbly root zone (10 YR 3/1) Layer II-compact silt (10 YR 3/2) Layer III- culture layer Layer IV-stream deposit (10 YR 3/3) Layer V-clay w/pebbles (10 YR 3/1)	0-20 20-50 50-60 60-110 110-130	Water table at 1.3 m. Layer III is identified as a cultural layer. It is stained with charcoal and contains a few sea urchin spines. Site 4697. Radiocarbon date—230 +/- 70 RCYBP
60	5.0 m. x 0.9 m. 1.2 m. deep	20	Layer I-root zone (10 YR 3/1) Layer II-silty clay (10 YR 3/2 to 3/3) Layer III-clay w/waterworm pebbles (10 YR 3/1)	0-20 20-100 100-120	Water table at 1.2 m. Layer I contains historic debris, such as glass, metal, and brick.
61	5.0 m. x 0.9 m. 1.3 m. deep	20	Layer I-zone of burning Layer II-beach deposit	0-40 40-130	Water table at 1.0 m. Layer I contains ash, charcoal, glass bottles, brick, etc. Probably mid-1800s. Layer II made up of coral, waterworm pebbles and cobbles, sand.
62	4.25 m. x 0.9 m 3.3 m. deep	17	Layer I- plow zone (10 YR 3/3) Layer II-stream deposit (10 YR 3/2)	0-65 65-303	Water table at 2.85 m. Layer II represents episodes of sediment deposition over time. Waterworm pebbles and cobbles at the water table level.
63	5.0 m. x 0.9 m. 1.6 m. deep	340	Layer I-plow zone (10 YR 3/3) Layer II-old beach zone (10 YR 4/0 to 4/2)	0-120 120-160	Water table was not reached. Layer I has 2 ash lenses, probably representing cane burning episodes.
64	4.5 m. x 0.9 m. 1.2 m. deep	8	Layer I- plow zone (10 YR 3/3) Layer II-stream deposit	0-40 40-120	Water table at 1.1 m.
65	5 m. x 0.9 m 1.0 m. deep	143	Layer I-silty loam (5 YR 3/3) Layer II-banded soil Layer III-stream deposit	0-35 35-90 90-100	Water table at 1.0 m. Layer II made up of bands of silt, sand and clay stream sediment. Layer III contains waterworm pebbles and cobbles.
66	4.0 m. x 0.9 m. 1.6 m. deep	25	Layer I-plow zone(10 YR 5/3 to 4/2) Layer II-earlier ag zone (10 YR 4/2) Layer III-marine/terrest. sand (10YR5/2) Layer IV-terrest. Sand (10 YR 3/2)	0-50 50-80 80-120 120-160	Water table at 1.6 m.
67	4.5 m. x 0.9 m. 1.6 m. deep	29	Stratigraphy similar to BT 66		Water table at c. 1.6 m. Trench collapsed.
68	4.5 m. x 0.9 m. 2.1 m. deep	26	Layer I-plow zone (10 YR 5/3 to 4/2) Layer II-earlier ag. zone (10 YR 4/2) Layer III-banded soils Layer IV-stream deposit (10YR3/1to2/2)	0-40 40-80 80-140 140-210	Water table at 2.0 m. Layer III contains sand, silt and clay.
69	5.0 m. x 0.9 m. 2.0 m. deep	33	Stratigraphy similar to BT 68		Water table at 2.0 m. Trench collapsed.
70	4.5 m. x 0.9 m. 1.7 m. deep	56	Layer I-plow zone (10 YR 3/3) Layer II-stream deposit (10 YR 3/1) Layer III- banded stream sands Layer IV-clay (10 YR 3/2) Layer V-stream deposit (10 YR 3/2)	0-60 60-80 80-110 110-140 140-170	Water table at 1.5 m.

71	4.5 m. x 0.9 m. 1.5 m. deep	33	Layer I-plow zone (10 YR 3/3) Layer II-sandy clay (10 YR 3/1) Layer III-clay (10 YR 3/2) Layer IV-stream sand (10 YR 3/1)	0-50 50-70 70-90 90-150	Water table at 1.4 m.
72	4.0 x 0.9 m. 1.6 m. deep	42	Layer I-plow zone (10 YR 3/3) Layer II-stream sand (10 YR 3/1) Layer III-stream deposit	0-60 60-100 100-160	Water table at 1.6 m.
73	4.0 m. x 0.9 m. 1.1 m. deep	350	Layer I-root zone Layer II-stream deposit	0-40 40-110	Water table at 1.1 m.
74	4.5 m. x 0.9 m. 2.8 m. deep	35	Layer I-plow zone (10 YR 3/3) Layer II-silty clay (10 YR 4/3) Layer III-fine sand (10 YR 3/1) Layer IV-clay (10 YR 4/3 to 4/2) Layer V-sandy clay (7.5 YR 3/0)	0-50 50-160 160-170 170-240 240-280	Water table at 2.7 m.
75	4.0 m. x 0.9 m. 2.4 m. deep	38	Layer I-plow zone (10 YR 3/3) Layer II-stream deposit	0-80 80-240	Water table not reached. Layer I is extremely rocky. Layer II grades from fine to coarse—70% rock density.
76	5.0 m. x 0.9 m. 3.4 m. deep	40	Layer I-plow zone (10 YR 3/3) Layer II-silty clay (10 YR 5/3 to 4/3) Layer III-sand (10 YR 4/1) Layer IV-stream sediment (10 YR 3/3)	0-70 70-140 140-150 150-340	Water table at 3.4 m. Stream sediment graded by texture, with pebbles and cobbles at bottom.
77	5.0 m. x 0.9 m. 2.4 m deep	30	Layer I-plow zone (10 YR 3/3) Layer II- stream deposit Layer III-silty clay (10 YR 5/3 to 4/3) Layer IV-stream deposit like BT 76	0-50 50-80 80-120 120-240	Water table at 2.4 m.
78	4.0 m. x 0.9 m. 1.0 m. deep	50	Layer I-silty clay (10 Yr 3/3 to 4/2) Layer II-stream deposit (10 YR 3/1)	0-60 60-100	Water table at 1.0 m.
79	4.0 m. x 0.9 m. 1.4 m. deep	50	Layer I-plow zone (10 YR 3/3 to 3/2) Layer II-stream deposit (10 YR 3/1)	0-40 40-140	Water table at 1.4 m.
80	4.5 m. x 0.9 m. 1.6 m. deep	55	Layer I-plow zone (10 YR 3/3 to 3/2) Layer II-stream deposit (10 YR 3/1) Layer III-clay (7.5 YR 3/2)	0-50 50-130 130-160	Water table at 1.3 m.
81	5.0 m. x 0.9 m. 2.0 m. deep	54	Layer I-plow zone (10 YR 3/3 to 3/3) Layer II-stream deposit (10YR3/1 to 2/2)	0-80 80-200	Water table at 2.0 m.
82	4.0 m. x 0.9 m. 1.8 m. deep	63	Layer I-plow zone (10 YR 3/3 to 4/3) Layer II-stream deposit (10 YR 3/2)	0-80 80-180	Water table at 1.6 m.
83	4.0 m. x 0.9 m. 1.7 m. deep	55	Layer I-plow zone (10 YR 3/3) Layer II-stream sand (10 YR 3/2) Layer III-silt (10 YR 3/2) Layer IV-clay (10 YR 4/2) Layer V-stream deposit	0-40 40-60 60-110 110-130 130-170	Water table at 1.3 m. Storm surge beach deposits occur on *makai* end of trench, at about 40 cmbs. These grade into water table level.
84	4.0 m. x 0.9 m. 1.9 m. deep	57	Layer I-plow zone (10 YR 3/3) Layer II-silt (10 YR 4/3) Layer III-sandy silt (10 YR 3/2) Layer IV-stream deposit	0-40 40-100 100-150 150-190	Water table at 1.6 m.
85	4.0 m. x 0.9 m. 2.5 m. deep	60	Layer I-plow zone Underlying sediment deposits	0-40 40-250	Water table at 2.3 m. Trench was too unstable to allow for detailed profiling.
86	4.0 m. x 0.9 m. 1.6 m. deep	54	Layer I-plow zone (10 YR 3/3) Layer II-sandy silt (10 YR 5/3 to 3/3)	0-40 40-160	Water table at 1.6 m.
87	4.0 m. x 0.9 m. 1.7 m. deep	70	Layer I-plow zone (10 YR 3/3) Layer II-silt (10 YR 4/1 to 3/1) Layer III-stream deposit	0-40 40-85 85-170	Water table at 1.6 m. Bottom of Layer I contains an ashy band with charcoal flecking—probably from cane burning.
88	4.0 m. x 0.9 m. 2.0 m. deep	74	Layer I-plow zone (10 YR 3/3) Layer II-silty clay (10 YR 4/2) Layer III-sandy clay (10 YR 3/2) Layer IV-stream deposit	0-70 70-100 100-120 120-200	Water table at 2.0 m.
89	4.0 m. x 0.9 m. 2.3 m. deep	60	Layer I- plow zone (10 YR 3/2 to 3/4) Layer II-silty clay (10 YR 4/2 to 3/3) Layer III-sandy silt (10 YR 3/1 to 2/2)	0-80 80-190 190-230	Water table at 1.9 m.
90	4.0 m. x 0.9 m. 1.8 m. deep	50	Layer I-plow zone (10 YR 3/2) Layer II-compact silt (10 YR 3/4) Layer III-banded silt (10 YR 4/3 to 3/3)	0-50 50-70 70-180	Water table at 1.6 m.
91	4.0 m. x 0.9 m. 1.5 m. deep	55	Layer I-plow zone (10 YR 3/3) Layer II-compact silt (10 YR 3/2) Layer III-stream sand (10 YR 2/2)	0-30 30-70 70-150	Water table at 1.2 m.
92	4.0 m. x 0.9 m. 1.5 m.	55	Layer I-plow zone with silt below (10 YR 4/3 to 3/3) Layer II-stream deposit	0-70 70-150	Water table at 1.17 m. Layer I is very rocky.

93	4.0 m. x 0.9 m. 3.0 m. deep	55	Layer I-plow zone (10 YR 4/3 to 3/3) Layer II-stream deposit (rocky) Layer III-stream sand	0-50 50-230 230-300	Water table at 3.0 m. Layer I is extremely rocky.
94	4.0 m. x 0.9 3.5 m. deep	60	Layer I-plow zone (10 YR 4/3 to 3/3) Layer II-stream sand Layer III-silty loam	0-40 40-70 70-350	Water table was not reached.
95	4.0 m. x 0.9 m. 2.7 m. deep	50	Layer I-plow zone 4/3 to 3/3) Layer II-stream deposit Layer III-silty clay loam (10 YR 4/3)	0-40 40-130 130-270	Water table at 2.5 m.
96	4.0 m. x 0.9 m. 2.3 m. deep	50	Layer I-plow zone in clay (10 YR 4/4) Layer II-stream deposit Layer III-silty clay loam (10 YR 3/3)	0-60 60-200 200-230	Water table at 2.2 m.
97	4.0 m. x 0.9 m. 2.9 m. deep	50	Layer I- plow zone (10 YR 4/4) Layer II-stream deposit	0-40 40-290	Water table at 2.8 m.

APPENDIX A

Radiometric data from Beta Analytic, Inc.

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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Walter Fredericksen — February 22, 1999

Xamanek Researches — March 2, 1999

Sample Data	Measured C14 Age	C13/C12 Ratio	Conventional C14 Age (*)
Beta-128107	270 +/- 70 BP	-27.6 o/oo	230 +/- 70 BP

SAMPLE #: OLOWALU SAMPLE #2
ANALYSIS: radiometric-PRIORITY
MATERIAL/PRETREATMENT:(charred material): acid/alkali/acid
COMMENT: the small sample was given extended counting time

NOTE: It is important to read the calendar calibration information
nd to use the calendar calibrated results (reported separately) when
erpreting these results in AD/BC terms.

NOTE: Sample "OLOWALU SAMPLE #1" was submitted but not analyzed.

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By international convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.

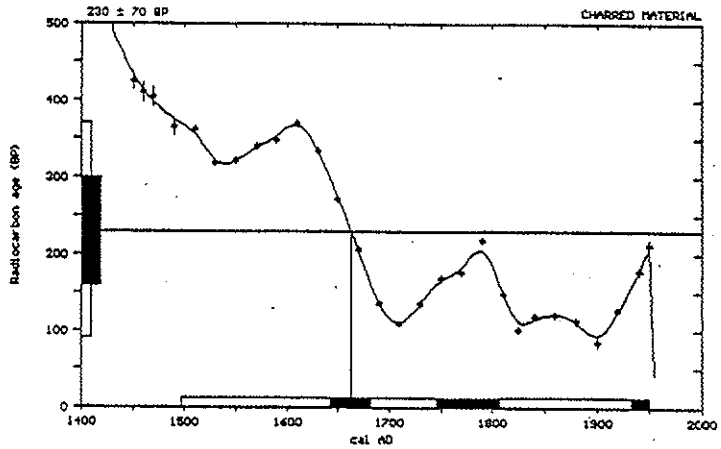
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables:C13/C12=-27.6:lab mult.=1)

Laboratory Number:	Beta-128107
Conventional radiocarbon age:	**230 ± 70 BP**
Calibrated results: (2 sigma, 95% probability)	**cal AD 1495 to 1950**

Intercept data:

Intercept of radiocarbon age with calibration curve:	cal AD 1665
1 sigma calibrated results: (68% probability)	cal AD 1640 to 1680 and cal AD 1745 to 1805 and cal AD 1935 to 1950



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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Walter Fredericksen — March 1, 1999

Xamanek Researches — March 9, 1999

Sample Data	Measured C14 Age	C13/C12 Ratio	Conventional C14 Age (*)
Beta-128396	160 +/- 70 BP	-27.3 o/oo	120 +/- 70 BP

SAMPLE #: OLOWALU SAMPLE #3
ANALYSIS: radiometric-PRIORITY
MATERIAL/PRETREATMENT:(charred material): acid/alkali/acid

NOTE: It is important to read the calendar calibration information
1 to use the calendar calibrated results (reported separately) when
.rpreting these results in AD/BC terms.

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By international convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil, if the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables:C13/C12=-27.3:lab mult.=1)

Laboratory Number: Beta-128396

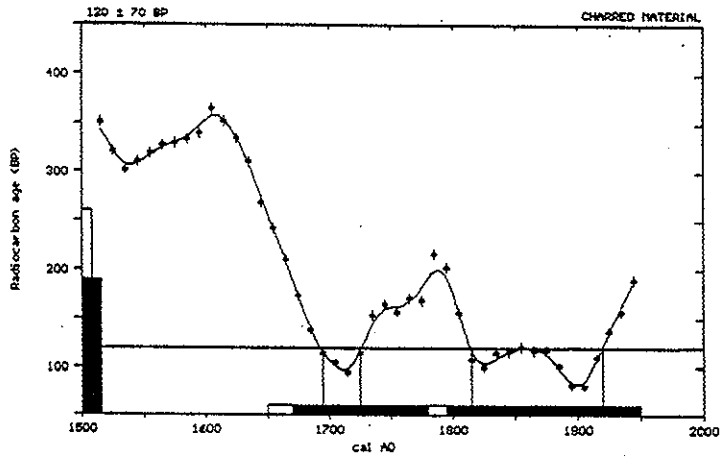
Conventional radiocarbon age: 120 ± 70 BP

Calibrated results: (2 sigma, 95% probability) cal AD 1650 to 1950 (Cal BP 300 to 0)

Intercept data:

Intercepts of radiocarbon age with calibration curve: cal AD 1695 (Cal BP 255) and
cal AD 1725 (Cal BP 225) and
cal AD 1815 (Cal BP 135) and
cal AD 1920 (Cal BP 30)

1 sigma calibrated results: (68% probability) cal AD 1670 to 1780 (Cal BP 280 to 170) and
cal AD 1795 to 1950 (Cal BP 155 to 0)



References:

Calibration Database

Editorial Comment

Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii.

INCAL98 Radiocarbon Age Calibration

Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

APPENDIX B

LAND COMMISSION AWARDS IN OLOWALU

Following the Mahele in 1848, there were 42 individual Land Commission Awards granted in the *ahupua'a* of Olowalu, between the years 1852 and 1855. The majority are in the upper reaches of the property, along Olowalu stream. The distribution of land awards,[1] and the present route of the stream suggest that the stream was channeled in a general, straighter north-south direction sometime after the Mahele. This was probably done to control flooding of agricultural fields. The award plots run across the alluvial fan in a northwesterly-southeasterly direction. A 1906 map of the Olowalu Plantation, made by A. C. Alexander, shows the new, straighter route of the stream (Map 6).

There are 36 land grant awards listed in the *mauka* portion of the property. Refer to Table 1 for detailed information on the awards. Thirty-three of the grants are *kuleana* located along Olowalu Stream, and were taro lands and houselots. Only 3 grants were for other purposes—the 17.592-acre award granted to Nahaolelua by Kamehameha IV in 1858, the .924-acre parcel granted to the Board of Education for a school at Olowalu 2, and the 16.5-acre Land Patent Grant (Grant 11073) to Pioneer Mill in 1942.

There are 9 awards on the makai portion of the property, and it should be noted that several *taro/kula kuleana* awards in the *mauka* area correspond to houselot awards on the *makai* property. These include LCA 6728 to Mahulu: LCA 5952 to Minamina; LCA 8817 to Kanakaole, and LCA 1742 to Z. Kaauwai (See Table 1).

[1] Please refer to Maps 4 and 5 for the approximate locations and distribution of LCAs within Olowalu *ahupua'a*, and to historic maps in Figures 1 and 1a.

TABLE 1

Land Commission Awards – *mauka* parcel[2]

TMK	Size in acres	Royal Patent	LCA Number	Year conveyed	Awardee	*Ili*	Nature of use
4-8-03: 11	1.787	7989	5829-E: 1, 2	9/22/1853	Kawehena	Hawaiikekee & Kamani	Houselot and taro land
4-8-03: 50	7.5	6267	4376: 1	3/6/1855	Keahi	Puukoliohilo	Kula at Puukuliohilo
4-8-03: 51	.638	6285	3772: 3	9/24/1853	Alapai		Kula land
4-8-03: 52	.919	6285	3772:2	9/24/1853	Alapai		Kula land
4-8-03: 53	2.704	6946	9906	9/24/1853	Pikao	Puumaumau	Houselot and taro patches
4-8-03: 54	.525	3810	8573: 2		Kailiula	Kuekue	Taro land
4-8-03: 55	7.0	4041	10128: 3	3/6/1855	E. Maui	Wailoa	Kula and taro
4-8-03: 56	.924	N/A	R.P.G.R.15;2	9/30/1882	Board of Ed.		School lot at Olowalu 2
4-8-03: 57	4.5	5183	5829: 2	9/22/1853	Haole	Wailoa	Taro and kula land
4-8-03: 58	1.75	4041	10128: 4		E. Maui	Wailoa	Kula
4-8-03: 59	4.938	3776	5113	11/1/1852	Kailaa		Kula
4-8-03: 60	2.975	2154	1742: 1	9/26/1853	Z. Kaauwai	Kamani 1	Land for cultivation
4-8-03: 61	1.655	7989	5829-E: 1,2,3	9/22/1853	Kewehena	Hawaiikekee & Kamani	Houselot and taro land (apana 3-kula land)
4-8-03: 62	1.813	5468	6058: 3	9/22/1853	Peekauai	Kamani	Kula land
4-8-03: 63	8.638	4041	10128: 5	3/6/1855	E. Maui	Kamani	Houselot and kula
4-8-03: 64	5.5	7102	5829-D:1,2,3	9/22/1953	Kaaoaohema		Houselot and taro patches
4-8-03: 65	6.5	6267	4376: 2	3/6/1855	Keahi	Puukoliohilo	Taro and kula
4-8-03: 66	.863	6611	10714	11/1/1852	Pohakanui	Kamani 2	Taro and kula
4-8-03: 67	.588	N/A	6547	11/1/1852	Hale	Kamani 2	Taro and kula
4-8-03: 68	.625	4041	10128: 2	3/6/1855	E. Maui	Kamani	Taro land
4-8-03: 69	3.456	6881	8657	9/24/1853	Kikau	Kamani 2	Kula, taro land and houselot
4-8-03: 70	2.063	3344/3811	8668	3/6/1855	Kaiwi		Taro and kula
4-8-03: 71	.581	5183	5829-F: 1	9/22/1853	Haole	Kamani	Taro land
4-8-03: 72	.456	5187	10592: 2	11/1/1852	Paia	Kamani 3	Taro land

[2] This information was provided by Mr. Robert Horcajo, Project Manager for Olowalu Elua, Associates, LLC, and came from the Bureau of Conveyances archives through Title Guarantee of Hawaii. It was determined in July 1999 that 2 *kuleana*—LCA 3888, and LCA 3772, Apana 1—located on the *mauka* project area were not part of Olowalu Elua Associates, LLC property (Letter from Title Guaranty of Hawaii to Mr. Robert L. Horcajo, July 14, 1999).

4-8-03: 73	31.5	5468	6058: 1	9 22 1853	Peekauai	Olua	Taro land
4-8-03: 74	50a	02a7	4376: 3	3 o 1855	Keahi	Kaumakakahi	Taro land
4-8-03: 75	181	5181	5952: 2	9 24 1853	Ahnamma		Taro land
4-5-02: 7a	1a 5	N A	L P Gr 1307	8 21 1942	Pioneer Mill		Portion of crown land of Olowalu
4-8-03: 77	232	4a42	10128	3 o 1855	E. Maui	Wailua	Kula
4-8-03: 78	592	N A	Award from Kam IV	8 2 1858	Nahaolelua		
4-8-03: 79	14a	5468	6058: 4	9 22 1853	Peekauai	Kaumakakahi	Taro land
4-8-03: 80	251	4a82	9728	9 22 1853	Manulu	Kamani	Taro land
4-8-03: 81	047	5872	5811: 2	9 24 1853	Kamakaole	Kaumakuahi	Taro lo's
4-8-03: 82	109	5872	5811: 3	9 24 1853	Kamakaole	Kaumakuahi	Taro land
		19285	5772: 1	9 24 1853	Mapu	Paukoliohila	Houselot
		0020	3888	2 28 1854	Pamoi		houselot

Land Commission Awards – *makai* parcel

TMK	Size in acres	Royal Patent	LCA Number	Year conveyed	Awardee	*Ili*	Nature of use
4-8-03: 11	1.5	2209	5519	9 22 1853	Hana	Maomao	Houselot
4-8-03: 12	32.5	4840	582[illegible]	11 1 1852	Naime	Kahaaha	Houselot
4-8-03: 13	3.5ac	2151	1432	9 26 1853	Z. Kauwa	Kahaaha	Houselot
4-8-03: 44	3.71	5127	8020: 1	3 o 1855	Kaiaele	Kahaaha	Houselot
4-8-03: 45	88.1	81[illegible]	8020: 4	3 o 1855	Kaiaele	Kaumakakahi	Houselot
4-8-03: 46	91.1	4952	9728: 2	9 22 1853	Mahulu	Kaumakakahi	Houselot
4-8-03: 47	59		240	4 22 1849	John Clark	Kahakamaka	Houselot
4-8-03: 48	7a2	5181	5952: 1	9 24 1853	Ahnamma	Kaumakakahi	Houselot
4-8-03: 49	1	5[illegible]	5811: 1	9 24 1853	Kamakaole	Kamani	Houselot

The remainder of the *ahupua'a* was crown land, that was originally granted to Kamehameha III. Crown lands became government lands after the annexation of the Hawaiian Islands in 1893.

A deed provided by Mr. Horcajo, of Olowalu Elua Associates, L.L.C. states that in conformity with the Land Act of 1895, all of the land "situate at Olowalu and Okumehame in the District of Lahaina, Island of Maui" was "granted and confirmed unto Walter M. Gifford for the consideration of Thirty-seven Thousand Seven Hundred and Fifty Dollars" ($37,750.00). This was identified as Land Patent No. 4973, and was a cash purchase at public auction, which took place on July 9, 1906. Title was granted on July 23, 1906. The land area in Olowalu was 684.7 acres, exclusive of L.C.A.s, school lots and land sold by Kamehameha IV to Kahaulelio, all of which amounted to 96.4 acres.

Photo 1 – Mouth of Olowalu Stream.

Photo 2 – General *mauka* view of eastern portion of study area. Monkeypod Trees line Honoapi'ilani Highway (Highway 30).

Photo 3 – Mitigation of Burial find #1 in access road.

Photo 4 – Excavation of Backhoe Trench 14—BT 13 in forground—Burial find #1 to the left.

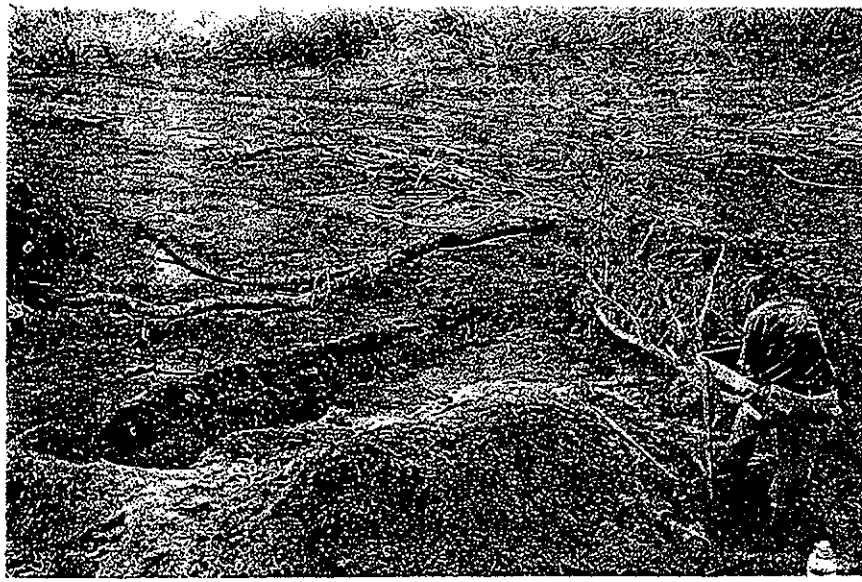


Photo 5 – Backhoe Trench 8, containing Burial #2. View to the northwest.

Photo 6 – Burial mitigation in process—view to the northwest.

Photo 12 – Backhoe Trench 8 with burial find covered with blue tarp, showing the proximity of the burials to the ocean.

Photo 13 – Backhoe Trench 78, located on the west side of Olowalu Stream. Note the shallow water table.

Photo 11 – Test Unit 1 in Site 4694 rock structure.

Photo 20 – Large tree growing within the brick structure.

Photo 21 – Iron post with rigging and eye on top. Ruins of the mill are behind thick vegetation.

Photo 18 – View of cistern portion of ruins, in the vicinity of the mule pen.

Photo 19 – Ruins of brick feature on *makai* end of large building foundation.

APPENDIX D-1

Approval Letter from Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD)

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

February 25, 2000

Mr. Robert Horcajo, Project Manager
Olowalu Elua Associates, LLC
173 Ho Ohana Street, Suite 201
Kahului, Hawaii 96732

LOG NO: 24957
DOC NO: 0002RC39

Dear Mr. Horcajo:

SUBJECT: **Review of Revised Archaeological Inventory Survey Report – Olowalu Makai Development Parcel**
Olowalu, Lahaina, Maui TMK: 4-8-3: portion 5

This letter reviews the revised report which was submitted February 7, 2000 and received in our office on February 9th (D. Fredericksen & E. Fredericksen 2000. Archaeological Inventory Survey of Makai Portion (Phase 1) of Olowalu Development Parcel ... Xamanek ms.). This revision addresses our review letter of January 14, 2000 (Log: 24,721; Doc: 0001RC11).

The summary of the ahupua'a settlement pattern in the background section of the report is better, but it still does not summarize the details of all the important information that was presented in that section of the report. However, rather than ask for another revision, our staff will prepare a detailed summary which will be placed in our library along with the report.

The revision has addressed all our other concerns, particularly regarding site size, descriptions, and interpretation matters. The report is now acceptable.

Although many precontact and early 1800s habitation sites may have been along the shoreline in this project area, sugarcane cultivation has apparently destroyed most of these sites. A fishpond to the east seems to be under the highway today, and it appears not to be in the project area. Seven archaeological sites, plus gleyed marsh soils with possible historical importance, survive in the project area. These include 4 precontact to early 1800s sites (3 habitation sites – 4694, 4697, and 4698; 1 burial site – 4693) plus the gleyed marsh soils, and 3 late 1800s-1900s sites (the Olowalu Mill Complex – 1602; a road remnant – 4696; a sea wall apparently associated with a road turnout – 4695).

We agree with the report's significance evaluations. The road remnant (4696) and associated sea wall (4695) are "no longer significant" because the limited important information in these sites was recorded during the survey. The 3 precontact to early 1800s habitation sites are significant for their information content, as are the gleyed marsh soils (which may contain important pollen and charcoal material for dating initial settlement along this coast). The burial site (4693) and the Olowalu Mill Complex (1602) are significant under multiple criteria. As an aside, our review letter of January 14th contained an error in final editing. Table 2 should have "no longer significant", not D, in the significance column for 4695 and 4696 and simply "no further work" or no entry at all in the mitigation column (as only significant sites need mitigation). We apologize for this, but could you please have Table 2 revised accordingly and send a replacement page? This change will clearly show to all readers of the report that these 2 sites are not significant.

Last, we agree with the revised mitigation proposals for the 5 significant sites and the gleyed marsh soils. The 5 sites will be preserved, and the gleyed marsh soils will undergo archaeological data recovery. These actions will alleviate (mitigate) the adverse effects of the proposed project to these sites.

Thus, by a copy of this letter, we recommend to the County and State permitting agencies that the following standard conditions be attached to any approved permits, to ensure that the mitigation commitments to treat the significant sites are acceptably carried out:

1. Five sites shall be preserved (3 precontact to early 1800s habitations sites – 4694, 4697, 4698; 1 burial site – 4693; and the Olowalu Mill Complex – 1602). A preservation plan for all sites but the burial site must be submitted to and be approved by the State Historic Preservation Division (SHPD) (including buffer zones, as appropriate around the sites, interim protection measures, and long-term preservation measures). The preservation proposal and plan for the burial site shall be submitted to the Maui/Lana'i Islands Burial Council for vote. Minimally, the buffer zones and interim protection measures shall be in place (and verified in writing by the SHPD) prior to land alteration in the area of the sites. The SHPD shall verify in writing to the permitting agencies when the plan has been successfully completed.

2. The gleyed marsh soils shall undergo archaeological data recovery. An archaeological data recovery plan (scope of work) shall be submitted to and be approved by the State Historic Preservation Division (SHPD) prior to the beginning of the data recovery work. This scope should be completed, before a data recovery contract is negotiated. Minimally, data recovery fieldwork must be successfully concluded (and verified in writing by the SHPD) prior to land alteration in this part of the project area. The SHPD shall verify in writing to the permitting agencies when the plan has been successfully completed.

3. Archaeological monitoring of land altering construction in the sand areas along the shore shall occur, as a contingency to identify, document and treat any burials that might be found. A monitoring plan (scope of work) shall be submitted to and be approved by the State Historic Preservation Division (SHPD) prior to the beginning of the monitoring. This plan (which need only be a few pages long) must specify how any burials that are found will be documented archaeologically, notification procedures, and treatment measures that will be taken. This scope should be completed, before a monitoring contract is negotiated.

If you have any questions, please feel free to contact Dr. Cordy at 692-8025.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

RC:jen

c: Land Division, DLNR (CDUA application)
Planning Department, County of Maui
Public Works Department, County of Maui
Burials Program, DLNR
Maui/Lana'i Islands Burial Council Chair

APPENDIX E.

Cultural Impact Assessment

SCS Project Number 920-CIA-1

A CULTURAL IMPACT ASSESSMENT OF APPROXIMATELY 0.8 ACRES OF LAND IN OLOWALU AHUPUA`A, LAHAINA DISTRICT, MAUI, HAWAI`I [TMK: 4-8-003:46]

Prepared by:
Leann McGerty, B.A.
and
Robert L. Spear, Ph.D.
January 2008

Prepared for:
Mr. Peter Martin
West Maui Land Co.

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INTRODUCTION

Scientific Consultant Services, Inc. (SCS) has been contracted by West Maui Land, to conduct a Cultural Impact Assessment on approximately 0.8-acres of land in Olowalu Ahupua`a, Lahaina District, Maui TMK: 4-8-003:46 (Figures 1and 2).

The Constitution of the State of Hawai`i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua`a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (2000). In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikeaouli) preserved the peoples traditional right to subsistence. As a result in 1850, the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupua`a* tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawaiian Revised Statutes (HRS) 7-1. In 1992, the State of Hawai`i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, "native Hawaiian rights...may extend beyond the *ahupua`a* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner" (Pele Defense Fund v. Paty, 73 Haw.578, 1992).

Act 50, enacted by the Legislature of the State of Hawai`i (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

> ...there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights...[H.B. NO. 2895].

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shore line developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other

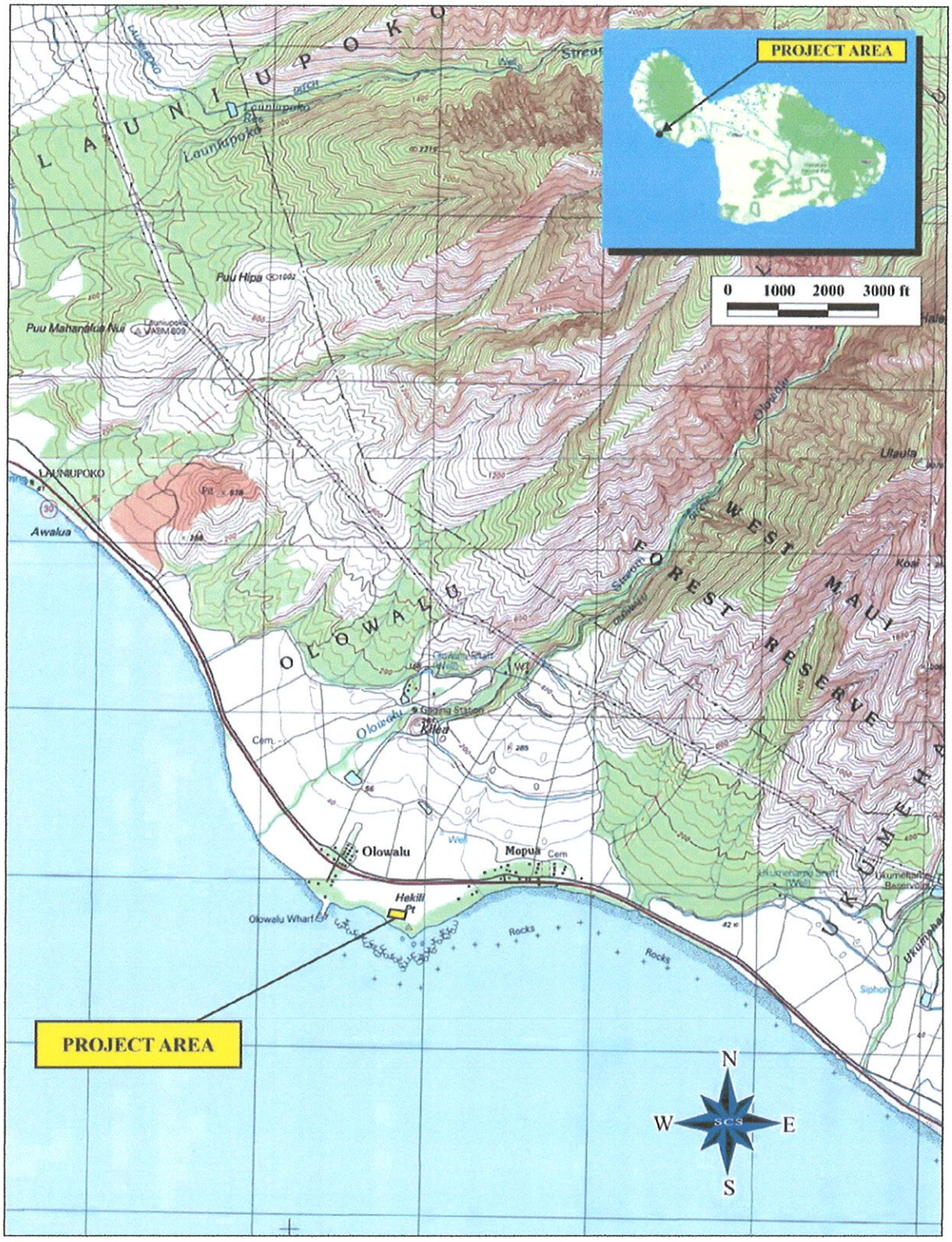

Figure 1: USGS Olowalu Quadrangle Map Showing Project Area.

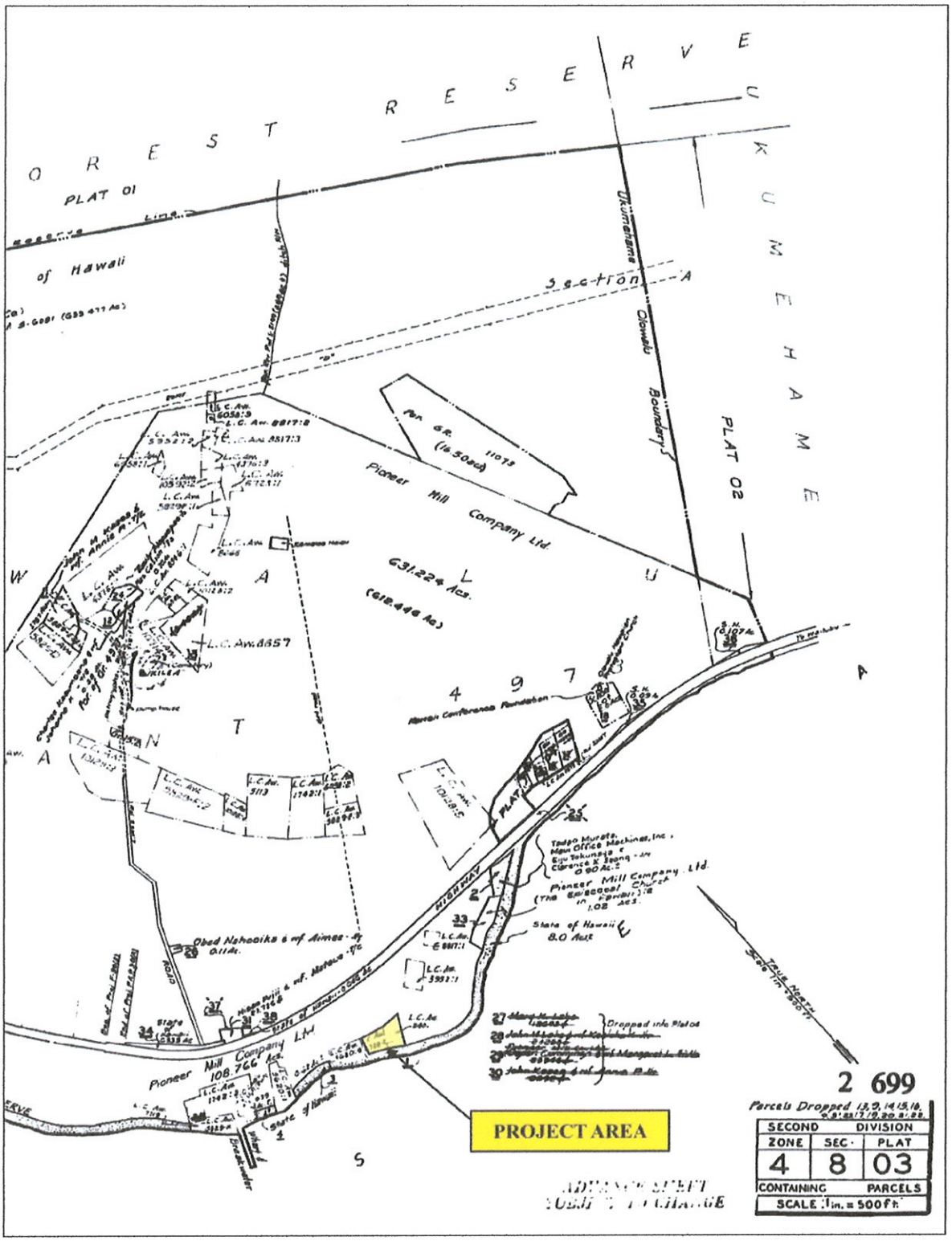

Figure 2: Tax Map Key [TMK] Showing Project Area.

ethnic groups. Cultural resources include a broad range of often overlapping categories, including places behaviors, values, beliefs, objects, records, stories, etc. (H.B. 2895, Act 40, 2000).

Act 50 also amended the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are...contrary to the State's environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000). Thus, not only are native Hawaiian cultural resources evaluated, but those of other ethnic groups as well.

Act 50 requires that an assessment of cultural practices be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua`a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997):

> The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religions and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural resources, including values, rights, beliefs, objects, records, and stories occurring within the project area and its vicinity (H.B. 2895, Act 50, 2000).

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Methodology", the OEQC states: that "...information

being proposed and its impact potential. Sending inquiring letters to organizations concerning development of a piece of property that has already been totally impacted by previous activity and is located in an already developed industrial area may be a "good faith effort". However, when many factors need to be considered, such as in coastal or mountain development, a good faith effort would undoubtedly mean an entirely different level of research activity.

INTERVIEWS

As suggested in the "Guidelines for Accessing Cultural Impacts" (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of the consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

As explained earlier, letters had been previously sent to organizations whose jurisdiction included knowledge of the area, for a CIA that was conducted in July of 2006 for Parcel 45A directly abutting the present project area. The letter, inviting consultation, included maps of Parcel 46 which was associated CIA lands.

Parcel 46 was a house lot and *kula* land at least until 1881 when it became a part of the Pioneer Mill sugar lands. Letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O`ahu; Cultural Resource Planner for the Maui Planning Department; the Central Maui Civic Club; and the Cultural Historian with the SHPD, Maui office. Six individuals familiar with Olowalu were contacted by phone. Three individuals did not respond to our request, one preferred to not be cited, but two others, Wally Fujii and Adeline Rodrigues, were willing to be interviewed. In addition, Hinano Rodrigues, Cultural Historian for SHPD and also a resident of Olowalu contributed his knowledge. The comments refer specifically to Parcel 45A when using "project area", but "vicinity" includes Parcel 46.

Wally Fujii is the owner of Olowalu Store and the retired principle of Baldwin High School. He was born in Olowalu in 1936. To his knowledge there were no cultural activities associated with the project area or its vicinity except fishing. Presently, access is easy for those who want to fish off the rocky beach (pers. comm Wally Fujii, July 7, 2006).

Addie Rodrigues was raised in Olowalu and has spent most of her life here. Her family comes from the Olowalu/Ukumehame area, extending back before the Māhele. She did not know of any cultural activities associated with the specific project area, but mentioned how the ocean resources have long been included as a food source. Activities such as net-fishing, gathering *limu* and hard-back crabs have continued from generation to generation and are very much alive today. Because of this, her concern was for access to the beach and ocean resources to continue.

Hinano Rodrigues, a resident of Olowalu and the Cultural Historian for SHPD, Maui Office, reiterated what Addie had reported. In addition, he included gathering *loli* (sea cucumber), *hā`uke`uke* and *hā`ue`ue* (sea urchin), fishing for *he`e* (octopus), lobster, and *lamalama* or torch fishing. All are activities that are still conducted along the beach and in the bay. Again, the concern was for easy access to allow these activities to continue.

Archival research included historical and cultural source materials that were used extensively and can be found listed in the References Cited portion of the report. Such scholars as Beckwith, Chinen, Kame`eleihiwa, Fornander, Kuykendall, Kelly, Handy and Handy, Puku`i and Elbert, Thrum, and Walker have contributed, and continue to contribute, to our knowledge and understanding of Hawai`i, past and present. The works of these, and other authors, were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona `Aina 2004 Database.

Analysis of the potential effect of the project on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). The project area has not been used for traditional cultural purposes within recent times except for the coastal section that continues to provide ocean resources to people of the district. Based on historical research and those responses received from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O`ahu; the Cultural Resource Planner for the Maui Planning Department; the Central Maui Civic Club; and the Cultural Historian for SHPD, it is reasonable to conclude that Hawaiian rights related to gathering, access or other customary activities within the project parcel will not be affected and there will be no direct adverse effect upon cultural practices or beliefs. However, as always with oceanfront development, the issue of access of the community to marine resources is prominent. It would seem for the present, coastal

access is insured for resource gathering, fishing and other activities customarily enjoyed by the local population along the coast.

CULTURAL ASSESSMENT

Based on organizational response and archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access, or other customary activities, will not be affected by development activities on Parcel 46. However, this land parcel was owned by the same individual from at least 1824 to 1881 and there is the possibility of family members having been buried on the site or in the vicinity during the 57 years of occupation. Beach internments were a common occurrence in Hawai`i, because of the easy burial conditions provided by the sand. In addition, it was generally not necessary to hide the bones of the *maka`āinana* for fear of desecration from enemies, as was the case with the *ali`i*.

In the unlikely event that human remains are encountered, all work in the immediate area should cease. The State Historic Preservation Division island archaeologist and State Historic Preservation Division Burial Sites Program (located in Kapolei, O`ahu) should both be immediately notified about the inadvertent discovery of human remains on the property. Only the State Historic Preservation Division has the authority to approve the removal of human remains, which is typically conducted in consultation with the appropriate burial council members.

Because there were no specific cultural activities identified within the project area parcel, there are no adverse effects.

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may be obtained through scoping, community meetings, ethnographic interviews and oral histories..." (1997).

This report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

(1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints of limitations which might have affected the quality of the information obtained;

(2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;

(3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;

(4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or being interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

(10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices, or beliefs; the potential of the proposed action to isolate cultural resources, practices, or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;

(11) the inclusion of bibliography of references, and attached records of interviews which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts; and previous archaeological project reports.

INTERVIEW METHODOLOGY

Interviews are conducted in accordance with Federal and State laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise or can be located by visiting the area. Organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail clubs, and Planning Commissions are invited to contribute their input and suggest further avenues of inquiry, as well as specific individuals to interview.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the

information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua`a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, letters had been previously sent to organizations whose jurisdiction included knowledge of the area for a CIA that was conducted in July of 2006 for approximately 0.8 acres of land TMK: 4-8-003: Parcel 45A, abutting the present project area to the west (McGerty and Spear 2006). The letter, inviting consultation, included a map of Parcel 46 which was associated CIA lands. Consultation was sought from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O`ahu; Cultural Resource Planner for the Maui Planning Department; the Central Maui Civic Club; and the Cultural Historian with the State Historic Preservation Division, Maui Office (SHPD). In addition, seven individuals familiar with Olowalu Ahupua`a were contacted by phone for an informal interview concerning the possibility of cultural activities within the project area. Based on the responses, an assessment of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

PROJECT AREA AND VICINITY

The project area is located on the *makai* side of Honoapi`ilani Highway and about 2000 feet (ca. 607 m) north of Olowalu Store. It is situated on the coast with beach and the Pacific Ocean as its southern boundary. To the north is the main highway and there is open land to the east and Parcel 45A to the west.

CULTURAL AND HISTORICAL CONTEXT

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu`u Kukui, forming the west end of the island (1,215 m amsl), is composed of large, heavily eroded amphitheater valleys that contain well-developed, permanent stream systems that water fertile agricultural lands extending to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted productive landscapes.

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha`ōhia, during the time of the *Ali`i* Kaka`alaneo (Beckwith 1940:383; Fornander places Kaka`alaneo at the end of the 15th century or the beginning of the 16th century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali`i `ai moku* (the *ali`i* who eats the island/district), which he held in trust for the gods. The title of *ai`i `ai moku* ensured rights and responsibilities to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili`āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili `āina*, or *`ili*, were smaller land divisions and were next to importance to the *ahupua`a*. They were administered by the chief who controlled the *ahupua`a* in which it was located (*ibid*: 33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in an *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in the *ahupua`a* of Olowalu, meaning literally "many hills" (Pukui *et al.* 1974:170).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys, such as Olowalu, provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and *mai`a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *`uala* (sweet potato, *Ipomoea batatas*) were cultivated. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Agricultural development on the leeward side of Maui was likely to have begun early in what is known as the Expansion Period (A.D. 1200-1400, Kirch 1985).

WAHI PANA (LEGENDARY PLACES)

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama`āina* (those familiar with the area) of the district. Information concerning only a few has been retained. Three *heiau* were recorded in Olowalu Ahupua`a in the 1920s (Thrum 1908, 1916, 1917; Walker 1930, Sterling 1998). Petroglyphs were inscribed and are still visible on the bare stone sides of a hill about a mile in from the highway past the present Olowalu Store. The figures are of several types, including those of dogs, women, children, letters from the English alphabet, having been drawn during different periods. It was suggested by one *kama`āina* (John Ka`aea Fujishiro, pers. Comm; McGerty and Spear 2005) that this area had functioned as a rest stop before attempting the crossing of the Olowalu mountains to `Īao Valley. As Olowalu is the largest and deepest valley on the southwest side of Maui, Handy recorded in the 1930s:

> ...[Olowalu] used to support extensive terraced cultivation. The lower ranges of terraces have been completely obliterated by canefields; by just where the sugar cane ends and the valley begins there is a little spot where five Hawaiian families, all of them intermarried, raise several varieties of taro in flourishing wet patches. Some of it is sold, but most is pounded by hand for the family poi. There are said to be abandoned terraces far up in Olowalu [1940: 103].

Indeed, in the valley, Walker recorded old taro patches and house sites, a lookout site, and a traditional *`auwai* still in use by the sugar plantation to bring water from the valley to the cane fields as the plantation did with the old *`auwai* in Ukumehame Ahupua`a, next door (Walker 1930; McGerty and Spear 2005).

Trails extended from the coast to the mountains, linking the two for both economic and social reasons. A trail known as the *alanui* or "King's trail" built by Kihapi`ilani, extended along the coast passing through all the major communities between Lāhainā and Mākena. A path along Kealaloa ridge leads to the summit of Pu`u Kukui, the headwaters of many streams, and continues beyond. The Lahaina Pali Trail, constructed in 1841, provided access to other parts of the island, including Wailuku (Tomonari Tuggle 1991, 1995). The most famous of the trails is that used to cross from `Īao Valley to Olowalu and was used by the surviving warriors and *ali`i* (Kalola, Keopolani, Kalanikupule, etc) of Maui to escape the forces of Kamehameha in the battle of *Kepaniwai* in the 1790s (Kamakau 1961).

Historically, Olowalu is known for the Olowalu Massacre perpetrated by Capt. Simon Metcalf of the ship *Eleanora* in 1790 (*ibid.*). Instead of seeking out and punishing those natives guilty of a crime, Metcalf chose to retaliate on the innocent inhabitants of Olowalu Village.

Placing all his ship's guns on the starboard side of the ship, Metcalf encouraged the natives to come in their canoes to trade at which time he fired on them, slaughtering men, women and children (Kuykendall 1980, Vol. I).

Most of the *ahupua`a* on the southern coast have been overshadowed by the famous roadstead and village of Lāhainā which served as the capitol of the Hawaiian Kingdom after the conquest of Kamehameha until 1855. The ethnographic and historic literature, often our only link to the past, reveals that the lands around Lāhainā were rich agricultural areas irrigated by aqueducts originating in well-watered valleys with permanent occupation predominately on the coast. Handy and Handy have stated the space cultivated by the natives of Lāhainā (district) at about "...three leagues [9 miles] in length, and one in its greatest breadth. Beyond this all is dry and barren; everything recalls the image of desolation" (1972:593). Crops cultivated included coconut, breadfruit, paper mulberry, banana, taro, sweet potato, sugar cane, and gourds.

Olowalu Valley, with its permanent stream, was one of the sources along with Ukumehame, Launiupoko, and Kaua`ula, providing agricultural opportunities for the growing leeward population. Handy and Handy reported:

> Southeastward along the coast from the *ali`i* settlement [Lāhainā] were a number of areas where dispersed populations grew taro, sweet potato, breadfruit and coconut on the slopes below and in the sides of valleys which had streams with constant flow. All this area, like that around and above Lahaina, is now sugar-cane land...[1972].

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1968:111; Kuykendall 1938 Vol. I: 145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were made available and private ownership was instituted, the *maka`āinana*, if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983;

Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

There were 88 claims for land in Olowalu during the Māhele (Waihona `Aina Database 2006). The project area incorporated LCA 6728, awarded to Mahulu (Appendix A). According to Kalawa who testified for Mahulu, *apana* 2 was a houselot and *kula* in the *`ili* of Kaunakukahi in Olowalu. He stated that he had seen Mahulu's "...house lot and pasture at Kaumukukahi in Olowalu" (Mahele Document No. 06728). There appeared to be a problem, however, with some taro land (*apana* 1) in the *`ili* of Kamani (LCA 05620, Mahele Database 2006).

Sugar was to be the economic future of Hawai`i and as early as 1828, two Chinese brothers, Ahung and Atai, of Honolulu's Hungtai Company arrived in Wailuku to explore the possibility of setting up one of its earliest sugar mills. Atai soon created a plant that processed sugar cane cultivated by Hawaiians, named the Hungtai Sugar Works (Dorrance and Morgan 2000:15–16). Ahung later joined Kamehameha III's sugar producing enterprise, although by 1844 both operations had ceased. The Wailuku Sugar Company was the next to follow, in 1862, and would expand sugar production over the next 126 years of its existence—4,450 acres by 1939. The Olowalu Company was organized in 1881 on lands given up by the West Maui Plantation. A small company, it produced a maximum of 2, 969 tons of sugar in 1931 (Dorrance and Morgan 2000:64). At this time, it was purchased by the Pioneer Mill and became a part of their acreage. A Map of Olowalu Sugar Plantation recorded in 1881, shows cane lands slowly creeping towards and around the *kuleana* that are still in the possession of the awardees: John Clark LCA 240, Z. Kaauwai LCA 1742, Nahue Wahine LCA 5829, Minamina LCA 5952, Haia LCA 7719, Kehele (Kahele) LCA 5620, and Mahulu LCA6728 (Figure 3). At some point in time, all the LCAs, including the project area became a part of the sugar lands belonging to the Pioneer Mill Company Ltd.

SUMMARY

The "level of effort undertaken" (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project

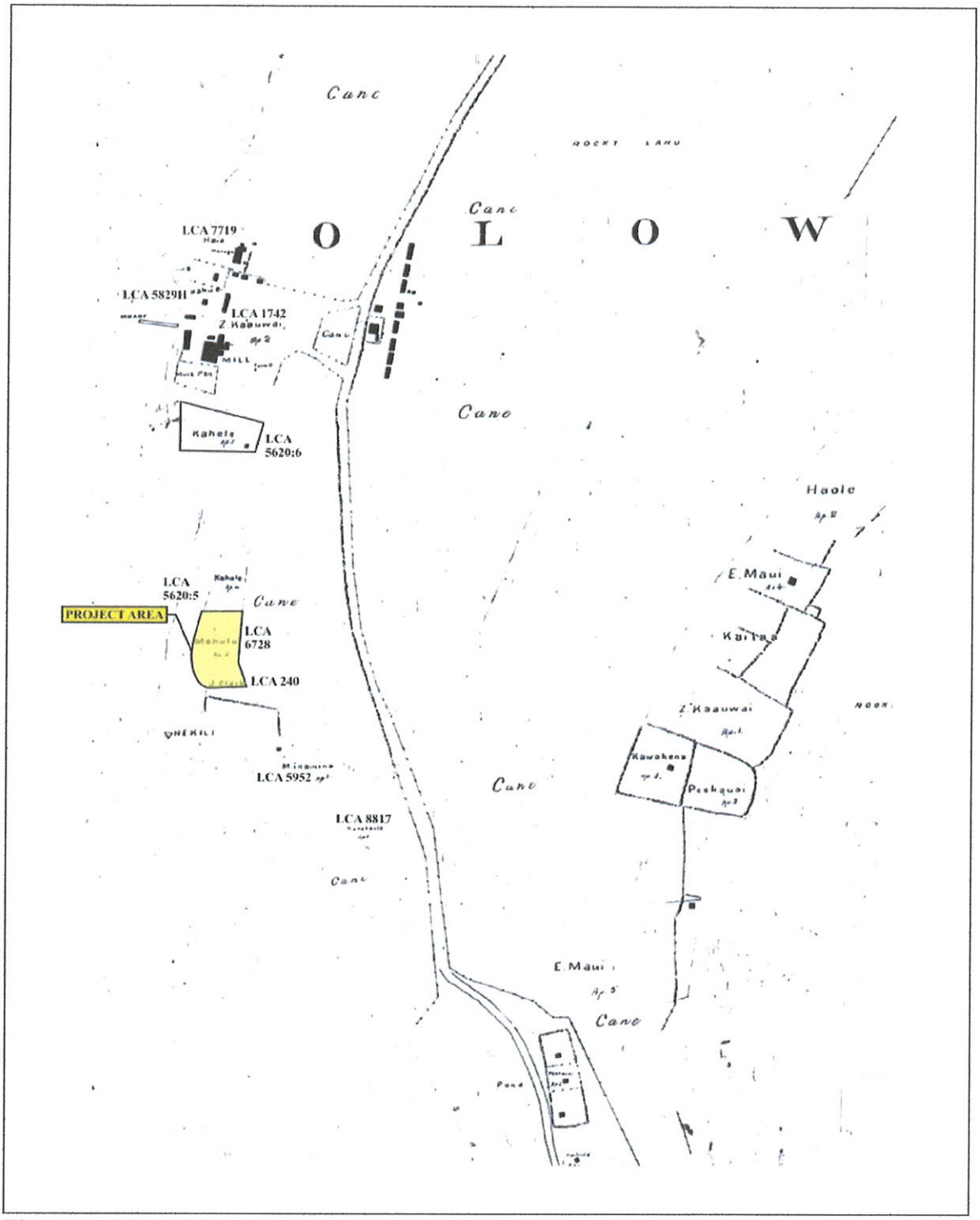

Figure 3: Map of Olowalu Sugar Plantation Maui, November 1881 (County of Maui Department of Planning).

APPENDIX A: LCA DATA

Review Cart & Checkout

DOCUMENT DELIVERY

Change password Log out

Mahele Database Documents

Number: 06728

Claim Number:	**06728**		
Claimant:	**Mahulu**		
Other claimant:			
Other name:			
Island:	**Maui**		
District:	**Lahaina**		
Ahupuaa:	**Olowalu**		
Ili:	**Kamani, Kaunakukahi**		
Apana:	**2**	Awarded:	**1**
Loi:	**20**	FR:	
Plus:		NR:	**414v6**
Mala Taro:		FT:	**223v7**
Kula:		NT:	**99v5**
House lot:	**1**	RP:	**4952**

Kihapai/Pakanu:		Number of Royal Patents:	**1**
Salt lands:		Koele/Poalima:	**No**
Wauke:		Loko:	**No**
Olona:		Lokoia:	**No**
Noni:		Fishing Rights:	**No**
Hala:		Sea/Shore/Dunes:	**Yes**
Sweet Potatoes:		Auwai/Ditch:	**No**
Irish Potatoes:		Other Edifice:	**Yes**
Bananas:		Spring/Well:	**No**
Breadfruit:		Pigpen:	**No**
Coconut:		Road/Path:	**No**
Coffee:		Burial/Graveyard:	**No**
Oranges:		Wall/Fence:	**No**
Bitter Melon/Gourd:		Stream/Muliwai/River:	**No**
Sugar Cane:		Pali:	**No**
Tobacco:		Disease:	**No**
Koa/Kou Trees:		Claimant Died:	**No**
Other Plants:		Other Trees:	
Other Mammals:	**No**	Miscellaneous:	**School house**

No. 6728, Mahulu, Olowalu, February 3, 1848
N.R. 414v6

To Kaauwai, Greetings and Peace: I hereby state my claim which may or may not be valid. It is a mala, and 20 lo'i, and a house lot. Perhaps, that is the claim.
Respectfully,
MAHULU

F.T. 223-224v7

No. 6728, Mahulu

Kalawa, sworn, I know the lands of Mahulu. They are in Kamani 3, Olowalu, and Kaunakukahi 1, Olowalu.

No. 1 is a section of kalo in Kamani 3.
No. 2 is a House lot and kula in "Kaunakukahi."

The claimant received these lands from Kaka, in the days of Kaaimalali, in 1843. There is no dispute about the House lot, but his title to the Kalo land is disputed by Piwaa the widow of Kaka. She says that her husband never gave the land to the Claimant.

Kanakaele, sworn, I heard Kaka say in the year 1843 to the Claimant, I don't h this land and I will give it to you and go and live on my son's land in Honuaula. Mahulu had tilled the land ever since.

Z. Kaauwai, sworn, for Piwaa. I know the land in dispute. In 1826 I lived here and this land there belonged to Kaka. In 1827 I received some of the loi in the disputed section. Kaka lived on this land until 1842 when he died. Before the death of Kaka, I asked Kaka who was his heirs, and he said his wife and children. They enjoyed this land until the year 1845 when Mahulu as luna took away this land for the first time. When he took it away Opunui, the son of Pawaa, was working it.

Kalawa recalled The House lot and kula piece is bounded:
Mauka and Hana sides by Naea's land
Makai by the sea shore
Kaanapali by my land.

No. 1 is bounded:
Mauka by Nakaikuaana's land
Hana by Kanahuliwa's land
Makai by Kealoaihue's land
Kaanapali by Kauauai's land.

There are three poalima lois in this piece.

N.T. 99-100v5
No. 6728, Mahulu

Kaalawa, sworn, He has seen 1 taro section at Kamani 3 and a house lot and pasture at Kaumukukahi in Olowalu. Land from Kaka during Kaaimalalo's time. No objections for the house lot. Pawaa is the wife of Kaka.

Z. Kaauwai has felt this interest for which Mahulu is claiming as his should be for Pawaii.

Kanakaole, sworn, He has heard Kaka and Mahulu say in 1843, that the interest in Kamani 3 is for Mahulu. Mahulu has lived and farmed there since that time to the present.

Z. Kaauwai, sworn, He has seen this section at Kamani in 1826, where Kaka was living. He was a school teacher there in 1847, so Kaka gave him 3 patches. Kaka continued to live there until his death in 1842.

When Kaauwai had returned for Wailuku, Kaka, named upon request his wife and children as heirs. The land was taken by Mahulu in 1845, where on he did farming from 1846 and 1847. No one had knowledge that Kaka had given the land to Mahulu.

The boundaries are:

Section 1 - Taro.
Mauka by Nakaikuaana
Hana by Kanahuliwaa
Makai by Kealoaikue
Kaanapali by Kanana.

Section 2 - School building.
Mauka and Hana by Naea's land
Makai by sea
Kaanapali by Kaalawa's house.

Poalima's are in the first section in Kamani.

[Award 6728; R.P. 4952; Kamani Olowalu Lahaina; 1 ap.; 3 roods 5 rods; Wailoa Olowalu Lahaina (Location index says Kamani & Wailoa 2 ap.; 1.69 Acs)]

APPENDIX F.

Preliminary Engineering and Drainage Report

PRELIMINARY

CIVIL ENGINEERING AND DRAINAGE REPORT

FOR

PROPOSED RESIDENCE

LOT 46-A

OLOWALU MAKAI-HIKINA SUBDIVISION

LAHAINA, MAUI, HAWAII

TAX MAP KEY: (2) 4-8-03:46

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871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII - 96793
JOB 98-59

DECEMBER 2007

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I. INTRODUCTION:

The purpose of this report is to provide a brief description of the existing infrastractural and drainage conditions at the project site and vicinity. It will also provide a brief summary of probable site improvements to support the project. It will also define the requirements for grading and Best Management Practices to control soil erosion during construction.

II. PROJECT DESCRIPTION:

The proposed project entails the construction of a single-story, 3-bedroom residence occupying a land area of about 3,215 square feet.

Related site work generally includes grading, driveway improvements, water, sewer and drainage systems. The proposed improvements are discussed in their respective sections of this report.

III. LOCATION:

The project site is located in Olowalu, a small community that lies along the shores of West Maui Mountains. It is particularly situated about 600 feet south of Honoapiilani Highway and mauka of a portion of Parcel 5. Refer to Figures 1, 2 and 3.

IV. ACCESS:

Regional access to the project site is primarily via Honoapiilani Highway which links West Maui to other parts of the island. The project site will be accessed from Honoapiilani Highway via a 24-foot wide access Easements A

and B across Lot 84-A of Olowalu Makai-Hikina Subdivision as shown on Figure 3.

V. EXISTING SOILS AND TOPOGRAPHY:

Soils at the project site are classified as Pulehu Silt Loam, 0 to 3 percent slopes (PpA) and Jaucas Sand, 0 to 15 percent slopes (JaC) [2]. PpA occupies most of the lot area while JaC is found on a narrow strip of the southern portion of the property. Refer to Figure 4. PpA belongs to Pulehu Soil Series that consist of well-drained soils on alluvial fans and stream terraces and in basins. It is characterized by slow runoff, no more than slight erosion hazard and moderate permeability.

JaC belongs to Jaucas Soil Series which consist of excessively drained, calcareous soils that occurs as narrow strips on coastal plains adjacent to the ocean. It is characterized by rapid permeability, very slow to slow runoff, slight water erosion hazard and severe wind erosion hazard where the vegetation is removed.

The existing topography of the project parcel is shown on Figure 6. The site is currently vacant. Generally, the site slopes down in a southerly direction towards the ocean at about one (1) percent. However, there is a low berm along the makai side of an existing dirt road that crosses the middle of the upper half of the property.

VI. WASTEWATER SYSTEM:

There is no existing County sewer collection system in the Olowalu area. The proposed residence will be served by an individual wastewater system (IWS) consisting of a septic tank and onsite leaching field. The IWS will be designed and installed in accordance with the requirements of the State Department of Health, Wastewater Branch. Location of the proposed IWS is schematically shown on Figure 7.

Based on the Department of Health Guidelines, the proposed three (3) bedroom residence must have a septic tank of at least 900 gallons capacity. The absorption area (leaching field) is based upon a flow of 200 gallons per bedroom per day and depends on the percolation rate (minutes per one inch) of the existing soil. Hence, the soil percolation rate must be determined before completion of the design of the IWS.

VII. WATER SYSTEM:

There is no existing County water system in the vicinity that could serve the proposed project.

Water requirements for the proposed residence is planned to be provided by Olowalu Water Company, LLC, a private entity that is currently providing potable water to users in Olowalu such as the Olowalu Mauka Subdivision.

VIII. DRAINAGE:

A. General:

The preliminary Drainage Study, in general, is based on the requirements, formulas, charts and tables of the Rules of the Design of Storm Drainage Facilities of the County of Maui [1] hereinafter referred to as County Drainage Standards.

B. Flooding Hazard:

The site is located within Flood Zones "C" and A4 as plotted on Panel 15003-0229B of the Flood Insurance Rate Map for the County of Maui. Refer to Figure 5.

Approximately the upper third portion of the lot is within Flood Zone "A" which is a designation for areas subject to minimal flooding. The lower 2/3 of the property falls within Zone A4 that designates areas of 100-year flooding. The established base flood elevation across this portion of the project site is 5 feet. Hence, any proposed improvements within this portion of the property shall comply with the requirements of Chapter 19.62, Flood Hazard Areas of the Maui County Code.

C. Existing Drainage Conditions:

At present, surface runoff from the lower 2/3 of the site generally flows in a westerly direction to discharge into the adjacent makai property and eventually into the shoreline area. Runoff from the upper third portion of the lot is diverted into the adjoining lots (Lots 45-A and 47-A) by an earth berm that runs along the makai side of the existing dirt road across

the site (see Figure 6). There is no man-made drainage facilities at the site or immediate vicinity.

D. Storm Runoff Quantities:

Hydrologic calculations are given in Appendix A - Preliminary Drainage Calculations. Based on the County Drainage Standards, the 10-year, 1-hour storm is used for surface runoff rates while the 50-year, 1-hour duration is used for the design of a drainage basin.

Based on the preliminary drainage calculations, the proposed project is anticipated to increase the existing 10-year storm runoff rate of 0.9 cfs to 1.7 cfs and the existing 50-year runoff volume of 2,143 cf to 2,928 cf, an increase of about 0.8 cfs and 785 cf, respectively. The runoff increases are due mainly to the introduction of impervious surfaces.

E. Conceptual Drainage Plan:

The proposed drainage plan is primarily to impound onsite the expected runoff volume increase as a result of the proposed project. This will be attained by the construction of retention basins which will be sized at a minimum to contain the 50-year runoff volume increase. The basins could be open-cut grassed lined or subsurface (perforated pipes with rock envelope buried underground) depending on the available space within the site. Preliminarily, two (2) open cut retention basins are proposed and are schematically laid out on Figure 7. The combined capacity of the basins must be at least the projected 50-year, 1-hour runoff volume increase.

F. Operation and Maintenance Plan:

The operation and maintenance of the proposed drainage facilities will be handled by the owner. The recommended operation and maintenance activities will include, but not limited to:

1. Periodic inspection of retention basins and drainage swales and after major storms. Repair damages, if any. Remove debris at drainage swales to permit unimpeded flow.
2. Removal of debris and sediment build-up in retention basins in order to maintain their design capacities.
3. Maintaining healthy growth of grass lawns and landscaping to prevent soil erosion; thereby reducing sediments that might enter the retention basins and the shoreline area.

G. Conclusion:

The proposed project will increase the existing storm runoff mainly due to addition of impervious surfaces such as concrete slabs and roofs. Despite the increase in runoff, the proposed residential development is not anticipated to have adverse significant drainage effects on adjacent and downstream properties. The proposed retention basins will retain the runoff increase onsite resulting in zero runoff increase to downstream properties. The proposed retention basins will also have the effect of reducing the potential for sediments contained in the runoff from entering the nearby seashore.

IX. GRADING REQUIREMENTS:

The site will be graded to properly receive the proposed improvements. Site grading will be in conformance with the applicable requirements of Chapter 20.08, Soil Erosion and Sedimentation and Chapter 19.62, Flood Hazard Areas of the Maui County Code. A grading and grubbing permit must be obtained from the Development Services Administration prior to grading and grubbing work. Along with the Grading and Best Management Practices (BMPs) plans, the following are to be submitted for grading permit application:

1. Verification if a coastal dune exists on the property by a Coastal Scientist. Grading of coastal dunes are prohibited.
2. Copy of SMA permit. All construction related conditions of the SMA permit shall be included in the grading plans.
3. Limits of shoreline setback area as determined by the Department of Planning. The importation and placement of soil within the shoreline setback area is prohibited.

X. BEST MANAGEMENT PRACTICES:

Requirements for the temporary control of soil erosion and dust during site improvement will be outlined and shown on the design construction plans. Some of the requirements will be as follows:

1. Control dust by means of water trucks or by installing temporary sprinkler systems or both if necessary.
2. Graded areas shall be thoroughly watered after construction activity has ceased for the day and for weekends and holidays.

3. All exposed areas shall be paved, grassed, or permanently landscaped as soon as finished grading is completed.

4. Storm runoff will be diverted away from graded areas to natural and/or existing drainageways during construction by means of sand bag berms or lined temporary swales.

5. Time of construction will be minimized.

6. Only areas that are needed for new improvements will be cleared.

7. Early construction of drainage control features.

8. Construction of proposed basins prior to mass grading of project site. The basins could be temporarily utilized as sediment catchment during construction. Storm runoff from construction area will be diverted to the basins.

9. Installation of dust control fence surrounding the project site.

10. Installation of silt fence, gravel bag berms or other approved sediment trapping devices at the downstream side of the grading area.

11. Temporary control measures shall be in place and functional prior to construction and shall remain operational throughout the construction period or until permanent controls are in place.

The Contractor will also be required to submit a satisfactory soil erosion control plan to minimize soil erosion prior to an issuance of a grubbing and grading permit by the Development Services Administration. Best Management Practices shall be in compliance with Section 20.08.035 of the Maui County Code (Ord. No. 2684) and "Construction Best Management Practices (BMPs) for the

County of Maui" of the Department of Public Works & Waste Management, May 2001.

XI. CONSTRUCTION PLAN APPROVALS:

Approval of construction plans for site development of the proposed project will be obtained from the Development Services Administration, Department of Public Works; Fire Prevention Bureau; Department of Planning; and State Department of Health, Wastewater Branch. The various improvements will be designed in compliance with the applicable requirements of these governmental agencies.

XII. REFERENCES:

1. Rules for the Design of Storm Drainage Facilities in the County of Maui, Title MC-15, Department of Public Works and Waste Management, County of Maui, Chapter 4.

2. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, prepared by U. S. Department of Agriculture, Soil Conservation Service, August 1972.

3. Flood Insurance Rate Maps for the County of Maui, June 1981.

4. Rainfall-Frequency Atlas of the Hawaiian Islands, Technical Paper No. 43, U. S. Department of Commerce, Weather Bureau, 1962.

5. Erosion and Sediment Control Guide for Hawaii, prepared by U. S. Department of Agriculture, Soil Conservation Service, March 1981.

6. Construction Best Management Practices (BMPs) for the County of Maui, Dept. of Public Works and Waste Management, County of Maui, May 2001.

APPENDIX A

PRELIMINARY DRAINAGE CALCULATIONS
PROPOSED RESIDENCE
LOT 46-A
OLOWALU MAKAI-HIKINA SUBDIVISION
TMK: (2) 4-8-03:46
DECEMBER 2007

GENERAL

I. Reference: Rules for the Design of Storm Drainage Facilities in the County of Maui, November 12, 1995

II. Hydrologic Criteria:

A. 10-Year, 1-Hour: for surface flow runoff rate

1-Hr. Rainfall Value = 2.0"

B. 50-Year, 1-Hour: for storm runoff volumes

1-Hr. Rainfall Value = 2.5"

III. Runoff Quantity:

A. Methodology:

1. Rational Method, Q = CIA

Where Q = Flow rate in cubic feet per second (cfs)

C = Runoff Coefficient

I = Rainfall intensity in inches per hour for a duration equal to the time of concentration

A = Drainage Area in Acres

= 0.80 Ac.

Hydrologic calculations employing this method were performed on computer using hydrologic software "Hydraflow Hydrographs 2004" by Intelisolve. The Standard Rational Method is used to calculate runoff

peak discharges while the Modified Rational Method is employed to determine runoff volumes.

B. Runoff Coefficient, C:

C Values:

Unimproved	= 0.30
Impervious Areas (Roofs, Conc., etc.)	= 0.95
Lawn (Developed)	= 0.17

1. Existing Condition:

$C = 0.30$

2. Developed Condition:

Impervious	= 0.25 Ac.
Lawn	= 0.55 Ac.

$$C_w = \frac{0.25 \times 0.95 + 0.55 \times 0.17}{0.80}$$

$$= 0.41$$

C. Time of Concentration, TC:

Length	= 170 ft.
Slope	= 1.0%
Tc	= 17 min. (Average Grass, Existing)
	= 5 min. (Paved, Developed)

D. Runoff Discharge:

Refer to attached Hydrograph Calculations. The proposed project is anticipated to increase the storm runoff as follows:

10-Year Storm Runoff Peak Rate:

Existing		= 0.9 cfs (Hyd. No. 1)
Developed		= 1.7 cfs (Hyd. No. 2)
	Increase	= 0.8 cfs

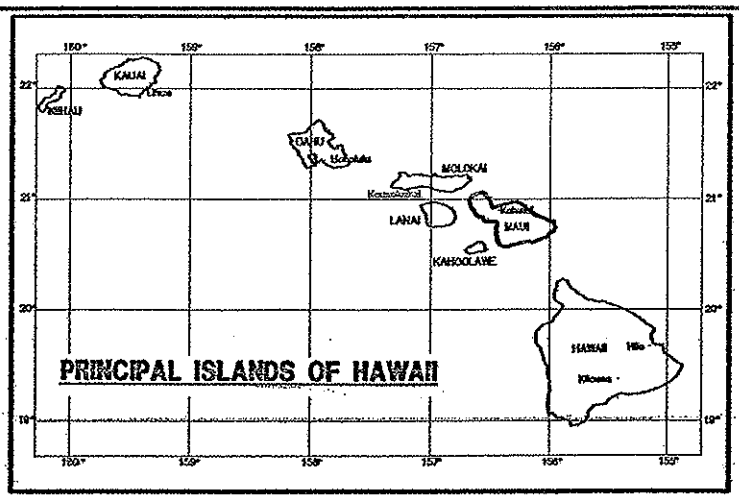
50-Year Storm Runoff Volume:

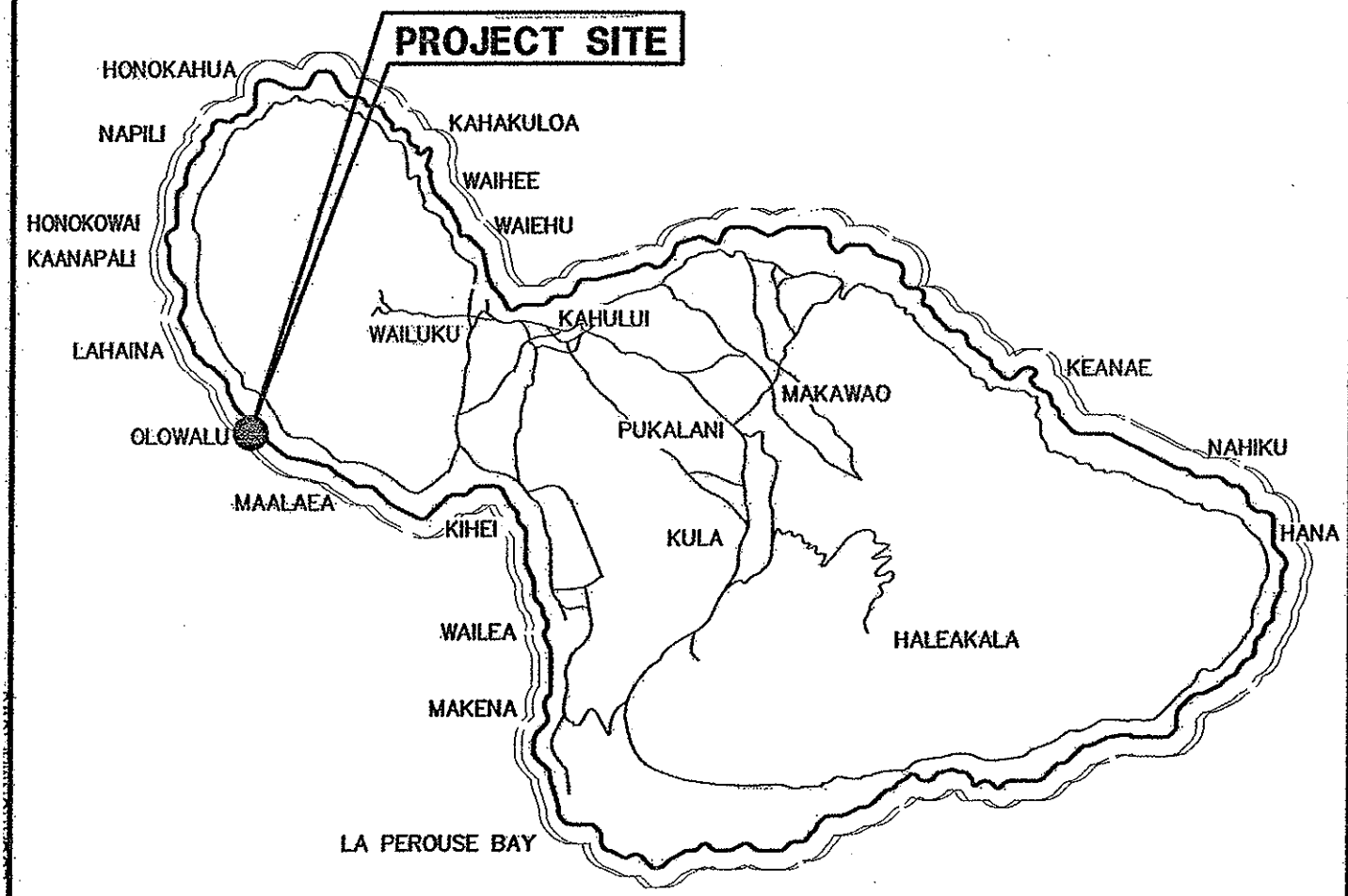
Existing		= 2,143 cf (Hyd. No. 3)
Developed		= 2,928 cf (Hyd. No. 4)
	Increase	= 785 cf (Min. Volume to be retained onsite in order not to increase existing runoff volume)

IV. RETENTION BASIN:

Following the applicable guidelines of the Storm Drainage Standards, the proposed retention basins will be designed to contain, at least, the 1-hour, 50-year runoff volume increase generated by areas less than 100 acres. Capacity of the basins will be calculated without taking into account the volume that percolates into the ground and that only 50% of void volume of crushed rock, if used, will be included.

Preliminarily open-cut retention basins are proposed since there is available space. The location of the proposed basins is shown on Figure 7. The capacity of each basin must be at least 400 cf to be able to impound the projected 50-year, 1-hour runoff volume.





N

LOCATION MAP

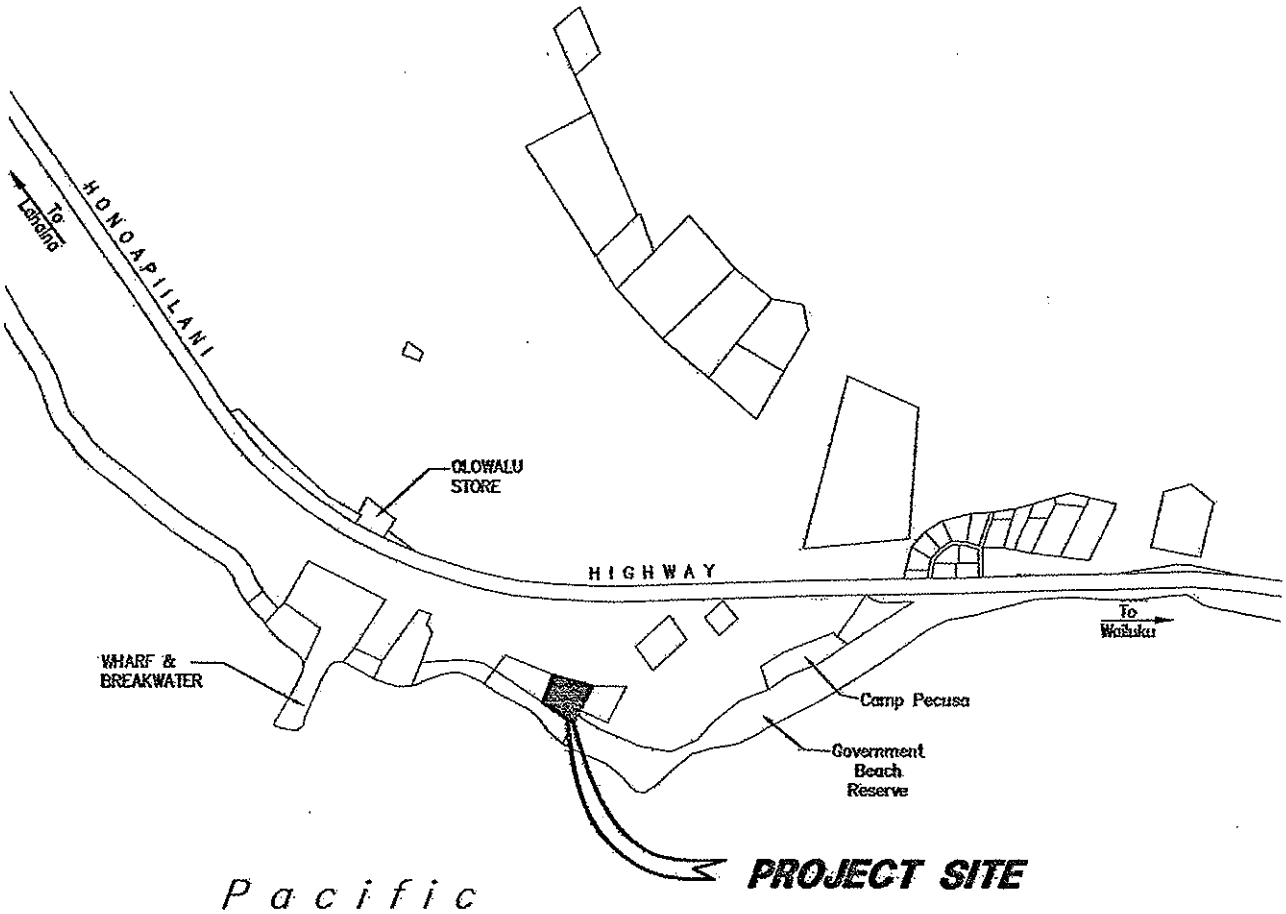
ISLAND OF MAUI

Tax Map Key (2) 4–8–03: 047

FIGURE 1

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

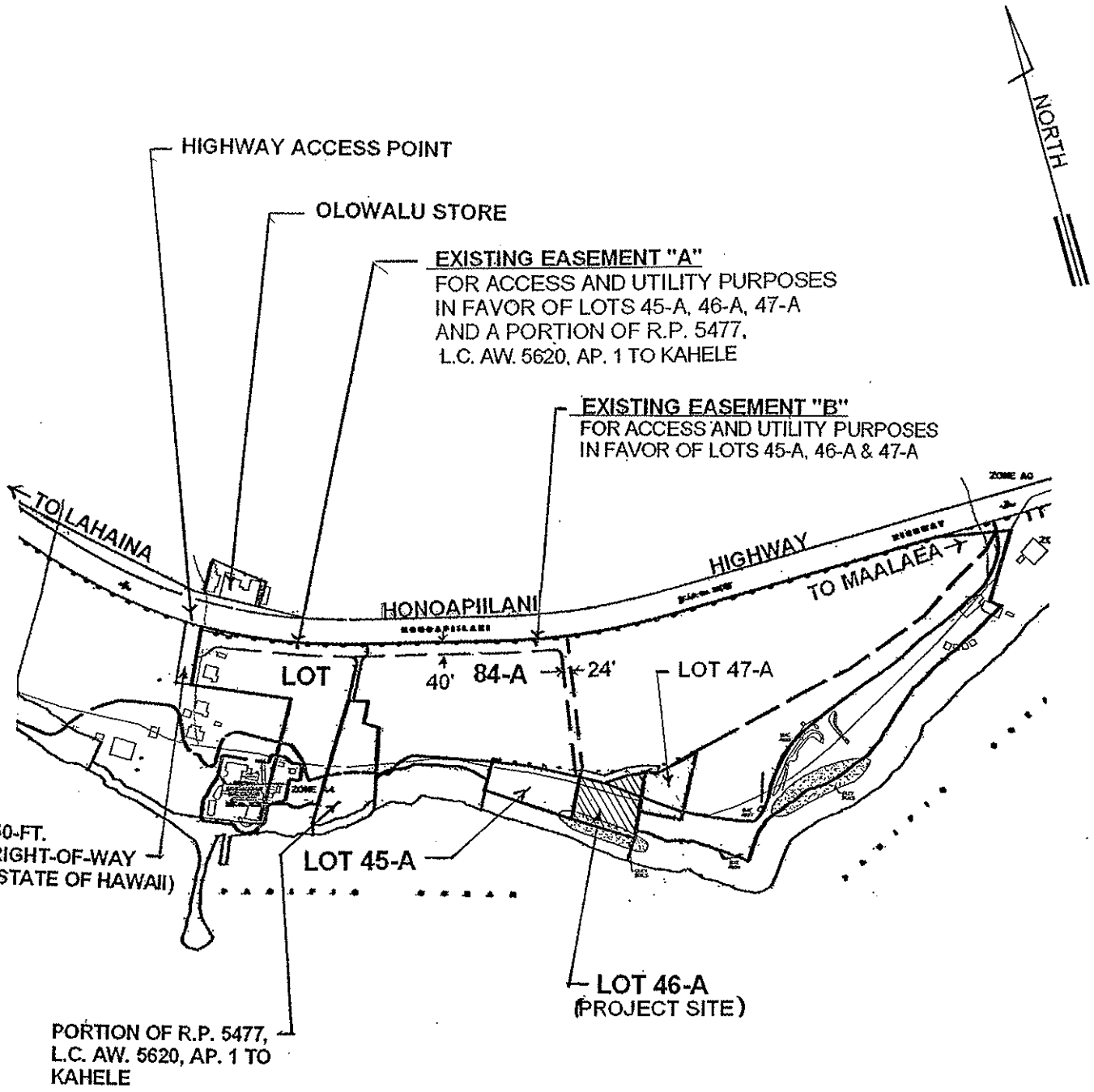
R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS – CIVIL & STRUCTURAL ENGINEERS



VICINITY MAP

NOT TO SCALE

FIGURE 2

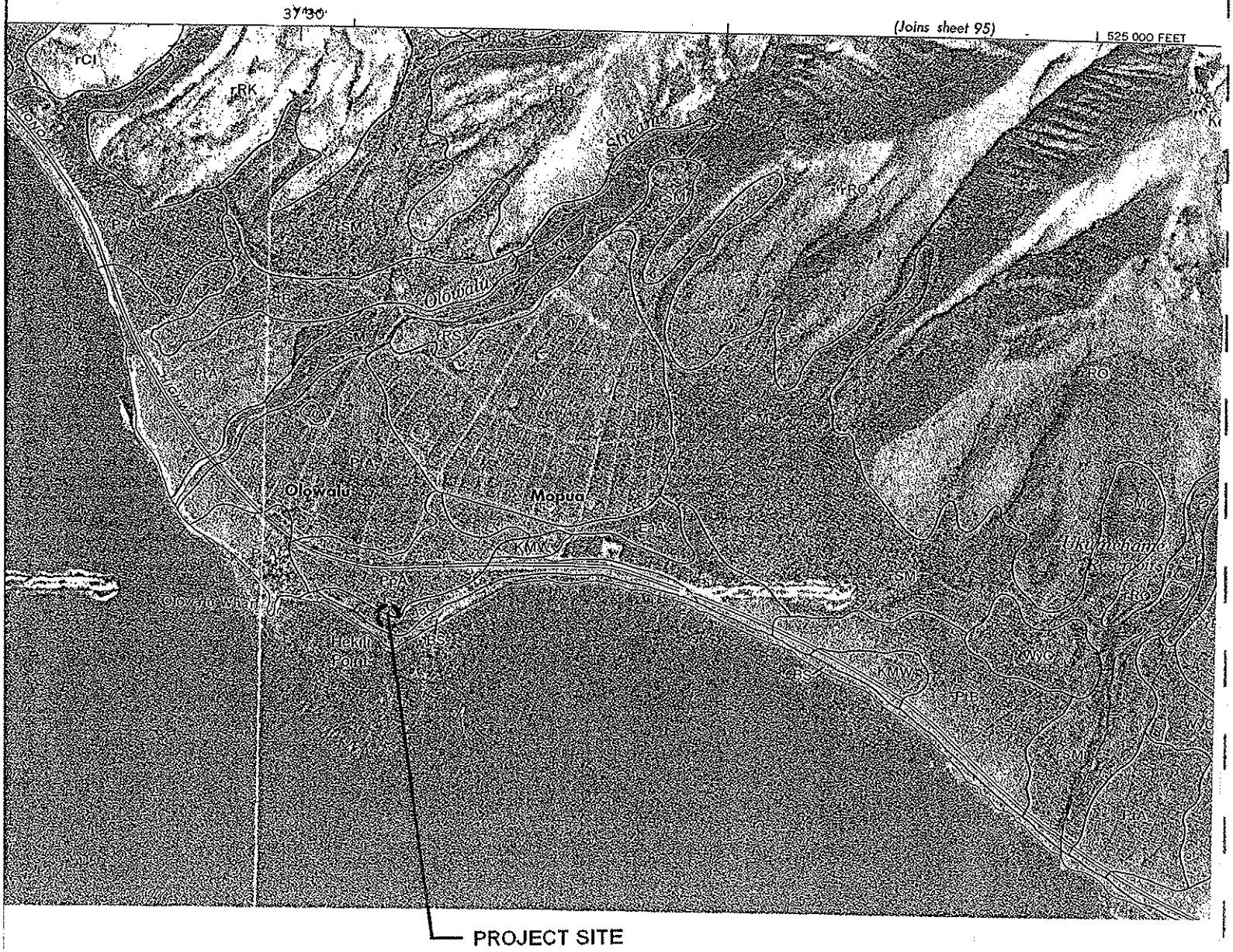


ACCESS PLAN

Scale: 1" = 500'

FIGURE 3

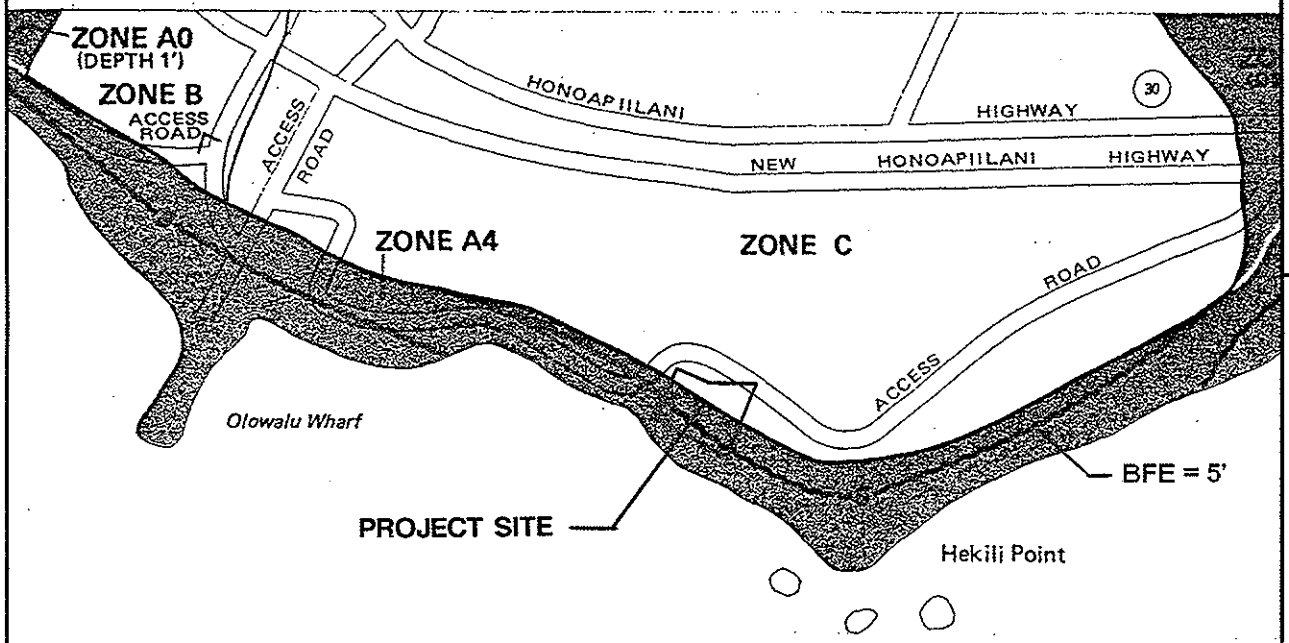
96



SOILS MAP

Scale: 1' = 2,000'

FIGURE 4



FLOOD ZONE DESIGNATION

Zone C: Areas of Minimal Flooding
(No Shading)

Zone A4: Areas of 100-year Flood;
Base Flood Elevations (BFE) and
Flood Hazard Factors area determined.

PACIFIC OCEAN

FIGURE 5

APPROXIMATE SCALE

500 0

NATIONAL FLOOD INSURANCE PROGRAM

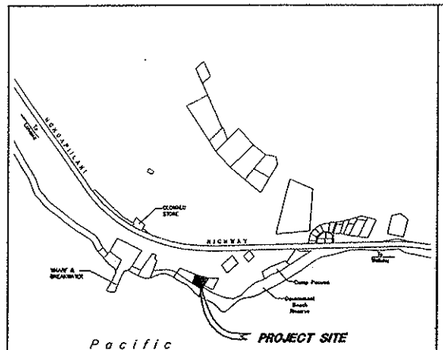
FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

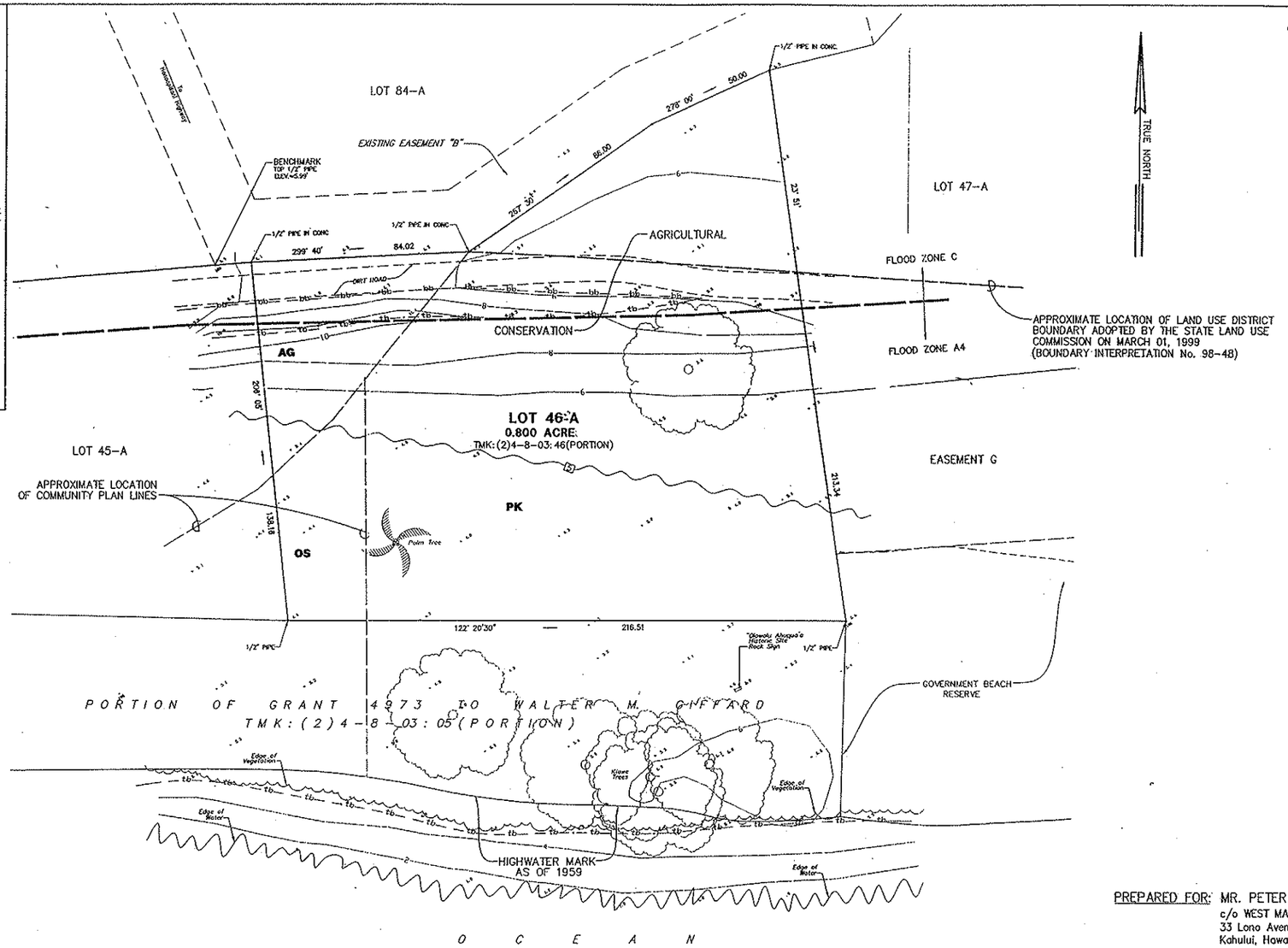
PANEL 229 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0229 B
EFFECTIVE DATE:
JUNE 1, 1981

federal emergency management agency
federal insurance administration



VICINITY MAP
NOT TO SCALE



LEGEND:

- CONTOUR
- EXISTING SPOT ELEVATION
- TRAVERSE STATION WITH ELEVATION
- COMMUNITY PLAN DESIGNATION LINE (APPROX.)
- BASE FLOOD CONTOUR
- FLOOD ZONE LINE (APPROX.)

NOTES FOR TOPOGRAPHIC FEATURES:

1. ELEVATION DATUM = MEAN SEA LEVEL.
2. ALL VISIBLE UTILITY STRUCTURES HAVE BEEN LOCATED IN THE FIELD, HOWEVER, CONNECTION OF UNDERGROUND UTILITY LINES AS SHOWN ARE UNVERIFIED AND COMPILED FROM EXISTING DATA. UNDERGROUND UTILITIES SHOWN HEREON ARE FOR INFORMATION ONLY, HAVING BEEN OBTAINED FROM THE BEST AVAILABLE SOURCES, BUT FROM OTHERS NOT CONNECTED WITH THIS COMPANY. THEREFORE, NO GUARANTEE IS MADE ON THE ACCURACY OR COMPLETENESS OF SAID INFORMATION.
3. THE FLOOD ZONE INFORMATION SHOWN IS INTERPOLATED FROM THE FLOOD INSURANCE RATE MAP PANEL 150003 0229B, DATED JUNE 1, 1981.

TOPOGRAPHIC SURVEY MAP
OF
LOT 46-A, OLOWALU MAKAI-HIKINA SUBDIVISION AND A PORTION OF GRANT 4973 TO WALTER M. GIFFARD

AT OLOWALU, LAHAINA, MAUI, HAWAII

20 10 0 20 40
GRAPHIC SCALE IN FEET

Scale: 1" = 50'

PREPARED FOR: MR. PETER MARTIN
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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

KIRK T. TANAKA
LICENSED PROFESSIONAL LAND SURVEYOR No. 7223-LS HAWAII, U.S.A.

05/29/07
KIRK T. TANAKA
Licensed Professional Land Surveyor
Certificate No. 7223
License Expires: APRIL 30, 2008
DATE

Tax Map Key (2) 4-8-03: 05 & 46 (PORTIONS)

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

MAY 29, 2007
JOB NO. 98-059

FIGURE 6

SOURCE: SHEET A-1 OF ARCHITECTURAL DRAWINGS (8/12/07)

EXISTING EASEMENT B
(24 FT. WIDE) FOR ACCESS AND
UTILITY PURPOSES IN FAVOR OF
LOTS 45-A, 46-A AND 47-A

PROPOSED LOCATION OF IWS

APPROXIMATE LAND USE
DISTRICT BOUNDARY

APPROXIMATE FLOOD
ZONE BOUNDARY

AGRICULTURAL

CONSERVATION

ZONE C

ZONE A4

DIRT ROAD

50'

86'

84'

125.54'

LOT 47-A

LOT 45-A

138.24

PROPOSED RESIDENCE

GRADE LAWN AREA TO DRAIN
INTO BASIN TO EXTENT POSSIBLE

40'

GRADE LAWN AREA TO DRAIN
INTO BASIN TO EXTENT POSSIBLE

40'

61.72'

PROPOSED LOCATION OF OPEN-CUT
RETENTION BASIN "A" (SEE NOTE)

PROPOSED LOCATION OF OPEN-CUT
RETENTION BASIN "B" (SEE NOTE)

LOT 46-A
0.800 ACRE

216.15'

100' SETBACK

100' SETBACK

26.08'

(64.0')

61

"Olowalu Ahupua'a
Historic Site
Rock Sign

(73')

NOTE: ROOF RUNOFF TO BE DISCHARGED
TO PROPOSED BASIN VIA
UNDERGROUND PIPING

SCHEMATIC SITE PLAN

Scale: 1" = 30'

FIGURE 7