

~~Draft~~Final Environmental Impact Statement

PROPOSED KIHEI RESIDENTIAL PROJECT

(TMK Nos. 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Prepared for:

A&B Properties, Inc.

Accepting Authority:

**State of Hawai`i,
Land Use Commission**

~~September 2007~~ May 2008



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~~September 2007~~May 2008

This document was prepared under my supervision and the information submitted, to the best of my knowledge, fully addresses document content requirements as set forth in sections 11-200-17 and 11-200-18 of the Hawai`i Administrative Rules, as appropriate.



Michael T. Munekiyo, A. I. C. P.
Project Manager

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Executive Summary

Project Name: Kihei Residential Project

Type of Document: ~~Draft~~Final Environmental Impact Statement

Legal Authority: Chapter 343, Hawai'i Revised Statutes

Agency Determination: ~~Environmental Impact Statement to be Prepared~~

Applicable Environmental Assessment review "Trigger": Proposed Amendment to Kihei-Makena Community Plan and Use of State or County Lands

Location: Maui Island
Kihei
TMK Nos. 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Landowner: Alexander & Baldwin, Inc.

Applicant: A&B Properties, Inc.

Accepting Authority: State Land Use Commission
P. O. Box 2359
Honolulu, Hawai'i 96804
Contact: ~~Anthony Ching, Executive Officer~~**Rodney Maile, Interim Executive Officer**

Phone: (808) 587-3822

EIS Preparer: Munekiyo & Hiraga, Inc. (under contract to A&B Properties, Inc.)
305 High Street, Suite 104
Wailuku, Hawai'i 96793
Contact: Kyle Ginoza
Phone: (808) 244-2015

Project Summary: ~~The applicant proposes to develop approximately 600 residential dwelling units on approximately 94.3 acres in the Kihei Residential project. The project will include single-family and multi-family housing types and will include affordable units. A small neighborhood commercial area, as well as park and open space areas with trails and bike paths, are also proposed at the project.~~

The project is anticipated to provide much-needed new housing supply for Maui's residents. Necessary infrastructure systems and services can be reasonably provided to serve the project. Moreover, the proposed action is not anticipated to result in significant adverse cumulative or secondary impacts:

Two (2) unresolved issues regarding project development are a mauka roadway, parallel to and east of Pi'ilani Highway; and water system improvements. The applicant has consulted with the Department of Public Works and the Department of Water Supply, respectively, to reach resolution on these outstanding items. These discussions are ongoing.

The applicant has evaluated the no action alternative, alternative uses of the site, and alternative site locations. However, these options will not address the pervasive need for affordable housing in the area.

In order to implement the project, the following approvals and permits are anticipated: State Land Use District Boundary Amendment, Community Plan Amendment, Change in Zoning, subdivision approval, and construction permits.

This site is situated at an attractive and central location in North Kihei, in close proximity to employment centers in South and Central Maui. The site is considered an infill location and is suitable for the development of a range of housing types to meet the housing needs of the region.

Project Summary

PROJECT DESCRIPTION:

The applicant proposes to develop approximately 600 residential dwelling units on approximately 94.3 acres in the Kihei Residential Project. The project will include single-family and multi-family housing types and will include affordable units. A small neighborhood commercial area, as well as park and open space areas with trails and bike paths, are also proposed at the project.

SIGNIFICANT BENEFICIAL AND ADVERSE IMPACTS:

The project is anticipated to provide much needed new housing supply for Maui's residents. Necessary infrastructure systems and services can be reasonably provided to serve the project. In addition, the project is anticipated to have a beneficial impact on the local economy both during construction and in the long term. Real property taxes generated by the project residents will contribute to the County's revenue tax base to support increases in regional public service demands over time.

From an infrastructure use perspective, project implementation will result in impacts to existing hydrology (drainage), largely due to the increase in impervious surface area, and other impacts related to wastewater, water, park, school, and roadway usage.

PROPOSED MITIGATION MEASURES:

Impacts resulting from infrastructure use will be mitigated either through the provision of additional resources onsite and offsite (drainage, water, and park) or through the payment of fair-share contributions (wastewater, school, and traffic). Additionally, in the long-term, real property taxes generated by project residents will help to offset costs of increased regional public service demands.

ALTERNATIVES CONSIDERED:

The applicant has evaluated the no action alternative, alternative uses of the site, and alternative site locations. However, these options will not address the pervasive need for the timely provision of affordable housing in the area. Further, alternative site layouts were

considered, though the proposed master plan was selected based on compatibility with adjacent residential land uses and its mix of housing types based on market preferences.

UNRESOLVED ISSUES:

Two (2) unresolved issues regarding project development are discussed. As noted in the Traffic Impact Analysis Report, intersections along Pi'ilani Highway in the vicinity of the project are anticipated to experience increasing traffic congestion in the future, even without the proposed project. The TIAR recommends applicable mitigation measures to address these future conditions. Included among these is the concept of a mauka roadway parallel to and mauka of the existing Pi'ilani Highway. The project's roadway system, including any connection to existing and future roadways, will be developed in consultation with the State Department of Transportation and the County Department of Public Works. Applicable traffic mitigation measures will be developed and implemented in consultation with the State Department of Transportation and the County Department of Public Works.

The applicant will participate in the funding and construction of adequate drinking water source, storage, and transmission facilities and improvements to accommodate water use generated by the project. The applicant is exploring several potential source opportunities, including surface water treatment and new well sources in Central Maui. To meet the water storage needs of the project, the applicant is in discussions with neighboring landowners concerning the location of such a tank, as well as potential joint development opportunities. All water system improvements will be developed with the cooperation and consent of the Department of Water Supply. Regarding potential non-drinking water supply, the applicant will examine partnership opportunities and will consult with the Department of Environmental Management staff concerning the extension of the R-1 water line.

Additionally, the applicant remains in discussions with various governmental agencies regarding assessment fees for infrastructure and public services, including fair-share educational contribution, park and playground assessment fees, traffic impact fees, and participation in Kihei wastewater system improvements, as well as the potential presence of arsenic and other pesticides at the property. While not specifically determined at this time, these matters will be resolved as the project progresses through the entitlement process and prior to development. Similarly, while affordable housing requirements are set forth in the Maui Residential Workforce Housing Policy, the applicant will coordinate with the Department of Housing and Human Concerns regarding the formulation and execution of an affordable housing agreement prior to development of the project.

LAND USE COMPATIBILITY:

The proposed project will require several land use entitlement approvals to proceed. A summary of the current land use parameters and the entitlement designations being sought for land use consistency with residential and commercial use is presented below.

Land Use Parameter	Existing Designation	Proposed Designation
State Land Use District	Agricultural (94.3 acres)	Urban (94.3 acres)
Kihei-Makena Community Plan	Agriculture (94.3 acres)	Multi-Family (67.9 acres)
		Single-Family (25.0 acres)
		Commercial (1.4 acres)
County Zoning	Agricultural (94.3 acres)	A-1, Apartment District (52.8 acres)
		A-2, Apartment District (15.1 acres)
		R-1, Residential District (25.0 acres)
		B-2, Community Business District (1.4 acres)

LIST OF PERMITS AND APPROVALS:

A summary of the required permits and approvals and an estimated time schedule for application and approval for project implementation is presented below.

Permit or Approval	Anticipated Submission Date	Anticipated Approval Date
District Boundary Amendment	2007	2008
Community Plan Amendment	2008	2010
Change in Zoning	2008	2010
Subdivision Approval	2010	2010
NPDES Permits, as applicable	2010	2011
Construction Permits	2011-2016	2011-2016

LIST OF DOCUMENT AUTHORS

<u>Document Name</u>	<u>Author</u>
Archaeological Inventory Survey Report:	Cultural Surveys Hawai`i, Inc.
Botanical and Fauna Surveys:	Robert W. Hobdy
Cultural Impact Assessment:	Cultural Surveys Hawai`i, Inc.
Environmental Impact Statement:	Munekiyo & Hiraga, Inc.
Market Study and Economic Impact Analysis:	ACM Consultants, Inc.
Preliminary Engineering Report:	R.M. Towill Corporation
Preliminary Drainage and Erosion Control Report:	R.M. Towill Corporation
Traffic Impact Analysis Report:	Austin, Tsutsumi & Associates, Inc.

List of Acronyms

AaB	Alae Sandy Loam
ALISH	Agricultural Lands of Importance to the State of Hawai'i
AMSL	Above Mean Sea Level
BMP	Best Management Practices
CIZ	Change in Zoning
CPA	Community Plan Amendment
CWRM	Commission on Water Resource Management
DBA	District Boundary Amendment
DLNR	Department of Land and Natural Resources
DOE	Department of Education
DOH	Department of Health
DOT	Department of Transportation
DPW	Department of Public Works
DWS	Department of Water Supply
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HAR	Hawai'i Administrative Rules
HC&S	Hawaiian Commercial & Sugar Company
HCZMP	Hawai'i Coastal Zone Management Program
HEER	Hazard Evaluation and Emergency Response
HRS	Hawai'i Revised Statutes
HUD	United States Housing and Urban Development
KWRF	Kihei Wastewater Reclamation Facility
LOMR	Letter of Map Revision
LOS	Level of Service
LSB	Land Study Bureau
MCC	Maui County Code
MECO	Maui Electric Company
MRWHP	Maui Residential Workforce Housing Policy
NPDES	National Pollutant Discharge Elimination System
OHA	Office of Hawaiian Affairs
PpA	Pulehu Silt Loam

SHPD	State Historic Preservation Division
SLUC	State Land Use Commission
SMA	Special Management Area
TIAR	Traffic Impact Analysis Report
TMK	Tax Map Key
USF&WLS	United States Fish and Wildlife Service
W1D2	Waiakoa Extremely Stony Silty Clay Loam
WgB	Waiakoa Very Stony Silty Clay Loam
WWRD	Department of Environmental Management, Wastewater Reclamation Division

I. PROJECT OVERVIEW

I. PROJECT OVERVIEW

A. PROJECT LOCATION, OWNERSHIP, AND CURRENT LAND USE

The subject property comprises approximately 94.3 acres and is identified by Tax Map Key (TMK) Nos. 3-8-04:002 (por.), 022 (por.), and 030 (por.). See **Figure 1** and **Figure 2**.

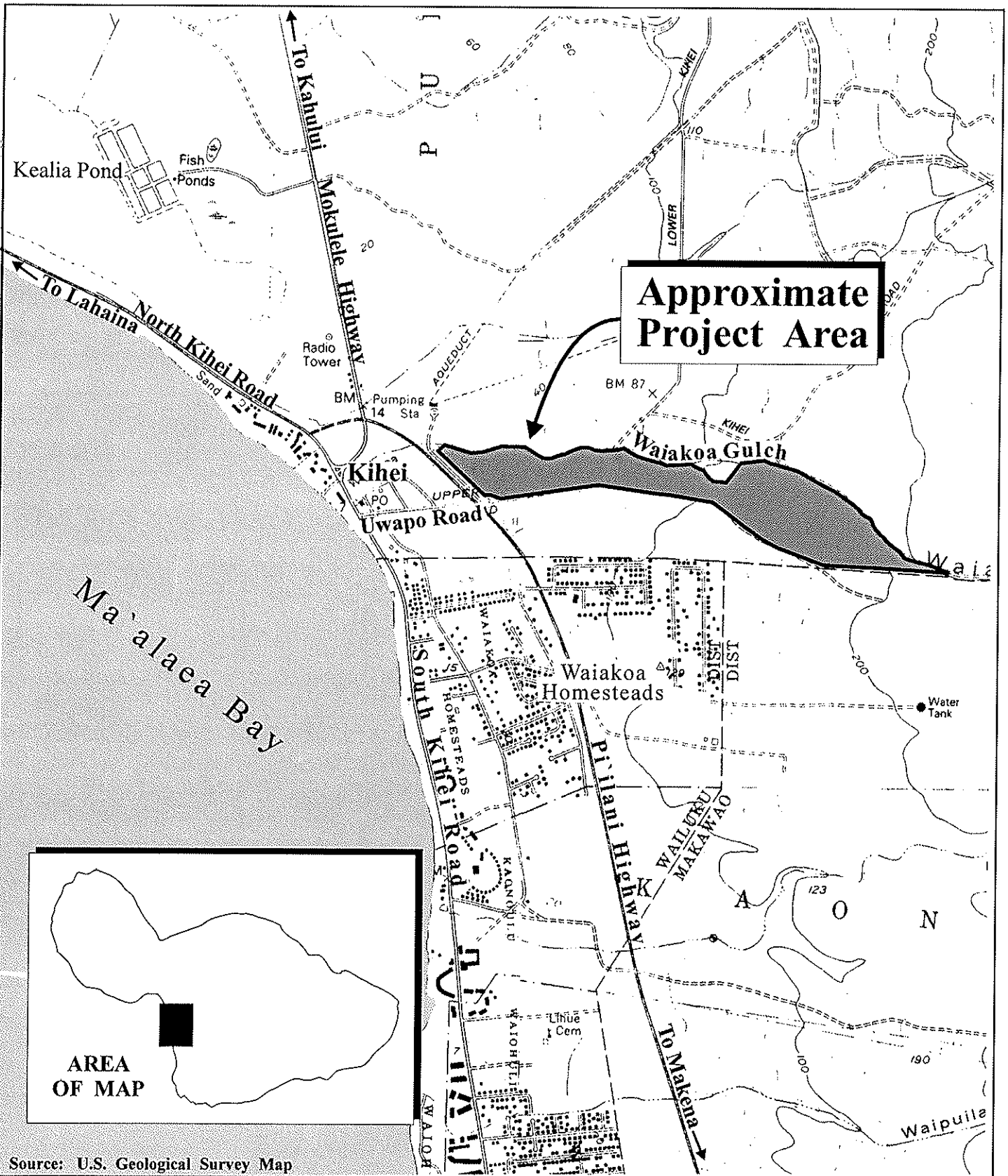
The subject property is located in Kihei, Maui on the mauka or eastern side of Pi'ilani Highway, approximately a quarter of a mile south of the Pi'ilani Highway-Mokulele Highway **North Kihei Road** intersection. The makai or western portion of the parcel is used for seed corn and truck crop cultivation, while the mauka portion of the property is vacant and unused. Single-family residential uses border the property to the immediate south and Waiakoa Gulch forms the northern boundary of the property. Vacant and undeveloped urban lands lie to the west of the property across Pi'ilani Highway, and unused agricultural lands occupy lands to the east. The property lies at the northern gateway to the Kihei area. See **Figure 3** and **Figure 4**.

Current access to the property is provided off of Kaiwahine Street and Pi'ilani Highway.

The parcels are owned by Alexander & Baldwin, Inc. and A&B Properties, Inc. is the authorized applicant.

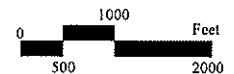
B. PROPOSED ACTION

A&B Properties, Inc. proposes to develop a master-planned residential community on approximately 94.3 acres of land situated in Kihei, Maui, Hawai'i. See ~~Figure 4~~ **Figure 5**. The project includes a mix of single-family detached and multi-family residential units, as well as a small neighborhood commercial area. **The project proposes a total of 600 residential units in addition to a small 1.4 acre neighborhood commercial site at its western (makai) end. Approximately 200 multi-family attached units are proposed at the western portion of the site and is labeled "Multi-Family Residential" on Figure 5. The central portion of the site is planned for approximately 100 single-family**



Source: U.S. Geological Survey Map

Figure 1 Proposed Kihei Residential Project
Regional Location Map



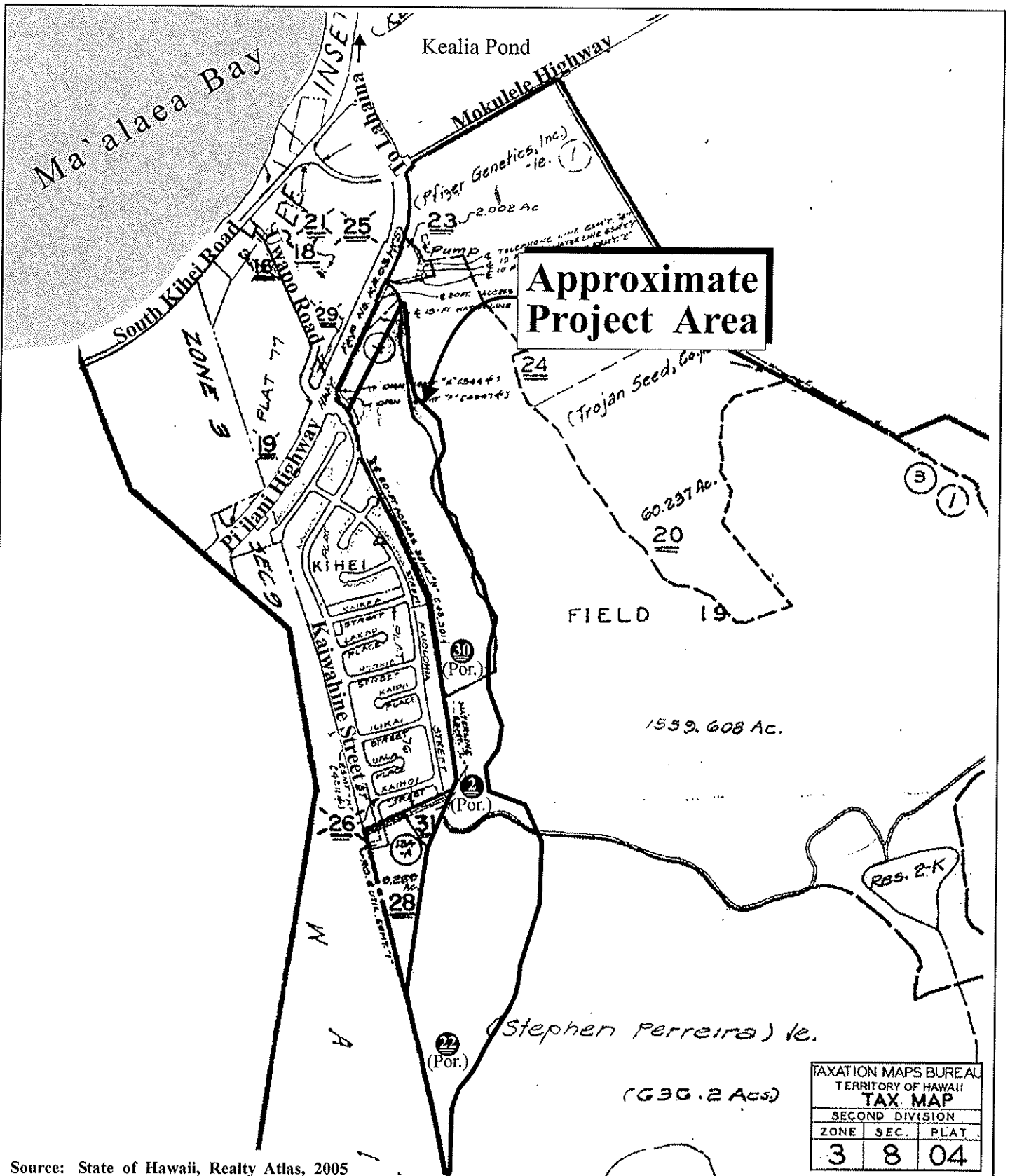
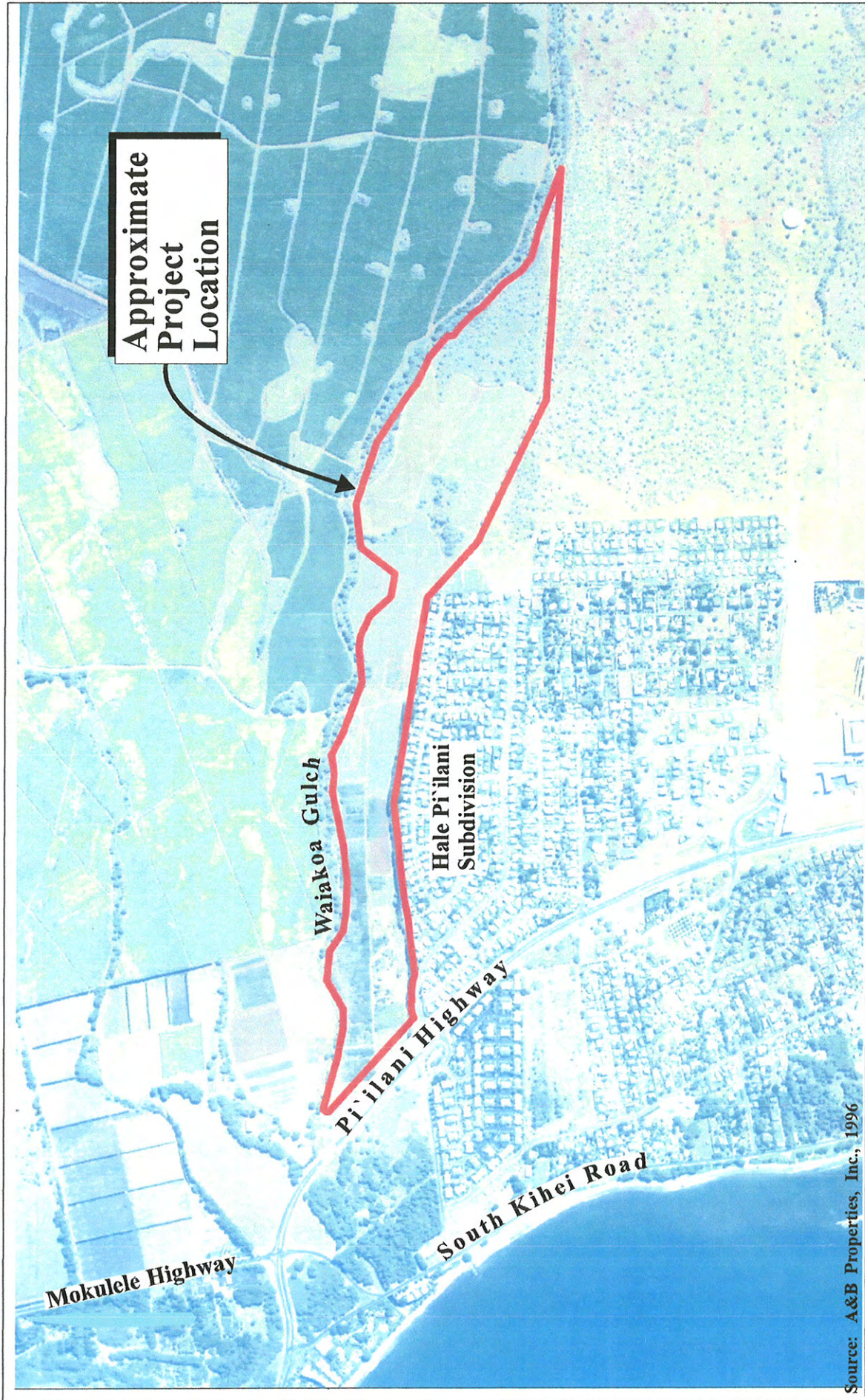


Figure 2 Proposed Kihei Residential Project
Site Location and Tax Map Key

NOT TO SCALE





Source: A&B Properties, Inc., 1996

Figure 3



Proposed Kihei Residential Project
Aerial Photograph of the Project Area

NOT TO SCALE

Prepared for: A&B Properties, Inc.



**View of project site looking east (mauka)
from near the center of the project**



**View of the project site looking east (mauka)
from near Pi'ilani Highway**

Source: A&B Properties, Inc.

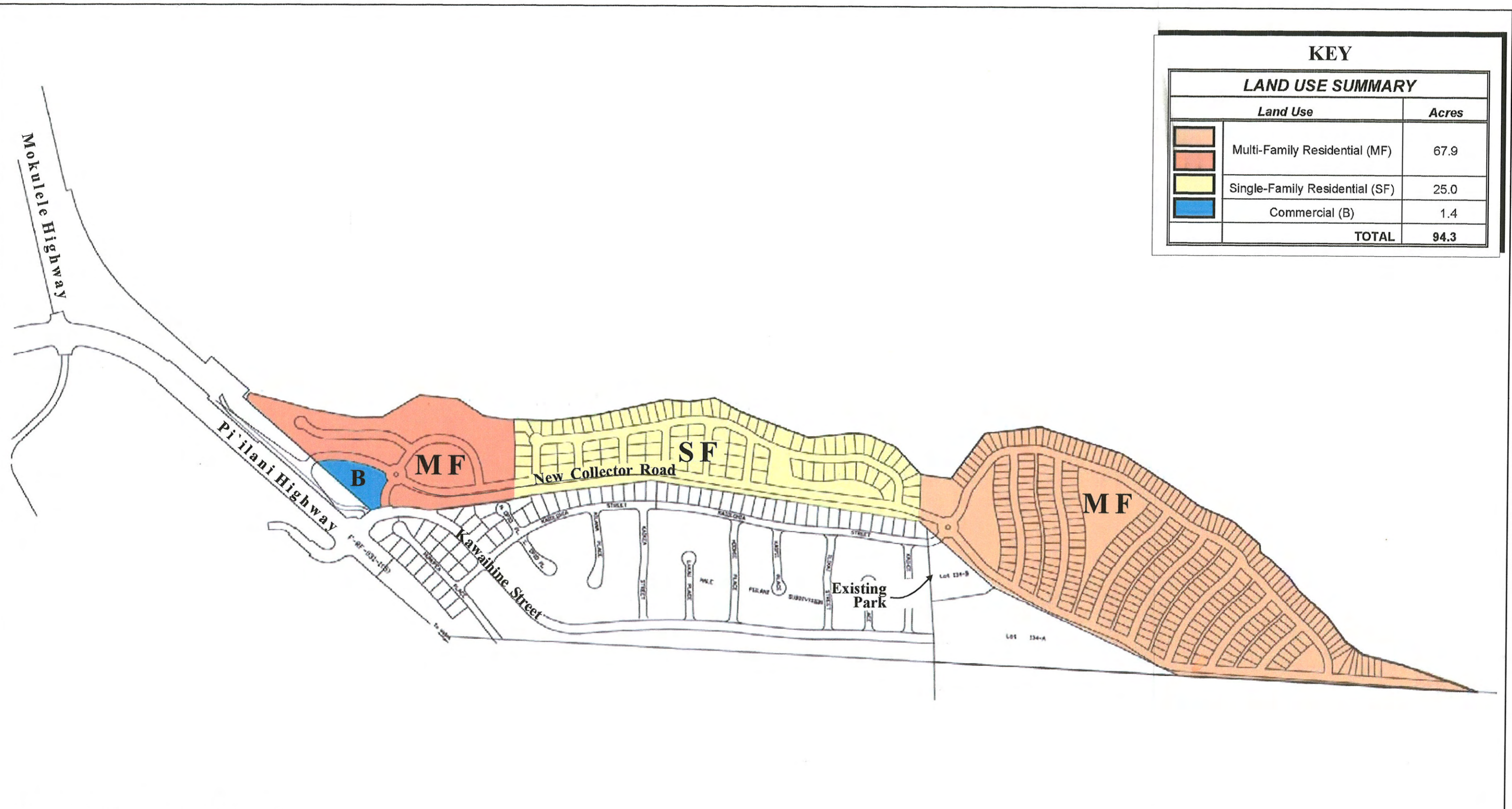
Figure 4 Proposed Kihei Residential Project Site Photographs

NOT TO SCALE

Prepared for: A&B Properties, Inc.


MUNEKIYO & HIRAGA, INC.

A&B\KiheiRes\FinalEIS\sitephotos



KEY

LAND USE SUMMARY		
	<i>Land Use</i>	<i>Acres</i>
	Multi-Family Residential (MF)	67.9
	Single-Family Residential (SF)	25.0
	Commercial (B)	1.4
TOTAL		94.3

Source: Chris Hart & Partners (January 18, 2007)

Figure 45

Proposed Kihei Residential Project
 Conceptual Master Plan

NOT TO SCALE



detached units on subdivided lots of approximately 6,000 square feet. This area is labeled “Single-Family Residential” on Figure 5. The eastern (mauka) portion of the project is planned for approximately 300 single-family detached residential units. These proposed single-family detached units would not be on individual subdivided lots, but clustered and offered under condominium ownership. This concept is intended to allow for a higher residential density (versus a typical subdivision) at a lower per unit cost, while still providing desired single-family detached units. This area is labeled “Multi-Family Residential” on Figure 5. Note that the land use designations shown on Table 5 refer to the respective community plan land use designations which would be requested for the project.

The proposed project will provide needed housing in close proximity to existing urban development and infrastructure. The applicant will coordinate with the County of Maui, Department of Housing and Human Concerns to develop an appropriate affordable housing program pursuant to the provisions of the Maui Residential Workforce Housing Policy (MRWHP). As provided under the MRWHP, the sales prices for affordable units will be established at the time of development, and based on Maui’s median family income at that time. Estimated pricing for the market single-family units (three (3) bedroom/two (2) bath) is in the range of approximately \$580,000.00 (2007 dollars). **Information regarding the proposed affordable housing program for the project is provided in Section “D” of this chapter.** For a detailed discussion of the housing market, including pricing of affordable units pursuant to the MRWHP, please see **Appendix "A"** (“A Market Study & Economic Impact Analysis of the Proposed Kihei Residential Project, Kihei, Island of Maui, Hawai`i”).

The project is situated in North Kihei, a region in South Maui approximately equidistant between the resort area of Wailea and the business/commercial area of Kahului and Wailuku. While the Kihei region is predominantly dry and at times windy, it is a desirable place to reside, particularly in the context of proximity to recreational, employment, and commercial areas.

The project will also include park and open space areas which will provide for a network of trails and bike paths that will connect to existing parks and open space areas.

The primary planned vehicular access points at the makai end of the project include a planned right-turn in and right-turn out off of Pi’ilani Highway, as well as access off of Kaiwahine Street. Within the mauka portion of the property, several access points to adjacent properties are planned.

An approximately 1.4-acre site is proposed for commercial use. Located at the southwest corner of the property, along Pi'ilani Highway, the proposed commercial area will allow for neighborhood business uses, which will provide services for the convenience of the surrounding neighborhoods. **The commercial component is not intended to be a destination area for residents and visitors whose origin or destination is not in the immediate vicinity of the project.**

The project's estimated construction cost of onsite/offsite infrastructure and site work is approximately \$59 million (2007 dollars). Building construction cost is estimated at approximately \$92 million (2007 dollars).

C. **PROJECT NEED**

The proposed project will increase the supply of available housing for Maui residents. Over the past five (5) years, the demand for housing on Maui has intensified due to steady population growth, high employment and historically low interest rates. This strong demand, coupled with limited supply, has led to rising housing prices. The Hawai'i Housing Policy Study Update 2003, estimated a deficit of approximately 3,755 needed resident housing units as of 2006. This deficit was projected to further increase to approximately 4,156 units by 2024. The long-term projection of housing conditions in South Maui indicates that the increase in households over the next five (5) years will outnumber the existing supply of new homes. A significant increase in housing supply will be needed to accommodate the region's anticipated growth.

The project will provide resident housing opportunities in both the near and long term. A range of housing types will serve to meet the varied housing needs of the region, at an attractive and central location in North Kihei. Additional product choices will provide healthy competition and allow for a more balanced housing market. In light of the current and projected housing market conditions, the proposed Kihei Residential project will provide a significant community benefit by offering residents new opportunities to secure affordable and market-priced housing products. For a more detailed discussion of the housing market, refer to **Appendix "A"** ("A Market Study & Economic Impact Analysis of the Proposed Kihei Residential Project, Kihei, Island of Maui, Hawai'i").

D. AFFORDABLE HOUSING PROGRAM

The applicant proposes to provide affordable housing for the Kihei Residential Project in accordance with the Maui Residential Workforce Housing Policy (MRWHP), Maui County Code Chapter 2.96. According to the MRWHP,

When more than fifty percent of the dwelling units and/or new lots in the development are offered for sale for less than \$600,000, forty per cent of the total number of units and/or lots shall be sold or rented to residents within the income-qualified groups established by this ordinance.

Unless an exemption is granted by the director, the percentage of ownership units within each income group shall be as follows:

- 1. Thirty percent of the ownership units shall be for “below-moderate income” residents;*
- 2. Thirty percent of the ownership units shall be for “moderate income” residents;*
- 3. Twenty percent of the ownership units shall be for “above-moderate income” residents; and*
- 4. Twenty percent of the ownership units shall be for “gap income” residents.*

The Kihei Residential Project is anticipated to contain over 50 percent of the dwelling units offered for sale for less than \$600,000.00, therefore, the MRWHP requires 40 percent of the total number of dwelling units to be affordable. The proposed affordable housing allocations are set forth in Table 1.

Table 1. Proposed Affordable Housing Program

Income Group	Income Range	Affordable Unit Allocation		Single Family		Multi Family	
	(% of Median Income)	%	Unit Count	Price Range		Price Range	
Below Moderate Income	80-100	30%	72	\$211,200.00	\$267,900.00	\$206,900.00	\$263,600.00
Moderate Income	100-120	30%	72	\$267,900.00	\$329,600.00	\$263,600.00	\$325,400.00
Above Moderate Income	120-140	20%	48	\$329,600.00	\$391,400.00	\$325,400.00	\$387,100.00
Gap Income Group	140-160	20%	48	\$391,400.00	\$469,300.00	\$387,100.00	\$464,800.00

E. ENTITLEMENTS REQUIRED

The proposed project will require several land use entitlement approvals to proceed. The current land use information for the project is summarized in **Table 12** below.

Table 12. Current Land Use Summary

Land Use Parameter	Existing Designation
State Land Use District	Agricultural
Kihei-Makena Community Plan	Agriculture
County Zoning	Agricultural

1. State Land Use District Boundary Amendment

The current State Land Use District designation of the property is “Agricultural”. The applicant filed a petition with the State Land Use Commission (SLUC) on March 2, 2007, for a State Land Use District Boundary Amendment (DBA) to re-designate the entire 94.3-acre project site from the “Agricultural” to the “Urban” District.

2. Kihei-Makena Community Plan

The property is currently designated as “Agriculture” on the Kihei-Makena Community Plan. A Kihei-Makena Community Plan Amendment (CPA) will be required to establish the land use categories delineated by the project’s master plan.

The CPA will be required to change the property’s designation from “Agriculture” to “Multi-Family” for two (2) areas totaling approximately 67.9 acres, and from “Agriculture” to “Single-Family” for an approximately 25.0-acre area. Additionally, the re-designation from “Agriculture” to “Commercial” for the approximately 1.4-acre area adjacent to Pi’ilani Highway will be required. The proposed acreages for the CPA are estimates at this time.

3. Change in Zoning

The property is currently zoned “Agricultural” by the County of Maui. The applicant will seek a Change in Zoning from the County of Maui to establish the appropriate zoning for the approximately 94.3-acre project area. At this time, the proposed Change in Zoning application would propose: approximately 52.8 acres to A-1, Apartment District; approximately 15.1 acres to A-2, Apartment District; approximately 25.0 acres to R-1, Residential District; and approximately 1.4 acres to B-2, Community Business District. The proposed acreages for the Change in Zoning are estimates at this time.

A summary of the **land use** entitlement designations being sought is presented in **Table 23** below.

Table 23. Summary of the Existing and Proposed Entitlement Designations

Land Use Parameter	Existing Designation	Proposed Designation
State Land Use District	Agricultural (94.3 acres)	Urban (94.3 acres)
Kihei-Makena Community Plan	Agriculture (94.3 acres)	Multi-Family (67.9 acres)
		Single-Family (25.0 acres)
		Commercial (1.4 acres)
County Zoning	Agricultural (94.3 acres)	A-1, Apartment District (52.8 acres)
		A-2, Apartment District (15.1 acres)
		R-1, Residential District (25.0 acres)
		B-2, Community Business District (1.4 acres)

F. CHAPTER 343, HAWAII REVISED STATUTES REQUIREMENT

The proposed action will involve an amendment to the Kihei-Makena Community Plan, as well as the use of State and County lands. This Environmental Impact Statement (EIS) is intended to cover any use of State and County lands, for purposes including, but not limited to, any roadway, infrastructure, utility system or other improvements relating to the development of the project. This would include, but not be limited to, roadway, infrastructure, utility systems and improvements to Pi'ilani Highway, **Mokulele Highway, North and South Kihei Road, Uwapo Road, Kaiwahine Street, Kaiolohia Street, Hale Pi'ilani Park**, as well as at other offsite locations. These actions are triggers for an environmental impact analysis pursuant to Chapter 343, Hawai'i Revised Statutes (HRS).

At its March 16, 2007 meeting, the State Land Use Commission (SLUC) reviewed the Environmental Impact Statement Preparation Notice (EISPN) for the proposed project and determined that the project may have a significant effect upon the environment to warrant the preparation of an EIS and the SLUC agreed to be the accepting authority for the EIS pursuant to Chapter 343, HRS. The EIS, prepared in accordance with Chapter 200 of Title 11, Department of Health Administrative Rules, Environmental Impact Statement Rules, will

advance findings and conclusions relative to the significance of the proposed action. The EIS will serve as the primary technical supporting document for the land use entitlement applications.

The EISPN was published in the April 8, 2007 edition of the Office of Environmental Quality Control's Environmental Notice. Comments received during the 30-day EISPN comment period ~~are~~ were included in ~~this document~~ **the Draft EIS.**

The Draft EIS was published in the October 8, 2007 edition of the Office of Environmental Quality Control's Environmental Notice. Comments received during the 45-day Draft EIS comment period are included in this document.

G. LAND OWNERSHIP

The subject property is owned in fee simple by Alexander & Baldwin, Inc. A&B Properties, Inc. is a wholly-owned subsidiary of Alexander & Baldwin, Inc. and is authorized to file the requisite land use applications on its behalf.

H. IMPLEMENTATION TIME FRAME

The implementation of the Kihei Residential project land use plan sought by this application will commence upon receipt of all land entitlements, regulatory permits, and approvals. It is estimated that the entitlement process will take approximately two (2) years to complete, followed by approximately two (2) years for the design and the approval of construction plans. Site construction is estimated to be initiated in 2011, with build-out of the project estimated over a five (5) year period until 2016.

**II. DESCRIPTION OF
EXISTING CONDITIONS,
POTENTIAL IMPACTS,
AND PROPOSED
MITIGATION MEASURES**

II. DESCRIPTION OF EXISTING CONDITIONS, POTENTIAL IMPACTS, AND PROPOSED MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

a. Existing Conditions

The project area is located at the northern gateway to the Kihei-Makena region. The project area is bordered by Waiakoa Gulch and agricultural lands to the north and residential uses to the south. Pi'ilani Highway borders the project area on the west. The Hale Pi'ilani single-family subdivision is located to the immediate south, while the Kihei Villages multi-family residential project lies to the southwest. The Kihei Gateway commercial center is located farther south, beyond the single-family residential areas mauka of Pi'ilani Highway. The Maui Research and Technology Park is also located south of the project site, adjacent to the Elleair Maui Golf Club and the nearby Kihei Wastewater Reclamation Facility.

The project area is comprised of portions of three (3) tax map key parcels. The remaining areas of these parcels (north of Waiakoa Gulch) are primarily in either seed corn or sugar cane cultivation. ~~The remnants of a concrete batching plant formerly used by Ameron Hawaii is located on an adjacent parcel (TMK 3-8-004.023), northwest of the project area near Waiakoa Gulch.~~

The coastal area of Kihei, southwest of the project site includes resort-oriented condominiums along South Kihei Road, as well as commercial centers, such as Azeka Shopping Center Mauka, Azeka Shopping Center Makai, and Kihei Kalama Village. Approximately 2.5 miles to the southwest of the project site are Kihei Elementary School and Lokelani Intermediate School. The County of Maui's Kihei Community Center and

Aquatic Center are located along Lipoa Street, across from the Kihei Elementary School. The County's Kalama Park, Kalepolepo Park, and Kamaole Parks I, II, and III are among the other recreational facilities found in the Kihei area, southwest of the project site.

b. Potential Impacts and Proposed Mitigation Measures

The proposed action is intended to provide a master-planned neighborhood addressing the need for increased housing inventory for Maui's residents. The property is located adjacent to existing urban areas and has ready access to supporting infrastructure systems.

There exists only residential, open space, and agricultural uses in the vicinity of the project area. In addition, the applicant has no near-term plans to change the agricultural uses that exist on the remainder of the subject parcels.

2. Climate

a. Existing Conditions

Maui is characterized by a semi-tropical climate containing a multitude of individual microclimates. The mean annual temperature of the island at all locations near sea level is about 75 degrees Fahrenheit. A high proportion of the rainfall that Maui receives each year falls on the northeast facing shores leaving the south and southwest coastal areas relatively dry. The project site is located within one of these drier areas of the southwest coast.

The Kihei coast is generally sunny, warm, and dry throughout the entire year. Annual temperatures in the region average in the mid to high 70's (Maui County Data Book, December 2006). June through August are historically the warmer months of the year, while the cooler months are January through March. During the summer months, average daily temperatures in Kihei typically range from the low 70's to the high 80's.

Average rainfall distribution in the Kihei-Makena region varies from under 10 inches per year along the coastline to more than 20 inches per year in the higher elevations. Rainfall in the Kihei-Makena region is highly seasonal,

with most of the precipitation occurring in the winter months (Maui County Data Book, December 2006).

Northeast tradewinds prevail approximately 80 to 85 percent of the time. Tradewinds originating from the northeast average 10 to 15 miles per hour during afternoons, with slightly lighter winds during mornings and nights. Between October and April, the southerly winds of Kona storms may be experienced.

b. **Potential Impacts and Proposed Mitigation Measures**

~~The proposed action is not anticipated to alter local micro-climates.~~ According to the United States Environmental Protection Agency, the development of cities and suburban areas has a tendency to increase temperatures slightly (up to 10 degrees Fahrenheit, in dense cities) as compared to surrounding natural land cover. This “heat island” effect, as it is often denoted, refers to urban air and surface temperatures that may be higher than nearby rural or undeveloped areas.

In order to minimize the potential of an elevated heat island profile, the applicant will implement a number of landscaping measures. For example, the applicant will provide shade trees and landscape vegetation throughout the subdivision to take advantage of the natural cooling effects of shading and the evaporative effects of water from the soil and leaves.

Further, the buildings will be architecturally designed and built with a low profile to minimize trapped heat and to maximize natural air flow. It is anticipated that these mitigation measures will serve to offset the potential heat island effect of the residences, businesses, and pavement in the subdivision. As a result, the proposed action is not anticipated to significantly alter local micro-climates.

3. Topography and Soils

a. Existing Conditions

Underlying the project site are soils belonging to the Pulehu-Ewa-Jaucas association. See **Figure 6**. The Soil Survey of the Islands of Kaua'i, O'ahu, Maui, Moloka'i, and Lana'i, State of Hawai'i characterizes the soils of the Pulehu-Ewa-Jaucas association as consisting of well-drained and excessively drained, medium-textured, moderately fine-textured, and coarse-textured soils on alluvial fans and in basins on the island of Maui, mainly in Central Maui. These soils are nearly level to moderately sloping. The association makes up about 4 percent of the island.

Pulehu soils make up about 40 percent of the association, Ewa soils about 15 percent, and Jaucas soils about 10 percent. Alae, Iao, Kealia, and Puuone soils make up the rest of the association. The natural vegetation consists of bermuda grass, bristly foxtail grass, kiawe, and lantana.












Pulehu soils have a surface layer of dark-brown, friable silt loam. Their substratum is dark-brown and dark yellowish-brown alluvium weathered from basic igneous rock. Ewa soils have a surface layer and subsoil of dark reddish-brown, friable silty clay loam. Jaucas soils have a pale-brown calcareous sand surface layer. Their substratum is yellowish-brown sand weathered from coral and seashells.

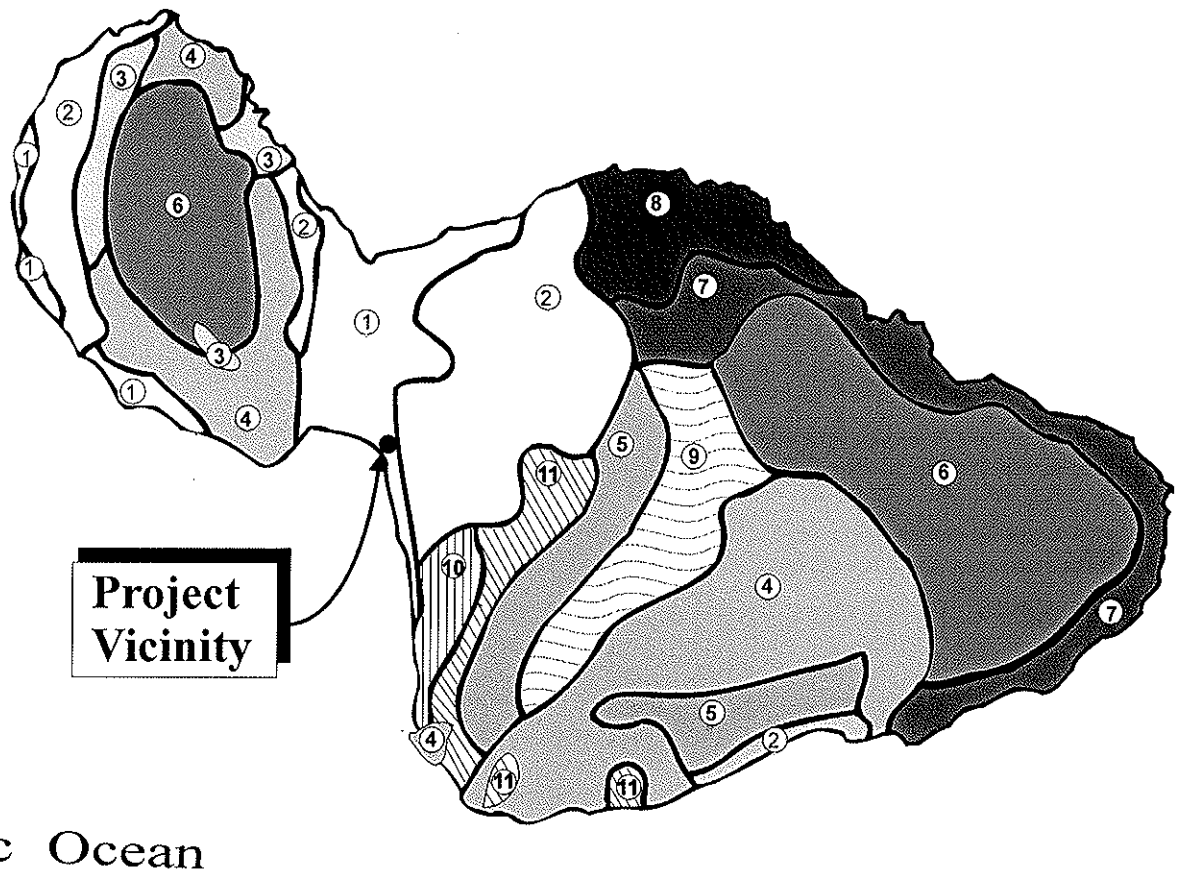
The specific soil types underlying the project site are Pulehu Silt Loam (PpA), Alae Sandy Loam (AaB), Waiakoa Very Stony Silty Clay Loam (WgB), and Waiakoa Extremely Stony Silty Clay Loam (W1D2). See **Figure 7**.

Pulehu Silt Loam (PpA) has 0 to 3 percent slopes. This soil was historically used for sugar cane. Small acreages are used for homesites.

Alae Sandy Loam (AaB) has no cobblestones on the surface and has 3 to 7 percent slopes. Runoff is slow, and the erosion hazard is slight. There can be a few to many pebble-size rock fragments in the surface layer. Most of this soil is used for sugar cane and pasture. A small acreage is used for truck crops.

LEGEND

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

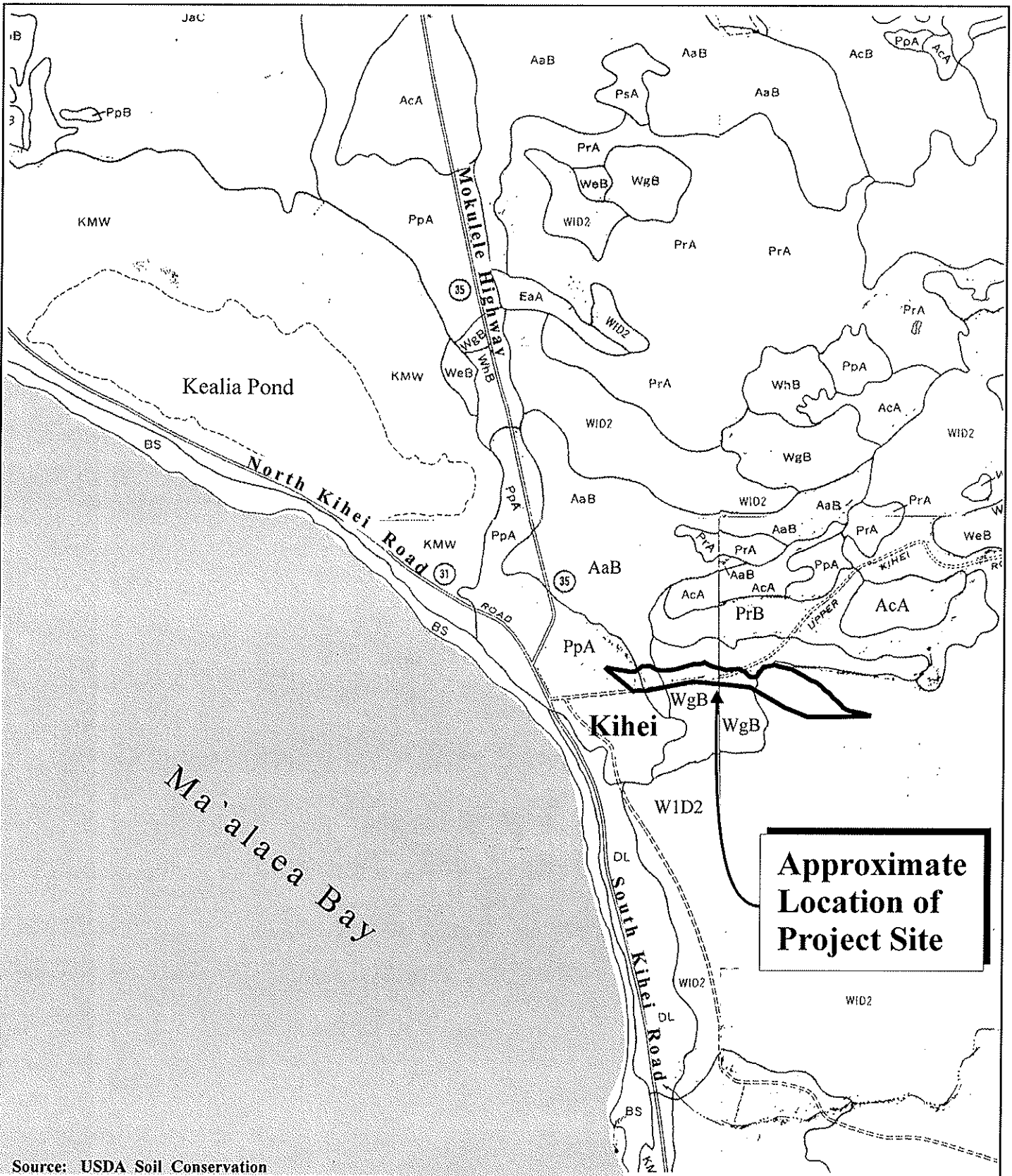


Source: USDA Soil Conservation Service

Figure 6 Proposed Kihei Residential Project
Soil Association Map



NOT TO SCALE



Source: USDA Soil Conservation

**Figure 7 Proposed Kihei Residential Project
Soil Classification Map**



NOT TO SCALE

Waiakoa Very Stony Silty Clay Loam (WgB) is found on smooth, low uplands. In a representative profile, the surface layer is dark reddish-brown silty clay loam about 2 inches thick. The subsoil, about 23 inches thick, is dark reddish-brown and very dark grayish-brown silty clay loam that has prismatic structure or is massive. The substratum is very dark brown silty clay loam and hard, basic igneous rock. The soil is neutral in the surface layer and slightly acid to neutral in the subsoil. Permeability is moderately slow. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.5 inches per foot of soil. In places, roots penetrate to bedrock. This soil is used for sugar cane, pasture, and wildlife habitat.

Waiakoa Extremely Stony Silty Clay Loam (W1D2) erodes and has stones covering 3 to 15 percent of the surface. In most areas, about 50 percent of the surface layer has been removed by erosion. Runoff is medium, and the erosion hazard is severe.

b. **Potential Impacts and Proposed Mitigation Measures**

Although three (3) of the four (4) specific soil types underlying the project site generally exhibit slow runoff and low erosion hazard, there is one soil type, namely Waiakoa Extremely Stony Silty Clay Loam, which commonly exhibits medium runoff and severe erosion hazard. To minimize runoff and erosion associated with this soil type, several Best Management Practices (BMPs) will be implemented. These include the following: constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site, protecting of natural vegetation, using wind erosion control, intercepting runoff above disturbed slopes, and using seeding and fertilizing or other soil erosion control.

The master-planned residential project proposed for the subject property is compatible with the property's underlying soil characteristics. **Except as listed above,** there are no geologic or soil hazard limitations associated with the subject property.

4. Agriculture

a. Existing Conditions

Of the four (4) major agricultural land classification systems generally used in Hawai'i, current soil conditions at the project site were assessed utilizing the two (2) more pervasively used systems: the Agricultural Lands of Importance to the State of Hawai'i (ALISH) and the Land Study Bureau (LSB) productivity classification systems. The ALISH system is based on a United States Department of Agriculture (USDA) standard which determines agricultural policy nationwide for a wide variety of crops. The LSB classification utilizes clear, quantifiable criteria based on underlying soil characteristics, specifically for predominant crops in Hawai'i.

In 1977, the State Department of Agriculture developed the ALISH 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", 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", but are of state-wide or local importance for agricultural use.

As reflected by the ALISH map for the project region, an approximately 45-acre portion of the western (makai) end of the project site has been designated as "Prime" agricultural lands while the remainder of the property, or approximately 49 acres, is "Unclassified". See **Figure 8**.

The University of Hawai'i, Land Study Bureau (LSB) developed the Overall Productivity Rating, which classified soils according to five (5) levels, with "A" representing the class of highest productivity soils and "E"

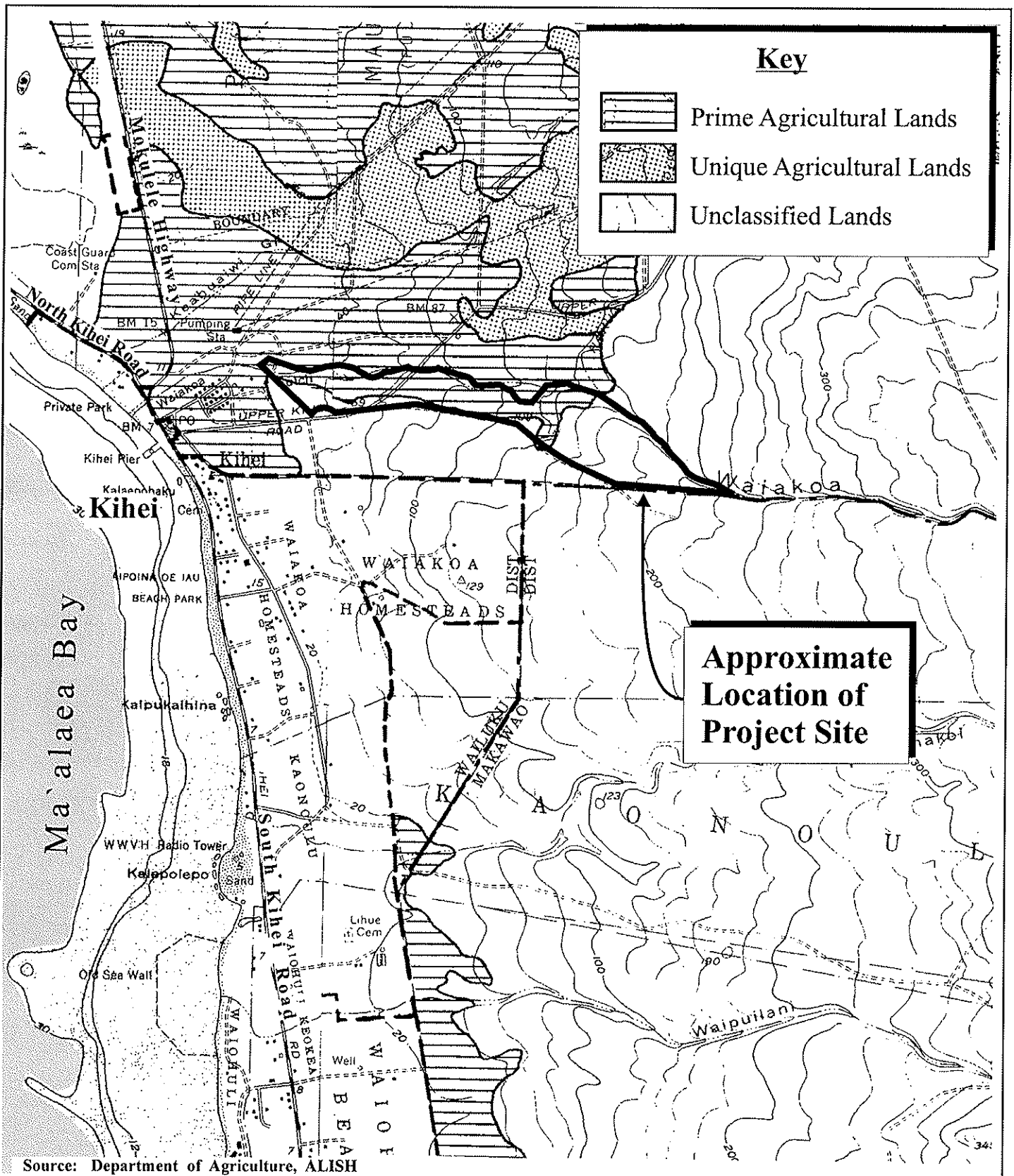


Figure 8 Proposed Kihei Residential Project
Agricultural Lands of Importance
to the State of Hawai'i Map

NOT TO SCALE



representing the lowest. These letters are followed by numbers which further classify the soil types by conveying such information as texture, drainage, and stoniness.

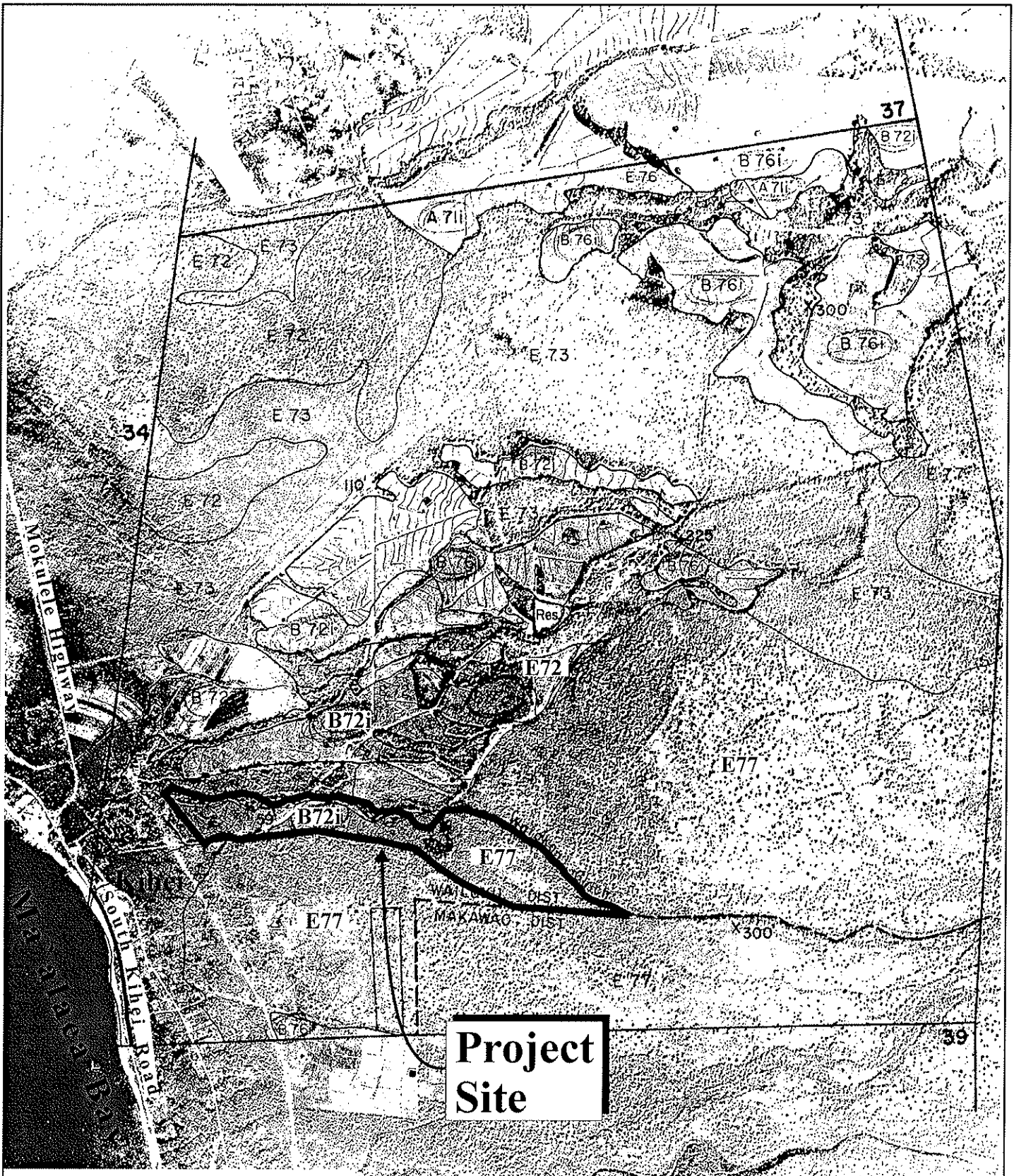
Regarding the western (makai) portion of the project site, the LSB designated these lands as “B72i”. The “B72i” lands comprise generally the same area as the “Prime” agricultural lands under the ALISH system. Machine tillability is moderately suited in this soil type, which is also considered to be stony, moderately fine textured, and well-drained.

On the other hand, the eastern (mauka) portion of the project site has been designated “E77”, which comprises an area similar to the “Unclassified” lands according to the ALISH classification system. See Figure 9.~~The project site is located on lands designated “E77”.~~ These lands have the lowest productivity rating by the LSB. Machine tillability is very poorly suited, thus grazing is the typical use for this type of soil. The soil is moderately fine and well-drained with complex nonstony, stony, and rocky lands.

The project site was formerly cultivated in sugar cane, but those operations ceased in the mid-1980’s. The makai portion of the project site, covering approximately 38 acres, is currently utilized by Monsanto Company under a lease agreement to cultivate seed corn. Truck crops, covering approximately 12 acres, are currently being cultivated in the central portion of the project site. This 12-acre area is farmed by an independent farmer. The mauka portion of the project site has been fallow since the cultivation of sugar cane ended in the mid-1980’s.

b. Potential Impacts and Proposed Mitigation Measures

The subject property lies within the State Agricultural district and is designated for agricultural uses by the Kihei-Makena Community Plan and Maui County zoning. Although approximately half of the project area is designated as "Prime" agricultural lands, Waiakoa Gulch effectively isolates these lands from other "Prime" lands farther north. The geometry of the subject property, with its relatively narrow north/south configuration defined by Waiakoa Gulch to the north and the Hale Pi'ilani residential



Source: University of Hawaii, Land Study Bureau, 1967

Figure 9

Proposed Kihei Residential Project
 Land Study Bureau Classification Map

NOT TO SCALE



subdivision to the south, poses logistical and compatibility challenges to long-term productive agricultural use. Refer to **Figure 3**. With the proposed project, Waiakoa Gulch would become the natural buffer between agricultural lands to the north and the proposed project and existing residential development to the south.

In anticipation of the project, and the potential removal of 38 acres from seed corn cultivation, replacement lands have been leased to Monsanto Company. These lands are situated in the near vicinity and proximate to Monsanto Company's headquarters near the intersection of Pi'ilani Highway and ~~Mokulele Highway~~ **North Kihei Road**. As noted above, an independent farmer operating on about 12 acres of the property will be impacted by the project. The applicant will work with the truck farmer to explore potential locations for relocation on other plantation lands with adequate water supply. Additionally, approximately 44.3 acres of the project area is vacant and unused.

The agricultural impact of this project is near negligible when taken in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands. In fact, much of the lands of these former plantations are still fallow. The proposed project will ultimately involve the use of approximately 94.3 acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui.

Furthermore, when evaluated based on the housing shortage that exists on Maui, coupled with the scarcity of entitled, undeveloped residential lands in South Maui, the conversion of the project's agriculture lands into residential development presents a beneficial opportunity. The proposed expansion of the urban district boundary is reasonable and will allow residential use up to a natural buffer at Waiakoa Gulch.

5. **Flood and Tsunami Hazards**

a. **Existing Conditions**

The Flood Insurance Rate Map (FIRM) for this area of Maui was amended by a Letter of Map Revision (LOMR Case No. 03-09-0438P) that was approved by **the Federal Emergency Management Agency (FEMA)** and effective as of July 1, 2004. The revised FIRM for this area of Maui designates the project site as being located within Zones B and C, areas of minimal flooding. The revised FIRM is shown in **Figure 910**.

This LOMR covered the western (makai) portion of the project site and is included as Appendix "B". The makai portions of the project site abut lands designated Zone AO/A2 which are special flood hazard areas by FEMA.

b. **Potential Impacts and Proposed Mitigation Measures**

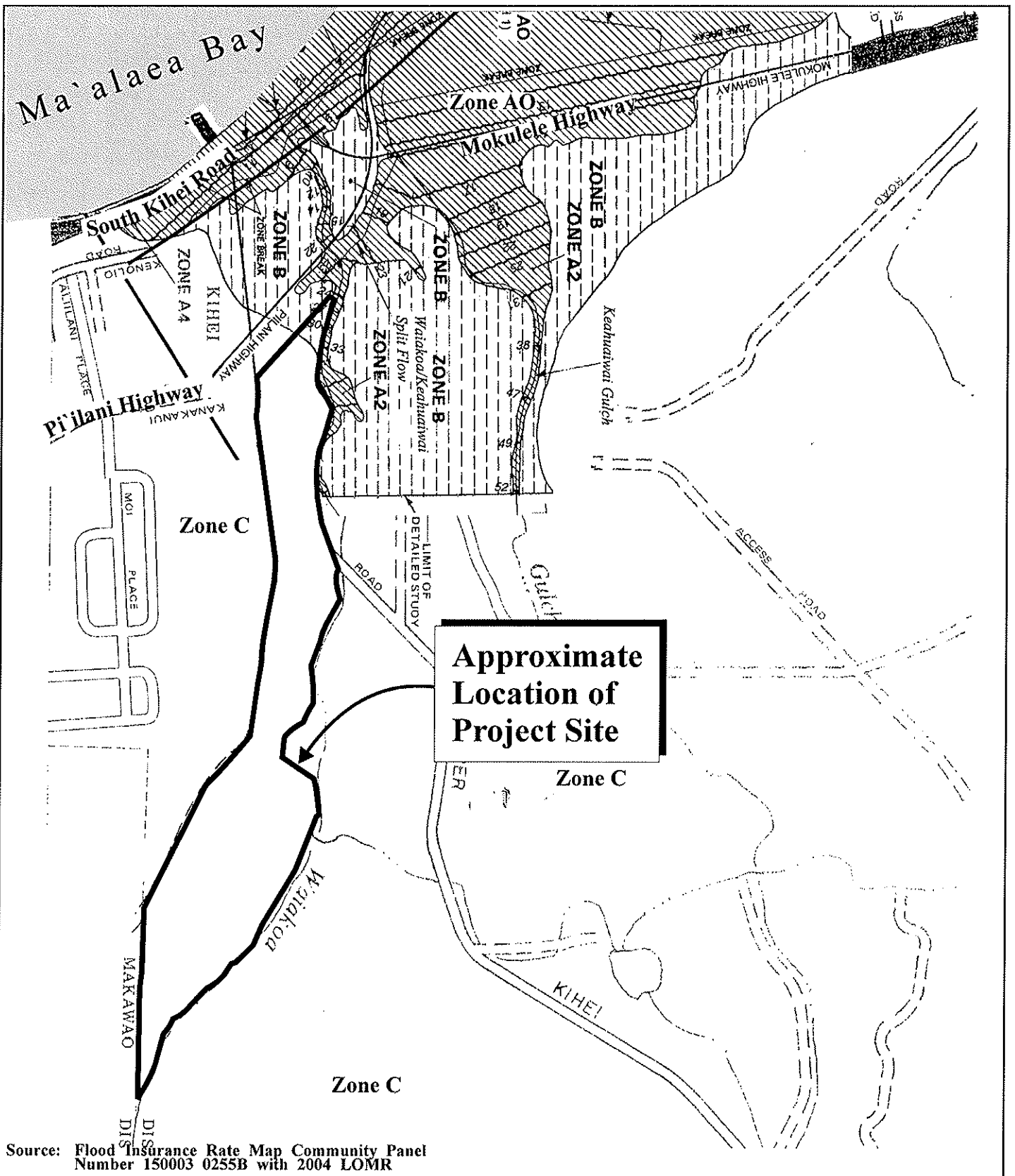
As noted above, the project site is currently designated within Zones B and C, areas of minimal flooding. Additionally, the applicant has undertaken a more detailed flood analysis along mauka portions of Waiakoa Gulch in the vicinity of the project site. **The purpose of this analysis is to define potential flood hazard areas along the mauka portions of the site.** As a result of this analysis the applicant has filed a Letter of Map Revision (LOMR) with the Federal Emergency Management Agency (FEMA) to update the FIRM for the area.

6. **Flora and Fauna**

a. **Existing Conditions**

Botanical and Fauna Surveys of the project site were conducted by Robert Hobdy, Environmental Consultant, in August 2005. See **Appendix "BC"**.

At the time of the surveys, the lower half of the subject property was recently plowed and was bare soil except for along the field margins and roads. The middle portion of the property had a diverse array of vegetable



Source: Flood Insurance Rate Map Community Panel Number 150003 0255B with 2004 LOMR

Figure 9-10 Proposed Kihei Residential Project
Flood Insurance Rate Map

NOT TO SCALE



crops and the upper portion of the property was predominantly populated with buffelgrass, along with scattered kiawe trees and koa haole shrubs.

Buffelgrass was the only species listed as abundant on the project site and best defined the character of the upper portion of the property. Three (3) native plants, `ilima, `uhaloa, and koali awahia were found **onwithin the upper (mauka) 40 or so acres of the** property, but all are common indigenous plants that are widespread on Maui. The vegetation throughout the property was dominated by non-native species. No endangered or threatened plant species were identified on the property.

Avifauna and mammals common to the project site and surrounding areas are typical of species found near other developed areas in Kihei. Feral mammals found within the project site included dogs, cats, and mongoose. There was evidence of axis deer on the upper part of the property, however, no deer were actually seen. Non-native birds were observed and very active in this area due to the sizable insect population, the abundance of plant seeds, and the dry conditions. There were no known threatened or endangered mammal, bird, or insect species identified throughout the course of the survey.

b. Potential Impacts and Proposed Mitigation Measures

Three (3) native plants, `ilima, `uhaloa, and koali awahia were found on the upper (mauka) 40 or so acres of the property. However, all are common indigenous plants that are widespread on Maui. The vegetation throughout the property was dominated by non-native species. No endangered or threatened plant species were identified on the property.

Given that the flora and fauna at the project site are generally limited to non-native, abundant species, the proposed project is not anticipated to have significant negative impact on the biological resources in the area.

The United States Fish and Wildlife Service (USF&WLS) noted potential impacts to seabirds in the area as a result of construction activities. To mitigate potential impacts, several Best Management Practices, as recommended by the USF&WLS, will be implemented

during construction. For instance, lights will be shielded so the bulb is not visible at or above bulb height, information will be disseminated regarding seabird fallout, and provisions for handling a downed seabird will be implemented during construction activities.

In addition, a list of standard BMPs for fish and wildlife, provided by the USF&WLS, will be incorporated by the applicant in project construction documents during the construction phase of development to prevent erosion, sedimentation, and other potential adverse impacts to aquatic fish and wildlife resources in the vicinity of the project site.

7. Streams, Wetlands, and Reservoirs

a. Existing Conditions

Waiakoa Gulch forms the northern boundary of the project site. Outside of major storm events, there is no active flow in the gulch. The current Flood Insurance Rate Map (FIRM) for this area designates the project site as being located within Zones B and C, areas of minimal flooding. The nearest wetland area is the Kealia Pond National Wildlife Refuge, which is located approximately 1.5 miles to the north of the subject property.

b. Potential Impacts and Proposed Mitigation Measures

As previously noted, the applicant has undertaken a more detailed flood analysis along mauka portions of Waiakoa Gulch in the vicinity of the project site. As a result of this analysis the applicant has filed a Letter of Map Revision (LOMR) with the Federal Emergency Management Agency (FEMA) to update the FIRM for the area.

The land plan for the project provides an open space buffer along the gulch to ensure adequate protection against gulch runoff during storm events. ~~Mitigation measures, such as Best Management Practices (BMPs) for erosion and sedimentation control, will be implemented to maintain the natural and functional integrity of the Waiakoa Gulch. The proposed action will not impact the Kealia Pond National Wildlife Refuge.~~

During construction, the following Best Management Practices (BMPs) will be implemented by the project contractors for erosion and

sediment control to maintain the natural and functional integrity of Waiakoa Gulch.

- **Constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site**
- **Staging construction**
- **Protecting of natural vegetation**
- **Stockpiling topsoil, and covering or stabilizing of the soil stockpiles**
- **Using wind erosion control**
- **Intercepting runoff above disturbed slopes**
- **Constructing of benches, terraces, or ditches at regular intervals to intercept runoff on long or man-made slopes**
- **Providing linings or other method to prevent erosion of storm channels**
- **Using seeding and fertilizing or other soil erosion control**
- **Providing vehicle wheel wash-down facilities**
- **Using stabilized construction entrances**
- **Using vegetated filter strips**

Greater detail of the design information for the proposed drainage and erosion control plan will be provided when the project progresses to the engineering design phase of development.

8. Archaeological and Historical Resources

a. Existing Conditions

An archaeological inventory survey report was completed for the project site and adjacent portions of Waiakoa Gulch in February 2006 by Cultural Surveys Hawai'i, Inc. See **Appendix "CD"**. The archaeological inventory survey comprised of a combination of fieldwork, laboratory work, and

document review. The fieldwork involved the execution of a complete ground survey of the entire project area for the purpose of site inventory and limited subsurface testing to evaluate the significance of any subsurface deposits. Laboratory work consisted of analysis of any subsurface deposits found and document review involved a review of all previous archaeological work conducted in the surrounding area.

During the field inspections, two (2) historic sites related to the former use of the property for sugar cane cultivation were identified. These two (2) sites were then further examined according to the accepted State and Federal significance evaluations. It is noted that no burial features or human remains were identified during pedestrian surveys or subsurface testing at the site.

The first historic site noted, identified as SIHP 50-50-09-5744 and located on the northern boundary of the project area, contained remnants of a possible former railway crossing that had been modified for agricultural water control. The structure consisted of two (2) features, an irrigation flume and a concrete bridge structure. Based on the construction method and materials, in addition to documentary research, the structure is estimated to have been built between 1900-1920 by either Kihei Plantation or ~~Hawai'i~~**Hawaiian** Commercial and ~~&~~ Sugar Company (HC&S).

The second historic site noted, identified as SIHP 50-50-09-5745 and located in the easternmost portion of the project area, contained a crude, hand-dug well. The probable water source for this well ran through an underground shaft that is oriented in a northwest to southeast direction. The final depth of the well is unknown due to fallen debris and rocks. Given the rather crude construction of the well, it is possible that this well was associated with either early water prospecting or what remains of one of the original wells dug for Kihei Plantation.

b. Potential Impacts and Proposed Mitigation Measures

As noted previously, two (2) sites of historical significance to sugar cane activities were documented during the archaeological inventory survey for the project site. The sites were reviewed in accordance with accepted evaluative protocols.

The following significance evaluations are broad criteria established for the State and National Register of Historic Places. These criteria are as follows:

Criterion A: Sites that are associated with events that have made a significant contribution to the broad patterns of our history.

Criterion B: Sites that are associated with the lives of persons significant to our past.

Criterion C: Sites that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value or that represent a significant and distinguishable entity, whose components may lack individual construction.

Criterion D: Sites which have yielded, or may be likely to yield, information important in prehistory or history.

Criterion E: Sites which have an important value to the native Hawaiian people or to another ethnic group of the State due to associations with traditional cultural practices once carried-out, or still carried-out, at the property or due to associations with traditional beliefs, events, or oral accounts – these associations being important to the groups’ history and cultural identity (State of Hawai’i criterion only).

Both of the historic sites identified during the archaeological inventory survey are considered significant under Criterion D, due to their potential to yield information important for understanding the history of the region. Information for these sites has been recorded as part of the inventory survey investigation through location documentation, written descriptions, photographs, plan view maps to scale, and oblique view renderings. Based on these findings, the report recommendation is that “no historic properties affected”, given that the two (2) historic sites’ significance has been recorded.

The archaeological inventory survey report was submitted to the State Historic Preservation Division (SHPD) for review. The SHPD concurred with the report’s findings and recommendations and accepted the report in a letter dated June 7, 2006. See **Appendix "CD-1"**.

~~Finally, should any significant archaeological resources be uncovered during work on the site, the SHPD will be contacted immediately and all applicable inadvertent discovery procedures will be followed.~~ **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 during construction activities, work will stop in the immediate vicinity and the applicant will contact the SHPD. Pursuant to their specific request, the Office of Hawaiian Affairs (OHA) will also be notified.**

9. **Cultural Resources**

a. **Existing Conditions**

The project site is located in the Pulehu Nui Ahupua`a of the moku of Makawao on the island of Maui. The moku of Makawao is one of twelve (12) moku on the island. As is true with most ahupua`a in this region, the lands can generally be divided into three zones: (1) coastal; (2) barren or transitional; and (3) inland.

The coastal area was and is rich in marine resources, based on Hawaiian traditions recounted and the presence of four (4) fishponds. A quarter mile band running along and starting from the shoreline by and large formed the coastal region. Research suggests temporary habitations in the coastal areas for marine exploitation.

Transitional lands characterized the region located mauka of the coastal areas, up to approximately five (5) to seven (7) miles inland of the coastline. These transitional lands were, on the whole, quite barren and contained bush/scrub vegetation and low annual rainfall accumulation. The dry lands suggest the inability to sustain agriculture year-round.

In the inland areas located mauka of the transitional lands, there was significantly more rainfall accumulation. Because of this, there was lush, sustainable vegetation. Research on pre-contact occupation suggests that most of the permanent habitations were in this inland area with a smaller permanent population located along the coastline.

b. **Potential Impacts and Proposed Mitigation Measures**

A Cultural Impact Assessment was completed for the project site and adjacent portions of Waiakoa Gulch in June 2006 by Cultural Surveys Hawai'i, Inc. See **Appendix "DE"**. The report was based on a variety of sources, including agency consultation, archival research, and consultation with lineal descendants of long-time area residents. Some of the agencies consulted include the Office of Hawaiian Affairs (OHA), the Maui/Lana'i Island Burial Council, the Maui Planning Department's Cultural Resource Planner, and the Hui Malama I Na Kupuna O Hawai'i Nei.

The current project area is situated along the southern edge of Waiakoa Gulch, in what was considered the transitional area between the mauka (inland) and makai (coastal) settlement areas. Based on the settlement pattern in adjacent ahupua'a and the knowledge shared by those interviewed and consulted during the course of the cultural assessment, it appears that the project area may have sustained a small, seasonal population during traditional Hawaiian times.

The waters of Waiakoa Gulch, although only seasonably available, may have supported limited freshwater aquatic resources, as well as limited agriculture during the rainy season. As a whole, however, the primary resources would have come from the abundant marine resources of the coastal region, in addition to agricultural crops from the mauka region of the ahupua'a.

Decades of continuous historic and modern agriculture and ranch activities have heavily modified stream flow and consequently left no evidence of traditional cultural practices within the project area.

As part of the cultural assessment, two (2) informant (kama'aina) interviews were conducted to gain an understanding of likely cultural practices which occurred in the vicinity. Mr. Leonard Kimokeo Kapahulehua explained that he was not aware of cultural practices in the present day nor of the existence of heiau (temples) or ahu (shrines) in the area. As a result, Mr. Kapahulehua did not feel that there would be any cultural impacts associated with residential development.

Mrs. Paula Kalanikau was also interviewed and, like Mr. Kapahulehua, did not recall significant cultural practices in the area, outside of use of the coastal fishing grounds. Mrs. Kalanikau noted canoe club related activities in the last few decades which occur to the west of the project site along the shoreline. However, in the direction of the project site from the shoreline area, Mrs. Kalanikau recalled only a multitude of kiawe trees and no significant cultural practices. Mrs. Kalanikau mentioned concern over the periodic flooding of Waiakoa Gulch and potential runoff impacting coastal and nearshore fishing grounds.

To address Mrs. Kalanikau's concern of runoff impacts to coastal areas, the erosion and soil control measures listed in Section II.A.7. Streams, Wetlands, and Reservoirs will be implemented.

Based on the information gathered during the cultural assessment, residential expansion into the lands comprising the project area will have minimal impact upon Native Hawaiian cultural resources within the immediate vicinity.

10. Air and Noise Quality

a. Existing Conditions

The air quality of the Kihei area is considered good with existing airborne pollutants attributed primarily to automobile exhaust from the region's roadways. There are no point sources of airborne emissions in the immediate vicinity of the project site. Other sources of airborne emissions may include construction activities around Kihei and smoke produced from sugar cane burning which takes place in the Central Maui isthmus. These sources are intermittent, however, and prevailing trade winds quickly disperse any particulates which are generated.

There are no significant noise generators in the vicinity of the project site. The predominant background noise source in the area is attributed to vehicle traffic along Pi'ilani Highway and surrounding roadways.

b. **Potential Impacts and Proposed Mitigation Measures**

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

~~Graded and grubbed areas will be vegetated to mitigate dust-generated impacts. In the long term, the proposed project is not expected to adversely impact local and regional ambient air quality. Ambient noise conditions will be temporarily impacted by construction activities. Heavy construction equipment, such as bulldozers, front-end loaders, and material-transport vehicles, will likely be the dominant source of noise during the construction period.~~

The major potential short-term air quality impact of the project will occur from the emission of fugitive dust during construction. In addition to regular watering and sprinkling, the following measures will be implemented by the applicant's contractor during construction activities to minimize the proliferation of fugitive dust, in accordance with Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control.

Use of wind screens and/or limiting the area that is disturbed at any given time will help to contain fugitive dust emissions. Wind erosion of inactive areas of the site that have been disturbed could be controlled by mulching. Trucks hauling soil material would be covered to mitigate dust. A routine road cleaning and tire washing program would help reduce fugitive dust emissions from trucks/vehicles tracking dirt onto nearby paved roadways. Installation of landscaping early in the construction schedule will also help to control dust.

During the construction phase, emissions from engine exhaust will occur from onsite construction equipment and other construction related vehicles. Increased vehicular emissions due to traffic disruptions by construction equipment or vehicles entering/exiting the

site can be mitigated by moving equipment during off-peak hours. Construction related emissions would be limited to the construction period of the project. After the project is completed, carbon monoxide concentrations at the site are anticipated to remain within acceptable air quality standards. The project site is situated adjacent to Waiakoa Gulch, which will serve as a buffer between the project and ongoing agricultural activities situated further to the north. Related noise and dust emissions from such agricultural activities are anticipated to be buffered by Waiakoa Gulch.

Concerning potential impact on the Department of Health's air monitoring station, the applicant has had discussions with the department regarding minimizing impacts. The Department of Health (DOH) noted that an air quality monitoring station is situated adjacent to the project site in the Hale Pi'ilani neighborhood park. The primary purpose of the air monitoring station is to monitor particulates resulting from cane burning. The DOH makes every attempt to prevent dust from construction activities from affecting the particulate readings.

Through consultation with the DOH, the DOH recommended adherence to Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control. The DOH further noted that, while there are no specific requirements for projects in the vicinity of an air monitoring station, the DOH will coordinate with the contractor to minimize impacts to the air monitoring station. Should air quality readings at the station be affected, the DOH will assist the contractor in the development of a dust mitigation action plan.

Development of the project will entail typical construction activities including excavation, grading, and the use of construction equipment (e.g. bulldozers, front-end loaders, and diesel-powered trucks). Existing residences to the south may be impacted by construction noise due to their close proximity to the project site. Noise from such construction activities would be short term and must comply with the State DOH noise regulations. Should noise during the construction phase of the project exceed the maximum allowable levels, a noise

permit may be required. This has been noted by the State DOH Maui District Health Office in their comment letter of April 17, 2007 to the EISPN.

After the completion of construction, noise generated by stationary mechanical equipment (e.g. compressors and HVAC equipment) at the site must meet applicable noise standards. The planning and design of the project will take into account means to attenuate noise from such facilities through proper placement and design. Given the limited commercial use planned at the project, the potential for such adverse impacts is anticipated to be minimal. A landscaped buffer is planned within the project site between the existing residences in the Hale Pi'ilani Subdivision and the planned new collector road. This should serve to mitigate potential noise associated with the planned road and the project.

The State Department of Transportation (DOT) is currently in the process of constructing the Mokulele Highway Widening project, west of the project site. Future traffic related noise resulting from the completed roadway may impact the western most (makai) portion of the project. The planning and design of this portion of the project will need to take into account applicable noise standards. The Federal Highway Administration utilizes a noise standard of 67 decibels (dBA) for residential communities. It should be noted that the predominant trade winds of the region place the highway downwind of the project site.

A review of relevant noise studies revealed that, for residential exterior environmental noise, a day-night average sound level should not exceed 65 dBA, according to the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency. According to data from the Kapalua Mauka Final Environmental Impact Statement, prepared by PBR Hawaii in November 2002, based on this acoustical standard, traffic noise from Honoapi'ilani Highway may impact residential properties located within 75 feet of the highway. The distance between the Pi'ilani Highway centerline and the project's property line is approximately 140 feet. Along Pi'ilani

Highway in particular, according to data reported in the Final Environmental Impact Statement for the New Kihei Elementary School, prepared by Comprehensive Consulting Services of Hawai'i in April 1992, heavy traffic volumes along Pi'ilani Highway traveling at 50 miles per hour generate a noise level of 62 dBA at the edge of pavement. Therefore, based on the sizable distance between the highway and the project site, it is anticipated that traffic noise attributed to Pi'ilani Highway will not adversely impact the proposed project.

Noise measurements, after completion of the highway, should determine the extent of the noise impact and applicable mitigation measures. Potential noise mitigation measures may include construction of landscaped earthen berms, use of sound barriers, setbacks, and air conditioning. The applicant will work with the State DOT, the DOH, and other agencies in complying with all applicable noise standards.

Ameron Hawaii previously operated a concrete batching facility north of the project site, near Waiakoa Gulch. Ameron has plans to reestablish the plant at a site mauka of the realigned Pi'ilani Highway (currently under construction) and north of Waiakoa Gulch. According to Ameron, the materials used in the Kihei batch plant are non-hazardous. Bulk cement will be stored in an overhead silo equipped with a filtered sand system. The batching process includes Best Management Practices (BMPs), such as watering of stockpiles, to control windblown fugitive dust. Ameron Hawaii's land use (license) arrangement has been coordinated with the applicant to ensure that adverse impacts to surrounding lands are minimized.

The Department of Transportation noted the occurrence of general aviation aircraft flights over the project. Although the flights will be at an altitude whereby no noise attenuation conditions or aviation easement requirements are expected, potential occupants of the project will be made aware prior to purchase that overflight may occur.

A landscaped buffer area is planned within the project site between the existing residences in the Hale Pi'ilani Subdivision and the planned new collector road. This buffer will serve to mitigate noise associated with the planned road and the project. The overall long-term impact of the proposed project on ambient **air and** noise levels is not anticipated to be significant given the predominantly residential character of the proposed project.

11. Scenic and Open Space Resources

a. Existing Conditions

The subject property is located mauka of Pi'ilani Highway at the northern portion of the Kihei urban area. The slopes of Haleakala are visible from the project site, with the West Maui Mountains visible to the northwest. The project site is not located within a scenic view corridor, nor is it a part of a valuable open space resource area.

b. Potential Impacts and Proposed Mitigation Measures

The proposed residential community will be developed as an architecturally integrated master planned area with low-rise residential structures. Landscaping will be installed as part of the development improvements to ensure visual buffering and softening of the built landscape. Adverse impacts to scenic or open space resources resulting from the project are not anticipated. While the property abuts the existing Hale Pi'ilani Subdivision, the property is situated at a lower grade than the existing subdivision (averaging approximately 10 feet lower in grade). See **Figure 1011**. This, in combination with a landscape buffer within the project site, will provide a vertical as well as horizontal separation to mitigate visual impacts of the project. The project will also incorporate park and open space areas that will provide view corridors. The project site is not visible from offsite shoreline locations in Kihei.

12. Hazardous Materials and Fertilizer Usage

a. Existing Conditions

The subject property is currently used for seed corn and truck farming operations, both of which total approximately 50 acres of land. The use of



This photo was taken looking south at the Hale Pi'ilani Subdivision from the project site.



This photo was taken looking northwest from the project site. The adjacent Hale Pi'ilani Subdivision (left portion of photo) is evident.

Source: A&B Properties, Inc.

Figure 1011 Proposed Kihei Residential Project Photo Showing Grade Separation

NOT TO SCALE

Prepared for: A&B Properties, Inc.


MUNEKIYO & HIRAGA, INC.

fertilizers in both agricultural operations is undertaken in accordance with best farm practices to ensure that overuse of soil nutrients is avoided. This objective on the part of both farming operations is deemed essential both in terms of environmental and cost considerations. The remainder of the property is vacant and fallow.

b. **Potential Impacts and Proposed Mitigation Measures**

Based on the past and current use of the subject property, there is no evidence of hazardous materials at the property. As noted previously, up until about the mid-1980's the project site was used for sugar cane cultivation. The applicant is in consultation with the State Department of Health, Hazard Evaluation and Emergency Response Office (HEER) concerning their comment regarding appropriate soils analysis and testing to evaluate the potential presence of arsenic. The applicant will work with the HEER to develop a mutually acceptable soil testing program to address these concerns. **comments to the Draft Environmental Impact Statement.**

There are no indications that appreciable levels of arsenic or other agricultural chemicals are present at the subject property. Nonetheless, the applicant acknowledges that the HEER Office noted the potential for residual pesticides in former agricultural lands that are proposed for urban use and the applicant has contacted the HEER Office regarding an appropriate soil testing program. The HEER Office stated in its letter of November 19, 2007 that detailed guidance for the investigation of former agricultural lands is currently under preparation. The applicant will continue to work with the HEER Office to develop a mutually acceptable soils testing program for this site with the understanding that corrective actions may be necessary.

Use of fertilizers within residential lots and within common areas will be in a manner consistent with best landscape practices to avoid over use of soil amendments and nutrients. With such practices, there are no anticipated adverse effects on groundwater resources attributed to fertilizer use.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Regional Setting

a. Existing Conditions

From a regional standpoint, the project site is located within the Kihei-Makena Community Plan region, which stretches from Ma`alaea in the north down to La Perouse Bay in the south. The region contains a diverse range of physical and socio-economic environments. With its dry and mild climate and proximity to recreation-oriented shoreline resources, the visitor-based economy has grown steadily over the years. The town of Kihei serves as the commercial and residential center of the region with the master-planned communities of Wailea and Makena serving as the focal point for the majority of visitor activities. A number of internationally recognized luxury hotels and golf courses are located along the coastline at Wailea and Makena.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is considered compatible with surrounding land uses. The regional character of the North Kihei area will not be adversely impacted by the extension of residential uses to Waiakoa Gulch.

2. Population and Demography

a. Existing Conditions

The population of the County of Maui has exhibited relatively strong growth over the past decade. The resident population for the County of Maui in 2005 was estimated to be 140,050 (SMS, June 2006) and is projected to increase to approximately 151,300 in 2010 (SMS, June 2006).

The subject property is located along the southwestern coast of Maui, within the Kihei-Makena Community Plan region. Just as the County's population has grown, the resident population of the Kihei-Makena region has also increased. The estimated population of Kihei in 2000 was 22,870 (SMS, June 2006), which comprised 19.4 percent of the island's

population. A projection of the resident population for this region in 2010 is estimated to be 28,114 (SMS, June 2006).

b. **Potential Impacts and Proposed Mitigation Measures**

The Kihei area currently contains a mix of housing types, both multi- and single-family, as well as commercial areas. The project's planned housing mix and small commercial area are consistent with existing land uses in the Kihei area. The proposed project is intended to meet a portion of the residents' demand for housing, which will result in a slight increase in the population of the region. **Based on the 2006 County average of three (3) persons per household (Maui County Data Book, 2006), approximately 1,800 persons are anticipated to occupy the 600 proposed units at full project build out. The specific commercial tenants are unknown at this time; however, based on the size and nature of the commercial site, the amount of resulting employees is anticipated to be minimal.** However, aside from this slight increase in population, no significant impacts to population and demography are anticipated.

3. **Economy and Labor Force**

a. **Existing Conditions**

The economy of Maui is heavily dependent upon the visitor industry. The dependency on the visitor industry is especially evident in the Kihei-Makena region, which is one of the State's major resort destination areas. The foundation for the region's visitor strength lies in the availability of vacation rentals, world-class resorts, and recreational facilities throughout Kihei, Wailea, and Makena. Service support for the visitor industry is also found in Kihei, where numerous retail commercial centers are located.

The State's overall economic growth rate remains high and its unemployment rate continues to be the lowest in the nation at 2.8 percent. Maui County is exhibiting similar trends with a seasonally unadjusted unemployment rate for the same period of 2.2 percent (State Department of Labor and Industrial Relations, April 2007).

b. **Potential Impacts and Proposed Mitigation Measures**

On a short-term basis, the project will support construction and construction-related employment. Accordingly, the project will have a beneficial impact on the local economy during the period of construction. Construction related wages resulting from the project is estimated at approximately \$60.4 million (2007 dollars). Additionally, State general excise taxes in the amount of approximately \$6.3 million are estimated over the development and construction period.

From a long-term perspective, project residents will require services related to family maintenance, goods, and services which are expected to further support local business owners. Real property taxes generated by the project residents will contribute to the County's revenue tax base to support any increase in regional public service demands over time.

Based on State operating expenditures at an estimated \$6.2 billion in 2006, and a de facto State population estimated at 1.5 million persons, the per capita expenditure is estimated at approximately \$4,700.00 per person. Similarly, the per capita estimate for County operating expenditures is estimated at approximately \$1,800.00 per person, based on total County operating expenditures of approximately \$317 million and an estimated de facto population of 181,000 persons.

Table 4 below contains the estimated operating expenditures per capita by functional area for the State of Hawai'i.

Table 4. State Operating Expenditures Per Capita

	2006 Operating Expenditures (\$thousands)	Population ^a	Expenditures, per:	
			Resident	Visitor
Governmental Activities:				
General Government	\$455,008.00	1,464,300	\$311.00	\$311.00
Public Safety	\$336,362.00	1,464,300	\$230.00	\$230.00
Highways	\$646,336.00	1,464,300	\$441.00	\$441.00
Conservation and Natural Resources	\$76,490.00	1,464,300	\$52.00	\$52.00
Health	\$690,265.00	1,464,300	\$471.00	\$471.00
Welfare	\$1,709,526.00	1,279,400	\$1,336.00	\$0
Lower Education	\$2,151,891.00	1,279,400	\$1,682.00	\$0
Higher Education	\$678,338.00	1,279,400	\$530.00	\$0
Other Education	\$19,183.00	1,279,400	\$15.00	\$0
Culture and Recreation	\$98,121.00	1,464,300	\$67.00	\$67.00
Urban Redevelopment and Housing	\$87,789.00	1,279,400	\$69.00	\$0
Economic Development and Assistance	\$215,578.00	1,279,400	\$168.00	\$0
Interest Expense	\$172,673.00	1,464,300	\$118.00	\$118.00
Business-type Activities:				
Airports	\$292,086.00	1,464,300	\$199.00	\$199.00
Harbors	\$61,408.00	1,464,300	\$42.00	\$42.00
Unemployment Compensation	\$105,786.00	1,279,400	\$83.00	\$0
Nonmajor Proprietary Fund	\$2,587.00	1,464,300	\$2.00	\$2.00
Subtotal	\$7,799,427.00	1,464,300	\$5,817.00	\$1,934.00
Less: Intergovernmental Revenues	(\$1,601,005.00)	1,464,300	(\$1,093.00)	(\$1,093.00)
Total	\$6,198,422.00		\$4,723.00	\$840.00
^a Population is based on resident and defacto (resident + visitor) numbers from the U.S. Census and the Department of Business, Economic Development & Tourism. Sources: State of Hawai'i, Department of Accounting and General Services, "State of Hawai'i: Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2006", 2007 and Mikiko Corporation, "Economic and Fiscal Impact Assessment for Ho'opili", August 2007.				

Table 5 below contains the operating budget per capita by functional area for the County of Maui.

Table 5. County Operating Budget Per Capita

	2006 Operating Expenditures (\$thousands)	Population ^a	Expenditures, per:	
			Resident	Visitor
Governmental Activities:				
Legislative	\$5,196.00	139,995	\$37.00	\$0
Management	\$88,821.00	181,534	\$489.00	\$489.00
Fire and Public Safety	\$20,561.00	181,534	\$113.00	\$113.00
Housing	\$13,128.00	181,534	\$72.00	\$72.00
Liquor	\$2,371.00	181,534	\$13.00	\$13.00
Administration	\$13,528.00	181,534	\$75.00	\$75.00
Recreation	\$22,872.00	181,534	\$126.00	\$126.00
Planning	\$3,579.00	139,995	\$26.00	\$0
Police	\$31,800.00	181,534	\$175.00	\$175.00
Legal	\$5,651.00	139,995	\$40.00	\$0
Infrastructure (exc. Water)	\$73,167.00	181,534	\$403.00	\$403.00
Water	\$36,191.00	181,534	\$199.00	\$199.00
Total	\$316,865.00		\$1,768.00	\$1,665.00
^a Population is based on resident and defacto (resident + visitor) numbers from the Maui County Data Book 2006. Source: County of Maui, "Operating Budget for the County of Maui for the Fiscal Year July 1, 2005 to June 30, 2006".				

The proportion of residents at the project anticipated to be new in-migrants to Maui is expected to be modest, given the pent up demand for housing on Maui and that the MRWHP requires residency within the County as a qualification criterion. Accordingly, an in-migrant population of between 5 percent and 10 percent was assumed for estimation purposes. Based on this assumption, between approximately 90 persons (30 households at an average of 3 persons per household) and 180 persons (60 households at an average of 3

persons per household) would be new residents to Maui County. The total estimated cost of providing State and County services for these new residents is estimated at between \$585,000 and \$1,170,000.

Based on current tax rates and other development assumptions, the annual real property tax base for the project has been estimated at approximately \$341,000.00. For greater discussion of the economic impacts of the project, refer to **Appendix "A"** ("A Market Study & Economic Impact Analysis of the Proposed Kihei Residential Project, Kihei, Island of Maui, Hawai'i").

4. **Housing**

a. **Existing Conditions**

The project site is located in Kihei, the commercial and residential center of South Maui. A range of housing types and conditions exists within these areas, from owner-occupied homes to luxury condominiums for part-time residents.

Over the past five (5) years, the demand for housing on Maui has intensified due to steady population growth, high employment and historically low interest rates. This strong demand, coupled with limited supply, has led to rising housing prices. The Hawai'i Housing Policy Study Update 2003, estimated a deficit of approximately 3,755 needed resident housing units as of 2006. This deficit was projected to further increase to approximately 4,156 units by 2024. The long-term projection of housing conditions in South Maui indicates that the increase in households over the next five (5) years will outnumber the existing supply of new homes. A significant increase in housing supply will be needed to accommodate the region's anticipated growth.

b. **Potential Impacts and Proposed Mitigation Measures**

The project will provide resident housing opportunities in both the near and long term. A range of housing types will serve to meet the varied housing needs of the region, at an attractive and central location in North Kihei. Additional product choices will provide healthy competition and allow for

a more balanced housing market. In light of the current and projected housing market conditions, the proposed Kihei Residential project will provide a significant community benefit by offering residents new opportunities to secure affordable and market-priced housing products.

The proposed Kihei Residential project would add approximately 600 residential units, including affordable units, to the supply of housing on Maui. The proposed project would assist in providing relief to the current overall shortage of housing. Moreover, the subject property's central location suggests that its impact will be beneficial to Maui's residential and commercial sectors. No negative impacts on housing conditions are anticipated. For a detailed discussion of the housing market and the impact of the proposed project, refer to **Appendix "A"** ("A Market Study & Economic Impact Analysis of the Proposed Kihei Residential Project, Kihei, Island of Maui, Hawai'i").

Regarding affordability of housing units, the project will be in compliance with the Maui Residential Workforce Housing Policy (MRWHP), Maui County Code Section 2.96. The MRWHP sets forth requirements for the provision of housing units for a defined set of household income brackets, including individuals and families earning between 80 percent and 160 percent of median household income.

As required under the MRWHP, a minimum of 40 percent of the project's units, or approximately 240 units (based on the project's planned 600 units), must be priced for households within this income range. The MRWHP specifies the proportionate allocation of the affordable units among the various income groups, which include: 30 percent (72 units) priced for below-moderate income households (earning between 80 percent and 100 percent of median income), 30 percent (72 units) priced for moderate income households (earning between 100 percent and 120 percent of median income), 20 percent (48 units) priced for above-moderate income households (earning between 120 percent and 140 percent of median income), and 20 percent (48 units) priced for gap income households (earning between 140 percent and 160 percent of median income).

While subject to agreement with the County, it is anticipated that the affordable units will comprise a mix of both multi-family and single-family units and that the affordable units will be developed concurrently with the market units. See Table 6 below.

Table 6. Affordable Housing Price Ranges

Income Group	Income Range	Affordable Unit Allocation		Single Family		Multi Family	
	(% of Median Income)	%	Unit Count	Price Range		Price Range	
Below Moderate Income	80-100	30%	72	\$211,200.00	\$267,900.00	\$206,900.00	\$263,600.00
Moderate Income	100-120	30%	72	\$267,900.00	\$329,600.00	\$263,600.00	\$325,400.00
Above Moderate Income	120-140	20%	48	\$329,600.00	\$391,400.00	\$325,400.00	\$387,100.00
Gap Income Group	140-160	20%	48	\$391,400.00	\$469,300.00	\$387,100.00	\$464,800.00

C. PUBLIC SERVICES

1. Police and Fire Protection

a. Existing Conditions

The headquarters of the County of Maui Police Department (MPD) are located at its Wailuku Station. The department consists of several patrol, support, administrative, and investigative divisions that service the Hana, Lana`i, Lahaina, Moloka`i, and Wailuku regions.

The MPD's Kihei Patrol, which covers the Kihei-Makena region, operates from a substation located at the Kihei Town Center, about 3.5 miles south of the project site.

Fire prevention, protection, and suppression services are provided by the County of Maui, Department of Fire and Public Safety. The Kihei Fire Station, which services the Kihei-Makena region, is situated on South Kihei Road near Kalama Park, approximately 3.0 miles south of the project site.

The Wailea Fire Station is located about 4.0 miles to the south of the project site. The Wailea Station services the area from Kamaole Beach Park II to Makena and provides back-up support for the Kihei Station when required.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will create a need for additional police and fire protection services. However, the project is located adjacent to existing residential areas which are currently afforded similar services. **Access to the project is planned from three (3) primary entry points to facilitate quick response to all portions of the project.** The project site is proximately located to existing police and fire stations within the Kihei region. The project will contribute toward such services through real property tax revenues generated from the project.

In consultation with the Department of Police and the Department of Fire and Public Safety, neither department voiced a need for substation sites within the project limits. Continued coordination with these agencies will be undertaken as the project progresses in the event their facility requirements should change.

2. Medical Facilities

a. Existing Conditions

The only major medical facility on the island is Maui Memorial Medical Center, which is located in ~~Kahului~~ **Wailuku** about eight (8) miles from the project area. The 231-bed facility provides general, acute, and emergency care services.

Clinics and offices are situated throughout the Kihei and Wailea areas, however these offer medical services on a lesser scale. Such clinics include Kihei Clinic and Wailea Medical Services, Kihei Pediatric Clinic, Kihei

Physicians, the Kihei-Wailea Medical Center, Maui Medical Group, and Kaiser Permanente.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to affect the service capabilities of emergency medical or general care operations. As noted above, medical services are available in the Kihei-Wailea region.

3. Educational Facilities

a. Existing Conditions

The State Department of Education (DOE) operates three (3) schools in the Kihei area. Kihei Elementary School and Kamali`i Elementary School each covers grades K to 5, and Lokelani Intermediate School covers grades 6 to 8. Maui High School, which covers grades 9 to 12 and is located in Kahului, is the designated public high school for Kihei residents. The approximate actual and projected enrollments, as well as the capacity of the area schools are in **Table 37** below.

Table 37. Actual and Projected Enrollments at Department of Education Schools

School	Capacity	Actual Enrollment		Projected Enrollment					
	SY 05-06 06-07	SY 07-08	SY 05-06	SY 06-07	SY 07-08	SY 08-09	SY 09-10	SY 10-11 11-12	SY 11-12 12-13
Maui High	1,563 1,526	1,732	1,709	1,726	1,821	1,830	1,842	1,851 1,662	1,861 1,665
Lokelani Intermediate	646 697	651	762	726	751	765	779	793 583	807 561
Kamali`i Elementary	830 797	650	703	701	712	725	738	751 611	765 603
Kihei Elementary	957 923	799	810	794	827	831	835	839 774	845 781

Source: Department of Education, 2006.

In addition, the Kihei Charter High School for grades 9 to 12 is also located in the region and had an enrollment of 145 students in 2005.

Maui Community College (MCC), which is located in Kahului, is a branch of the University of Hawai'i system. MCC is the primary higher education institution serving Maui.

b. **Potential Impacts and Proposed Mitigation Measures**

Based on the proposed 600 residential units, the DOE has estimated that the project will generate approximately 134 elementary school students, 71 middle school students, and 58 high school students when the project has reached maturity and enrollment stabilizes.

The DOE noted that Kihei Elementary School has sufficient capacity to accommodate the project's estimated enrollment. ~~However, the DOE has indicated that Lokelani Intermediate School is currently over its facility capacity by 46 students. As Table 3 indicates, Maui High School also is in a similar situation with regards to capacity. As shown in Table 7,~~ **enrollment at both Kamali'i Elementary and Lokelani Intermediate Schools are also below capacity. However, Maui High School is over its facility capacity.** It is noted that the DOE is undertaking site selection and planning studies for a new high school in Kihei to satisfy future capacity needs.

The 2007 Legislature passed a bill establishing school impact fees. As a result, tThe DOE has recommended that the State Land Use Commission impose a school fair-share contribution condition during the district boundary amendment process. The applicant will continue discussions with the DOE concerning a fair-share educational contribution for the project.

4. **Recreational Facilities**

a. **Existing Conditions**

Diverse recreational opportunities are available in the Kihei-Makena Community Plan region. Shoreline activities, such as fishing, surfing, jogging, camping, picnicking, snorkeling, swimming, and windsurfing, are by far the predominant form of recreation in the area. Numerous public park facilities exist within a relatively short driving distance of the project

site, including Waipu`ilani, Kalama, and Kama`ole I/II/III Beach Parks. Additionally, recreational resources available in Kihei, Wailea, and Makena include the Kihei Community Center and Aquatic Center, as well as resort-affiliated, world-class golf courses and tennis centers.

Moreover, adjacent to the subject property to the south, the Hale Pi`ilani residential subdivision contains an approximately 2-acre neighborhood park. The park currently contains a small grassed field, basketball court, and playground.

b. Potential Impacts and Proposed Mitigation Measures

The applicant has been in coordination with the County of Maui, Department of Parks and Recreation to ensure satisfactory compliance with parks and playgrounds assessment requirements. Preliminarily, it is estimated that the park assessment would amount to just under seven (7) acres for a 600-unit residential subdivision in South Maui. The applicant is currently exploring the possibility of creating a new park adjacent and north of the existing Hale Pi`ilani neighborhood park to satisfy its park assessment requirements. **As required, the proposed park space will be graded, automatically irrigated, and will contain restroom facilities and parking.**

In addition, the project will include other landscaped open space areas and pocket parks linked by a path and trail system. The path and trail system will promote connectivity within the project, as well as with other adjacent neighborhoods. The adjacent Waiakoa Gulch will provide a natural project buffer and opportunities for passive recreation. These features will serve to improve the visual landscape, promote connectivity within the project, as well as to offsite locations, and create recreational opportunities for project residents.

5. Solid Waste Disposal

a. Existing Conditions

Single-family residential solid waste collection service is provided by the County of Maui. Residential solid waste collected by County crews is

disposed of at the County's Central Maui Landfill facility, located 4.0 miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill also accepts commercial waste from private collection companies. A new expansion to the Central Maui solid-waste landfill facility was recently opened. Privately owned facilities, such as the Maui Demolition and Construction Landfill and the Pohakulepo Concrete Recycling Facility, accept solid waste and concrete from demolition and construction activities. These facilities are located at Ma'alaea, near Honoapi'ilani Highway's junctions with North Kihei Road and with Ku'ihelani Highway. A County supported green waste recycling facility is located at the Central Maui Landfill.

b. **Potential Impacts and Proposed Mitigation Measures**

The single family residential units located in the completed subdivision will be served by the County of Maui's solid waste disposal facilities. **An estimate of the amount of solid waste attributable to the project at full project build out is 5.67 tons per day, which is based on a factor of approximately 6.3 lbs/person/day for 1,800 persons.** The small commercial area, as well as the multi-family areas, will be served by private waste collection companies. The proposed project is not anticipated to affect the service capabilities of residential or commercial waste collection operations. In the *Public Facilities Assessment Update, County of Maui (20022007)*, R. M. Towill Corporation projected that the Central Maui Landfill would have adequate capacity to accommodate commercial and residential waste through the year 2020, with a surplus of approximately one (1) million cubic yards of landfill space.

D. **INFRASTRUCTURE**

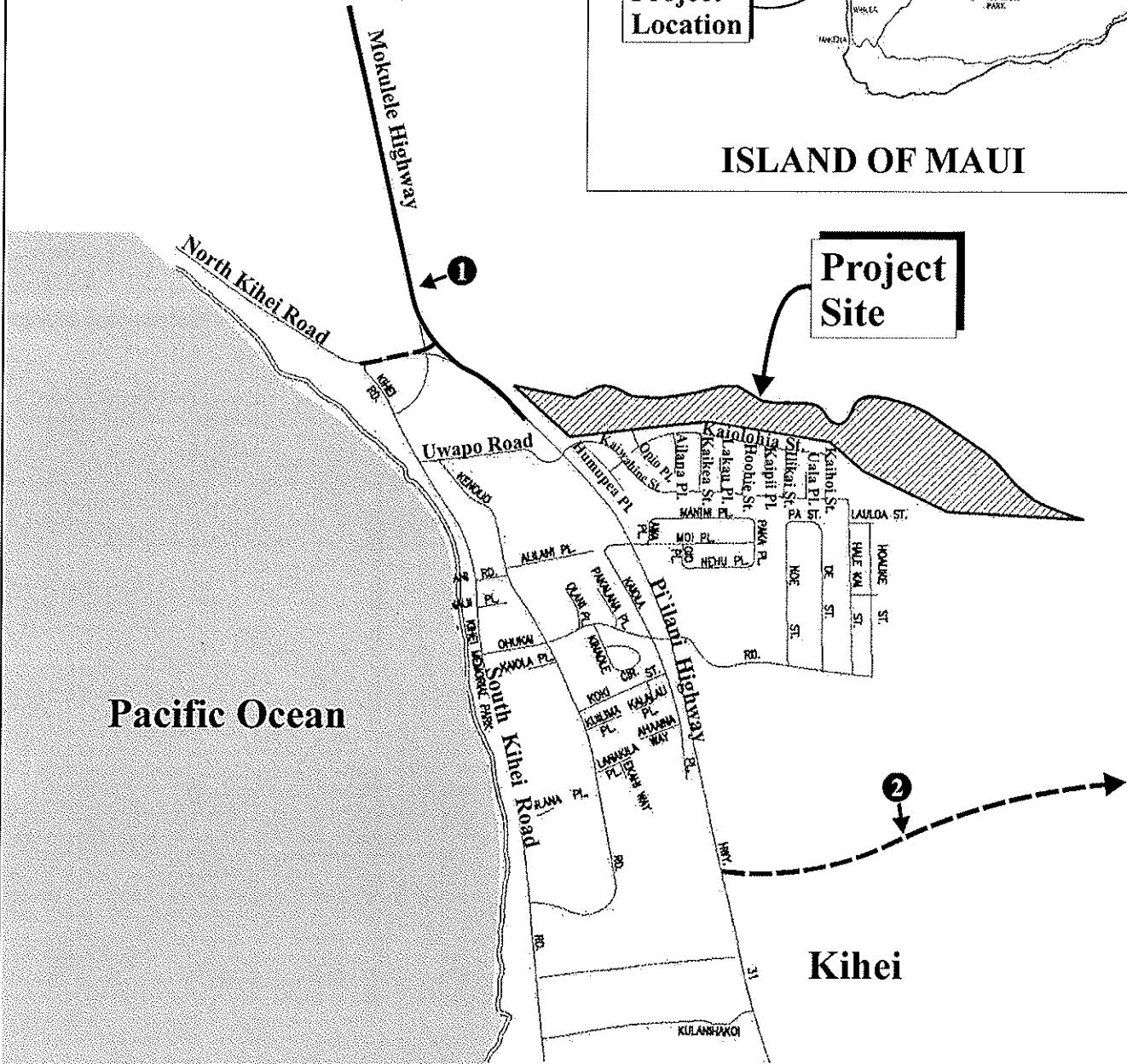
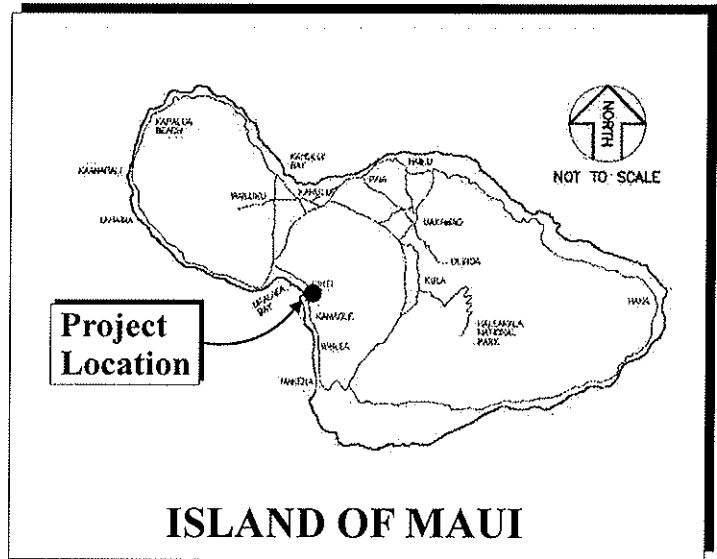
1. **Roadways**

a. **Existing Conditions**

Access to the Kihei region is provided via North Kihei Road from the West Maui and the Wailuku areas and via Mokulele Highway from the Kahului and the Upcountry areas. See **Figure 112**. The following is a summary of major roadways in the vicinity of the project site.

KEY

- 1** Mokulele Highway Widening and Realignment (under construction)
- 2** Proposed Kihei-Upcountry Highway (to connect to Haleakala Highway)



Source: Austin, Tsutsumi & Associates, Inc.

Figure #12 Proposed Kihei Residential Project
Existing and Planned Area Roadways NOT TO SCALE



(1) **Pi`ilani Highway**

In the vicinity of the project site, Pi`ilani Highway is a four-lane, State arterial highway providing access between Kihei and Wailea and runs parallel to and mauka of South Kihei Road. Pi`ilani Highway is the main arterial road in the area. In addition to paved shoulders, Pi`ilani Highway has traffic signals and right- and left-turn lanes at major intersections. Pi`ilani Highway narrows to two (2) lanes approximately 5 miles south of the project site near the Maui Meadows subdivision and ends at Wailea Ike Drive in the Wailea Resort. The project site is located adjacent to Pi`ilani Highway, in the vicinity of its **intersectionconnection** with Mokulele Highway.

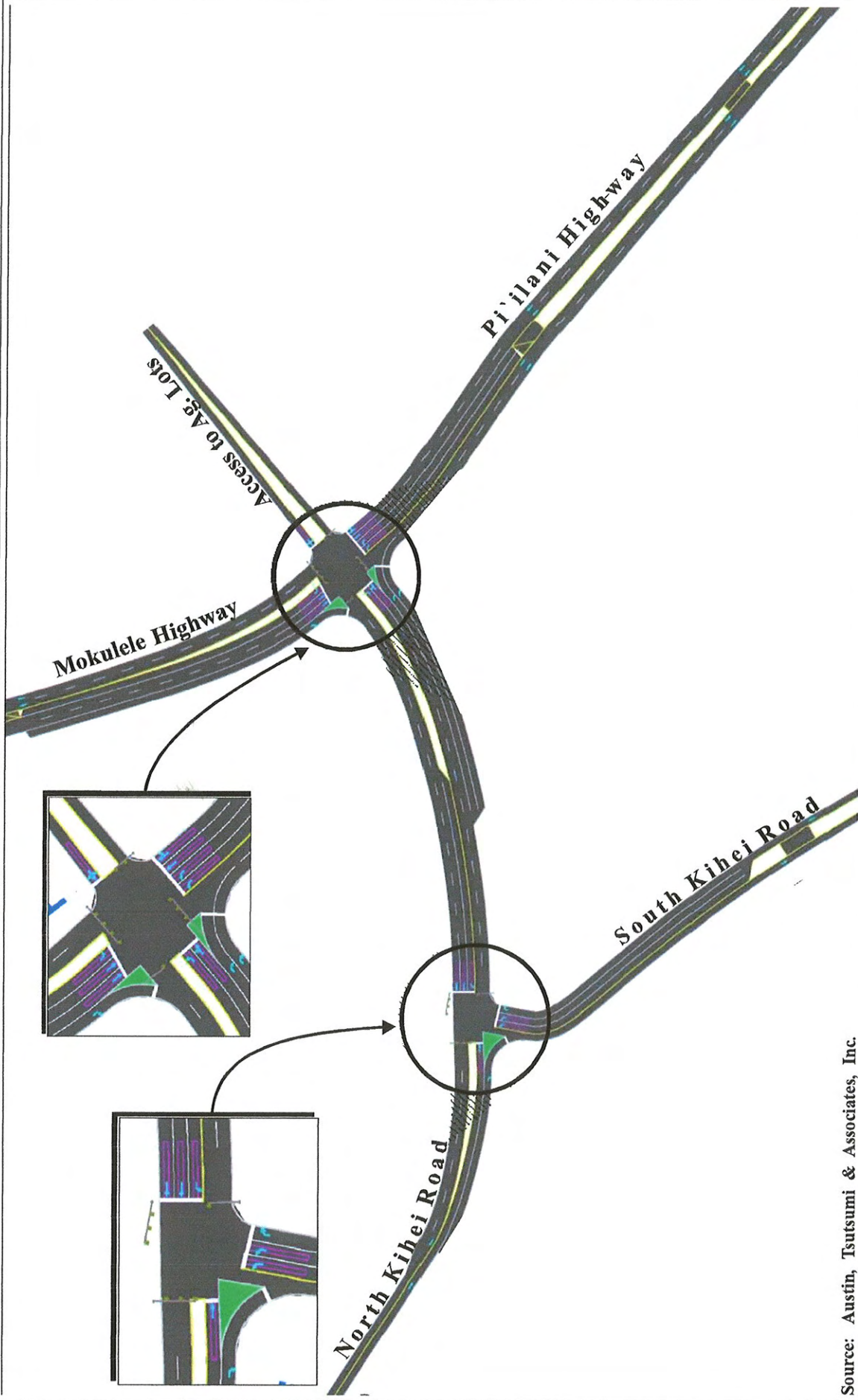
The State Department of Transportation (DOT) is currently constructing the Mokulele Highway Widening, Vicinity of Maui Humane Society to Pi`ilani Highway project. This project **willhas** resulted in the realignment of both Pi`ilani and Mokulele Highways. With these improvements, vehicles heading southbound on Mokulele Highway **willnow** access onto Pi`ilani Highway without having to make any turns. Conversely, vehicles northbound on Pi`ilani Highway **will** access onto Mokulele Highway without making any turns. **See Figure 13.**

(2) **Mokulele Highway**

Mokulele Highway connects Kihei and Kahului. In the vicinity of the project site, Mokulele Highway is a two-lane State arterial highway which is currently being widened and realigned as part of the Mokulele Highway Widening, Vicinity of Maui Humane Society to Pi`ilani Highway project. With the improvements currently underway, Mokulele Highway will become a four-lane, divided roadway. The widening project is scheduled for completion in 2008. The Pu`unene Sugar Mill, the Maui Humane Society, the Army National Guard, and various industrial facilities are located along Mokulele Highway.

(3) **North Kihei Road**

This two-lane, undivided State roadway runs along the coastline and adjacent to the Kealia Pond National Wildlife Refuge. Near the southern end of this roadway, there are a



Source: Austin, Tsutsumi & Associates, Inc.

Figure 13

Proposed Kihei Residential Project Mokulele Highway Realignment

NOT TO SCALE



Prepared for: A&B Properties, Inc.



A&B/KiheiRes/Final EIS/mokulelerealignment

number of residential complexes at Sugar Beach. In the north, North Kihei Road intersects Honoapi`ilani Highway at Ma`alaea. North Kihei Road is used primarily by vehicles traveling between West Maui, Central Maui, and Kihei.

(4) **South Kihei Road**

This two-lane, undivided County collector roadway runs in a north-south direction along the Kihei coastline from its intersection with North Kihei Road to Okolani Drive in Wailea. At its northern terminus, South Kihei Road turns into North Kihei Road, which continues north to Ma`alaea. South Kihei Road provides local access to residences, visitor accommodations, shopping areas, and parks along the Kihei coastline.

(5) **Kaiwahine Street**

Kaiwahine Street is a two-lane, undivided County collector roadway which extends east from Pi`ilani Highway. Makai (west) of its signalized intersection with Pi`ilani Highway, Kaiwahine Street becomes Uwapo Road. Kaiwahine Street serves as the primary access way for the Hale Pi`ilani residential subdivision. Access to the project site is currently via Kaiwahine Street.

(6) **Uwapo Road**

Uwapo Road is a two-lane, undivided, east-west County collector roadway between South Kihei Road and Pi`ilani Highway. Uwapo Road provides access to a number of multi-family residential complexes and Kenolio Park.

(7) **Ohukai Road**

Like Uwapo Road, Ohukai Road is a two-lane, undivided County roadway which runs in an east-west direction south of the project site. Ohukai Road intersects Pi`ilani Highway and provides access to residences and commercial areas.

b. **Potential Impacts and Proposed Mitigation Measures**

A Traffic Impact Analysis Report (TIAR) was completed for the project by Austin Tsutsumi & Associates in May 2007. See **Appendix "EF"**.

Existing roadway traffic conditions were analyzed based on current land use, population, the existing roadway network, and vehicular traffic counts. Growth factors were then applied to account for increases in population and other proposed developments anticipated within the region.

The TIAR assumes 2016 as the build-out year for the Kihei Residential project (Base Year). Traffic projections were first undertaken for the Base Year without the project, but including regional traffic growth (2 percent growth per year) and other known developments in the region. The TIAR also describes planned roadway improvements within the region.

Based on the analysis, overcapacity conditions are projected to occur by the Base Year even without the Kihei Residential project. It is anticipated that traffic improvements will be necessary just to accommodate the Base Year traffic conditions with the expected growth. Appropriate traffic mitigation measures to address Base Year conditions (without project-generated traffic) include the following.

- At the North Kihei Road/South Kihei Road/Pi'ilani Highway intersection, modify the eastbound North Kihei Road approach to provide an additional through lane.
- Continue to pursue development of the Kihei-Upcountry bypass and a north-south roadway parallel to Pi'ilani Highway.
- Pursue carpooling incentives and increased bus service.

The TIAR notes that projected Base Year (2016) traffic volumes (without project-generated traffic) assume the full or partial implementation of several large future developments, including Makena and Honua Ula, which are subject to further County approvals. The Base Year assumptions for these projects include the following: Makena: 1,178 additional resort and residential units along with a 100,000 square foot shopping center; Honua Ula: 1,400 new resort and residential units and an 80,000 square foot shopping center. It is estimated that these two (2) projects alone will generate 1,955 (a.m.) and 3,134 (p.m.) vehicular trips during the respective peak hours of traffic. Should these projects be delayed or reduced in magnitude, a significant reduction in projected traffic volumes would result

for the Base Year. The TIAR examines the effect of such a delay in these projects, beyond the Base Year (2016).

The TIAR estimates that the proposed project will generate approximately 616 trips during the morning (AM) peak hour of traffic (7:00 a.m. to 8:00 a.m.) and 737 trips during the afternoon (PM) peak hour of traffic (4:15 p.m. to 5:15 p.m.). These trips were then distributed across the roadway network within the study area based on existing traffic patterns. These trips translate into the project contributing a maximum of 11 percent of the traffic volume during both the AM and PM peak hours of traffic. See **Table 48** below.

Table 48. Projected Traffic Counts in 2016 on Pi'ilani Highway Near Project

Peak Hour	Pi'ilani Highway Trips	Project-Generated Trips	Percent
AM	5,496	616	11%
PM	7,022	737	10%

A summary of the anticipated levels of services (LOS) at major intersections in the vicinity of the project site is presented in Table 9 below.

Table 9. Level of Service Summary

	Existing Conditions		Base Year 2016		Base Year 2016 With Mitigative Measures		Year 2016 With the Project		Year 2016 With the Project and Recommended Improvements		Year 2016 With the Project and without Honua Ula and Makena	
	AM LOS	PM LOS	AM LOS	PM LOS	AM LOS	PM LOS	AM LOS	PM LOS	AM LOS	PM LOS	AM LOS	PM LOS
North Kihei Road/South Kihei Road/Piilani Highway												
WB LT	A	A	--	--	--	--	--	--	--	--	--	--
NB LT/RT	F'	F'	--	--	--	--	--	--	--	--	--	--
North Kihei Road/South Kihei Road/Piilani Highway (signalized)												
EB TH	--	--	C	F'	C	C	B	C	B	C	C	C
EB RT	--	--	A	A	A	B	A	B	A	B	A	B
WB LT	--	--	D	F'	C	D	C	D	C	D	D	D
WB TH	--	--	A	C	A	B	A	C	A	C	A	A
NB LT	--	--	D	E	D	E	C	D	C	D	C	D
NB RT	--	--	C	D	C	D	B	C	B	C	C	D
Overall	--	--	C	E*	B	C	B	C	B	C	B	C
Overall Delay	--	--	23.4	59.1	18.4	25.4	15.6	26.2	15.6	26.1	17.7	22.0
South Kihei Road/Mokulele Highway												
WB LT/RT	C	F	--	--	--	--	--	--	--	--	--	--
SB LT/TH	A	A	--	--	--	--	--	--	--	--	--	--
South Kihei Road/Uwapo Road												
WB LT/RT	C	D	C	F	C	F	C	F'	C	F'	C	F'
SB LT	A	A	A	A	A	A	A	A	A	A	A	A
Piilani Highway/Mokulele Highway												
EB LT	C	C	--	--	--	--	--	--	--	--	--	--
EB TH/RT	C	D	--	--	--	--	--	--	--	--	--	--
WB LT	C	C	--	--	--	--	--	--	--	--	--	--
WB TH	E	D	--	--	--	--	--	--	--	--	--	--
WB RT	E	F'	--	--	--	--	--	--	--	--	--	--
NB LT/TH	E	E	--	--	--	--	--	--	--	--	--	--
NB RT	C	D	--	--	--	--	--	--	--	--	--	--
SB LT	D	D	--	--	--	--	--	--	--	--	--	--
SB LT/TH	D	E	--	--	--	--	--	--	--	--	--	--
SB RT	C	C	--	--	--	--	--	--	--	--	--	--
Overall	D	E	--	--	--	--	--	--	--	--	--	--
Overall Delay	54.5	67.4	--	--	--	--	--	--	--	--	--	--
Piilani Highway/Mokulele Highway (with realignment)												
EB LT	--	--	F	F	F	F	F	E	F	E	F	F
EB LT/TH	--	--	F	F	F	F	F	E	F	E	F	F
EB RT	--	--	C	C	D	E	D	D	D	D	D	D
WB LT/TH/RT	--	--	F	F	F	F	F	F	F	F	F	F
NB LT	--	--	D	F'	D	F'	D	F'	E	F'	D	E
NB TH/RT	--	--	B	B	B	B	C	C	A	A	B	B
SB LT	--	--	F	F	F	F	F	F	F	F	F	F
SB TH	--	--	F'	F'	F'	F'	F'	F'	F'	F'	D	F'
SB RT	--	--	C	C	C	C	C	F	C	B	B	C
Overall	--	--	D	F*	D	F*	E	F*	D	F*	D	E
Overall Delay	--	--	46.4	92.2	48.1	96.9	55.6	117.0	52.1	111.3	39.6	57.5
Piilani Highway/Uwapo Road/Kaiwahine Street												
EB LT/TH	D	E	F'	F'	F'	F'	F'	F'	--	--	--	--
EB LT	--	--	--	--	--	--	--	--	F	F'	F'	F
EB TH	--	--	--	--	--	--	--	--	E	F	E	F
EB RT	C	D	E	F	E	F	E	E	E	E	E	F
WB LT/TH	D	E	F'	F'	F'	F'	F'	F'	--	--	--	--
WB LT	--	--	--	--	--	--	--	--	F'	F'	F	F'
WB TH	--	--	--	--	--	--	--	--	E	F	E	F
WB RT	C	D	E	F	E	F	F	F	F'	F	F'	F
NB LT	E	E	F	F	F	F	F	F	F	F	F	F
NB TH	B	B	F'	F'	F'	F'	F'	F'	F'	F'	E'	F'
NB RT	A	A	A	A	A	A	B	A	B	B	B	B
SB LT	D	E	F	F'	F	F'	F	F'	F	F'	F'	F
SB TH	A	A	A	F'	A	F'	A	F'	D	F'	A	B
SB RT	A	A	A	A	A	A	A	A	C	B	A	A
Overall	B	B	E*	F*	E*	F*	F*	F*	F*	F*	E*	F*
Overall Delay	15.0	18.1	72.6	131.8	72.7	131.9	247.5	313.9	107.8	191.8	58.7	80.6
Piilani Highway/Project Access												
WB RT	--	--	--	--	--	--	C	C	C	C	C	C

*volume to capacity (v/c) ratio > 1.0

Due to the moderate (11 percent) contribution in traffic due to the proposed project, additional roadway improvements will be warranted in conjunction with the development of the project as follows.

- Construct the proposed right-turn in/right-turn out only project access onto Pi'ilani Highway. Provide an exclusive right-turn deceleration lane on the northbound Pi'ilani Highway approach (continuation of Pi'ilani Highway/Kaiwahine Street/Uwapo Road westbound right-turn acceleration lane) and an exclusive northbound acceleration lane.
- At the Pi'ilani Highway/Uwapo Road/Kaiwahine Street intersection, modify the southbound Pi'ilani Highway approach to provide double left-turn lanes. Modify the eastbound Uwapo Street approach to provide an exclusive left-turn and through lane. Modify the westbound Kaiwahine Street approach to provide two (2) exclusive left-turn lanes, a through lane, and an exclusive westbound right-turn lane connecting to an exclusive northbound acceleration lane. Modify the traffic signal system at this intersection to provide an 8-phase traffic signal timing configuration.

The applicant will ensure that all proposed roadway development and improvements are in accordance with the Hawai'i Revised Statutes, Maui County Code, and other applicable rules and regulations. This includes the Hawai'i Standard Specifications for Road and Bridge Construction dated 2005, the Standard Details for Public Works Construction, 1984, as amended, and the Manual on Uniform Traffic Control Devices for Streets and Highways, 2003.

The TIAR recommends mitigation measures and improvements to be implemented for the project. These are outlined above and on page 56 of the TIAR. As noted in the State Department of Transportation's (DOT) letter of November 21, 2007, agreement on the mitigation measures and improvements to be implemented by the applicant will be determined with the DOT Highways Division. This would occur as part of the applicant's engineering design process and the preparation of specific onsite and offsite roadway and intersection improvement plans. DOT approval will be required prior to finalizing plans and undertaking these roadway and intersection improvements.

The Department of Public Works and the DOT Highways Division will be given the opportunity to review and approve roadway construction plans to ensure that applicable regulations are satisfied.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The Kihei Residential Project may be subject to the provisions of Chapter 14.62. Although the specific traffic impact fee schedule for the South Maui region has not yet been adopted by ordinance, the final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

Lastly, the project presents an opportunity to promote non-automobile travel for recreational and household pursuits. In order to minimize vehicle trips particularly outside the project, a limited commercial area within the project limits is planned to serve the needs of the adjacent community. Accommodations to support public bus transportation services will be provided in the commercial area to facilitate an alternative travel mode. Also, recreational needs will be served by the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths and walking trails will connect these areas and promote recreational activity and also serve to reduce residents' reliance on automobiles.

2. Water System

a. Existing Conditions

The Kihei area is served by the Department of Water Supply (DWS) of the County of Maui. The existing water mains in the project vicinity include: a 12-inch ductile iron (DI) main along Kaiwahine Street, an 8-inch DI main along Kaiolohia Street, an 18-inch cast iron (CI) main adjacent to and crossing Pi'ilani Highway, and a 36-inch concrete main (Central Maui Transmission System) crossing the subject property in a north/south direction approximately midway through the site. The 2.0 million gallon Makai Heights Reservoir provides storage for the north Kihei area.

b. **Potential Impacts and Proposed Mitigation Measures**

A Preliminary Engineering Report was prepared for the proposed project's water system by R.M. Towill Corporation in May 2007. See **Appendix "FG"**. Based on the DWS design standards, the estimated water demands for the project were calculated and are presented in **Table 510**:

Table 510. Estimated Project Water Demands

Description	Flows
Average Daily Demand	0.53 million gallons per day (mgd)
Maximum Daily Demand	0.79 mgd (1.5 x average daily demand)
Peak Hour Demand	1.58 mgd (3.0 x average daily demand)

Based on preliminary consultation with the DWS, it is likely that the DWS will require the applicant to develop a **potable drinking** water source and storage facilities to serve the project. These facilities would be connected to the existing DWS system and dedicated to the County of Maui. The applicant is exploring several potential source opportunities, including surface water treatment and new well sources in Central Maui. To meet the water storage needs of the project, an 800,000 gallon tank at a ground elevation of 345 feet is planned. The applicant is in discussions with neighboring landowners concerning the location of such a tank, as well as potential joint development opportunities. The Makai Heights Reservoir has an estimated remaining capacity of 339,000 gallons which could be used to service a portion of the project. However, further consultation will be undertaken with the DWS during the design phase to determine whether any of this storage capacity would be available for the project. In order to interconnect with the DWS system, a pressure reducing valve would be required. The applicant will continue to work closely with the DWS to ensure that the development of the water system is in accordance with County standards.

~~Further, in an effort to minimize potable water usage and to promote potable water conservation efforts, the applicant will explore the availability of non-potable water sources in the region. It is hoped that adequate non-potable water sources could be found which will reduce the demand on the potable water supply for irrigation purposes.~~

The potential integration of non-potable water for the project will be pursued further during the civil design phase of the project.

The project site is situated over the Paia aquifer (State Aquifer No. 60302) which has an estimated sustainable yield of 8 million gallons per day (mgd). The Paia aquifer extends from Paia to north Kihei, within Central Maui, just east of the Kahului aquifer. The subject site is located in the southern portion of the aquifer, in an area of underlying brackish water (chlorides in excess of 250 parts per million). Wells in this portion of the aquifer are generally used for irrigation purposes. Based on available well information from the Commission on Water Resource Management (CWRM) there are approximately 30 registered wells (excluding wells not in use or for observation) within the Paia aquifer. The majority of the wells are used for irrigation purposes, including those in the vicinity of the project site. The underlying brackish water extends well beyond the project site (mauka/east). Fresh drinking water begins to occur in the basalt lava flows at approximately elevation 1,200 feet above mean sea level (amsl), far beyond the site's maximum elevation of approximately 230 feet amsl. The only listed domestic wells in the Paia aquifer are on the northern end of the aquifer, in the vicinity of Spreckelsville and Maliko Gulch. Due to the project's relative proximity to the ocean, it is not situated upgradient of any known drinking water wells. Based on these factors, the project is not anticipated to have significant adverse impact upon drinking water resources. Specific information concerning the current withdrawal rate from the aquifer was not available, however, the area is not designated a ground water management area by the CWRM.

Regarding potential adverse impacts upon groundwater resources resulting from project implementation, the project will connect to the County wastewater system and household refuse will be collected by County personnel on a regular basis as part of the residential refuse collection service. Further, impacts to groundwater resources attributable to hazardous materials usage are not anticipated since uses typically associated with such materials (e.g. industrial use) are not planned at the project. As a result, the project is not anticipated

to have a significant adverse impact upon groundwater resources as a result of project development.

As mentioned in the Draft EIS, the applicant is exploring several potential drinking water source opportunities, including surface water treatment and new well sources in Central Maui. A primary focus has been the development of a surface water treatment plant utilizing water from the West Maui ditch system. Engineering design of the plant is well underway, as well as the preparation of other needed regulatory documents. Over the past three (3) years, in excess of \$850,000.00 has been spent on the engineering design and preparation of regulatory documents needed for the plant to proceed. The plant is now about 80 percent designed and other environmental and engineering documents are also nearing completion. The applicant is also pursuing other potential sources, including a new drinking water well in the Kahului aquifer. Potential well sites have been identified and a test well was drilled. The results of the well's pump test indicate a sustainable capacity of approximately 0.648 million gallons per day.

The timing of completion of the source development projects will, in large part, determine the particular water source for the project. The applicant acknowledges that both source alternatives will require further discussion, review, and approval by applicable governmental agencies and expects to continue discussions as the planning and design for the project proceeds. Nonetheless, the applicant is committed to develop source, storage, and transmission facilities to serve this project. The applicant will coordinate with the DWS to incorporate this project into the County's Water Use and Development Plan.

Further, regarding measures to reduce drinking water consumption, the applicant will explore the availability of non-drinking water sources in the region. The applicant would like to be able to utilize R-1 recycled water, where appropriate. The applicant will examine partnership opportunities for the potential use of non-drinking water and will consult with the Department of Environmental Management staff concerning the extension of the R-1 water line from the Kihei Wastewater Reclamation Facility.

Additionally, the applicant will explore the availability of other non-drinking water sources for landscape irrigation purposes, which will be pursued further during the civil design phase of the project. The information on “Maui County Planting Plan – Plant Zone 3” from the Department of Water Supply, will be utilized, as applicable, to place plants in landscaping, which will help to conserve water and protect the watershed from degradation. Rain sensors will be provided on all automated irrigation controllers in common landscaping areas. The applicant will initiate a regular maintenance program to check and reset the automated irrigation controllers.

Plumbing fixtures will be installed in accordance with Maui County Code Section 16.20A.680, which requires the utilization of low-flow fixtures and devices in an effort to conserve water. The applicant will advise owners to maintain fixtures and devices to minimize leakage.

It is acknowledged that the substitution of additional multi-family units for a portion of the single-family units would result in less overall water demand for the project. This is due to the lower average daily water demand factor for multi-family units (560 gallons per day) versus that for single-family units (1,000 gallons per day). However, various other factors were also considered in developing the project master plan and unit mix. By offering a range of housing types it was felt that the project would attract and serve a wider range of the housing market. The unit mix does reflect the general market preference for single-family detached units. It was also felt that single-family residential use was compatible and consistent with the adjacent portions of the Hale Pi'ilani subdivision. Also, the higher density multi-family use was deemed more appropriate closer to the primary vehicular access points on the western (makai) portion of the site.

The CWRM requested that the project be included in the County's Water Use and Development Plan. The applicant will coordinate with the DWS, as applicable, to address the CWRM request.

3. Wastewater System

a. Existing Conditions

The Kihei region is currently serviced by a wastewater collection, treatment, and disposal system owned and operated by the County of Maui, Department of ~~Public Works and Environmental Management~~, Wastewater **Reclamation** Division (WWRD). The system consists of a number of pump stations and forced mains which convey wastewater through the County's transmission lines. The Kihei Wastewater Reclamation Facility (KWRF) processes the wastewater for the South Maui area.

The KWRF is located mauka (east) of Pi'ilani Highway and south of the Elleair Maui Golf Club. The KWRF provides treatment for the South Maui region to produce recycled water at the R-1 level by the State Department of Health standards. R-1 recycled water is the highest quality of recycled water. The **cumulative allocated** capacity of the KWRF is approximately ~~8.06.6~~ mgd and the current dry weather flow into the plant is approximately 4.7 mgd. The KWRF is currently operating at approximately ~~5971~~ percent of its capacity.

Wastewater from the existing Hale Pi'ilani residential subdivision adjacent to the project is transported via a 12-inch **polyvinyl chloride (PVC)** gravity sewerline across Pi'ilani Highway and along Uwapo Road to Pump Station No. 2, located on South Kihei Road. According to WWRD staff, the 12-inch line currently only carries flows generated by the Hale Pi'ilani subdivision. Based on estimated flows from the Hale Pi'ilani subdivision, there is approximately 1.86 million gallons per day (mgd) of remaining available capacity in the existing 12-inch line.

Pump Station Nos. 2 to 5 convey flows from North Kihei to Pump Station No. 6, which is adjacent to the Kihei Fire Station and Kalama Park on South Kihei Road. Of these pump stations, only Pump Station No. 2 at 51.3 percent operates at above 50 percent of capacity. The combined flows from these pump stations are transported to the KWRF.

b. **Potential Impacts and Proposed Mitigation Measures**

A Preliminary Engineering Report was prepared for the proposed project's wastewater requirements by R. M. Towill Corporation in May 2007. Refer to **Appendix "FG"**. Utilizing WWRD wastewater flow standards, other design flow criteria, and based on the project's conceptual land plan, the estimated wastewater demands for the project were calculated and are presented in **Table 611**:

Table 611. Estimated Project Wastewater Demands

Description	Flows
Base Flow	0.191 million gallons per day (mgd)
Average Dry Weather Flow	0.203 mgd
Maximum Dry Weather Flow	0.818 mgd
Peak Wet Weather Flow	0.935 mgd

The estimated 1.86 mgd of available capacity in the existing 12-inch gravity sewer line is sufficient to accommodate the peak wet weather flow of 0.935 mgd from the project without a need for an upgrade. However, since Pump Station No. 2 is at just over 50 percent of capacity, the WWRD will initiate a capacity analysis for expansion of that pump station. The applicant anticipates further discussions with the WWRD in determining its appropriate participation in such improvements.

4. **Drainage System**

a. **Existing Conditions**

Maui receives varying levels of rainfall in a given year depending on location. The average annual rainfall (1999-2005) for the Kihei area was 11.25 inches (Maui County Data Book, December 2006). The project site is currently gently sloped, with an average slope of approximately 3 percent. Runoff generally flows in a westerly (makai) direction toward Pi'ilani Highway. Dual 48-inch culverts currently carry flows beneath Pi'ilani Highway. Waiakoa Gulch borders the project site to the north.

The current Flood Insurance Rate Map (FIRM) for this area of Maui designates the project site as being located within Zones B and C, areas of minimal flooding. As previously noted, the applicant has undertaken a more detailed flood analysis along mauka portions of Waiakoa Gulch in the vicinity of the project site. As a result of this analysis the applicant has filed a Letter of Map Revision (LOMR) with the Federal Emergency Management Agency (FEMA) to update the FIRM for the area.

b. **Potential Impacts and Proposed Mitigation Measures**

A Preliminary Drainage Report was prepared for the proposed project's drainage requirements by R.M. Towill Corporation in May 2007. See **Appendix "GH"**.

The estimated peak rate and volume runoff from the existing undeveloped site are approximately 93 cubic feet per second (cfs) and 62 acre-feet, respectively. In comparison, the estimated peak rate and volume of runoff from the developed site are approximately 189 cfs and 67 acre-feet, respectively, resulting in a net increase in runoff volume of 5 acre-feet.

The proposed drainage improvements are intended to reduce the post-development peak runoff through the creation of several detention basins. These detention basins will accommodate the increased, post-development runoff volume, thereby limiting the peak rate of runoff.

Opportunities to further reduce post-development flows below existing drainage conditions will be evaluated during the design phase of the proposed development. The use of drainage basins is expected to mitigate offsite drainage runoff and impacts to coastal waters. **The applicant will ensure that runoff from parking lots and driveways will be directed to nearby landscaped areas and detention basins to minimize drainage-related impacts resulting from project implementation. Also, native plants which require less water will be sought for the landscaped areas within the project.**

Further appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the design process. ~~During construction, recommended Best Management Practices (BMPs)~~

~~will be implemented for erosion and sedimentation control.~~ During construction, the contractor will implement the following recommended Best Management Practices (BMPs) for erosion and sediment control.

- Constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site
- Staging construction
- Protecting of natural vegetation
- Stockpiling topsoil, and covering or stabilizing of the soil stockpiles
- Using wind erosion control
- Intercepting runoff above disturbed slopes
- Constructing of benches, terraces, or ditches at regular intervals to intercept runoff on long or man-made slopes
- Providing linings or other method to prevent erosion of storm channels
- Using seeding and fertilizing or other soil erosion control
- Providing vehicle wheel wash-down facilities
- Using stabilized construction entrances
- Using vegetated filter strips

Greater detail of the design information for the proposed drainage and erosion control plan will be provided when the project progresses to the engineering design phase of development.

5. Electrical, Telephone, and Cable Television Services

a. Existing Conditions

Electrical power, telephone, and CATV services to the region are provided by Maui Electric Company, Hawaiian Telecom, and Oceanic Time Warner

Cable of Hawai'i, respectively. Electrical facilities and cable lines are located along Pi'ilani Highway.

b. Potential Impacts and Proposed Mitigation Measures

Electrical, telephone and cable service providers will likely need to implement system enhancements to accommodate the proposed project. **As noted, Maui Electric Company will require an electrical line extension, access, and easements in order to provide service to the project. In addition, energy conservation measures will be considered as part of the project design phase of development and further coordination with Maui Electric Company will occur at that time. As a result, the applicant will consider implementation of the following demand side management measures to conserve natural resources and to promote energy efficiency.**

- **Site buildings to take advantage of natural features and maximize their beneficial effects by providing for solar access, daylighting, and natural cooling.**
- **Design south, east, and west shading devices to minimize solar heat gain.**
- **Consolidate utility and infrastructure in common corridors to minimize site degradation and cost, improve efficiency, and reduce impermeable surfaces.**
- **Provide tenant sub-metering to encourage utility use accountability.**

Coordination with Maui Electric Company, Hawaiian Telcom, and Oceanic Time Warner Cable of Hawai'i will ~~be initiated~~**continue** to ensure that systems planning and design can be programmed in concert with the project's development schedule.

E. CUMULATIVE AND SECONDARY IMPACTS

~~Cumulative impacts are defined as the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.~~

- The proposed project is not part of a larger action, nor would it occur within the context of such actions. It is noted, however, that the County of Maui's ongoing General Plan update process will involve the formulation of a Maui Island Plan which would delineate urban and rural growth boundaries. Other landowners in the vicinity may seek to have portions of their respective land holdings placed on the Maui Island Plan for purposes of defining future development potential in the North Kihei region. Should lands other than the proposed Kihei Residential project be identified as potential future areas for urban and/or rural growth, planning for such areas would need to consider land planning integration opportunities. Upon completion of the General Plan update, the respective community plans, including the Kihei-Makena Community Plan, will be updated. The timeframe for the overall completion of the updating of the community plans has not yet been established. However, the overall timeframe for the General Plan covers a planning horizon up to the year 2030.
- The applicant acknowledges the possibility that future regional growth opportunities in surrounding lands in the North Kihei region may be possible. Specifically, the project's interior roadway system provides opportunity for connection to areas beyond the project limits. Should there be an identified mauka bypass roadway parallel to Pi'ilani Highway as a long-term growth infrastructure component, the project's roadway system could allow for connection to such a bypass road.
- Similarly, should opportunities for joint development of water storage and conveyance systems become available, the project's water system concept has been formulated with the notion that integration with adjoining properties' water systems can be accomplished.

Existing and future developments in the Kihei-Makena region were the basis for analyzing potential cumulative and secondary impacts related to development of the Kihei Residential Project. It is noted that some of these projects are in the planning and entitlement phase and may not necessarily be constructed. See Table 12.

Table 12. Proposed Development in the Region

Development	Land Use	Number of Units/Area
Kaonoulu Industrial Park	Light Industrial	88 acres
Honua Ula (Wailea 670)	Single-Family Residential	475 dwelling units
	Single-Family Resort	475 dwelling units
	Multi-Family Residential	225 dwelling units
	Multi-Family Resort	225 dwelling units
	Shopping Center	80,000 square feet (gross leasable area)
	Golf Course	200 acres
Wailea Resort	Single-Family Residential	85 dwelling units
	Single-Family Resort	85 dwelling units
	Multi-Family Residential	285 dwelling units
	Multi-Family Resort	285 dwelling units
	Shopping Center	20,000 square feet (gross leasable area)
	Office	60,000 square feet (gross leasable area)
	Warehouse	40,000 square feet (gross leasable area)
Makena Resort	Single-Family Residential	53 dwelling units
	Single-Family Resort	53 dwelling units
	Multi-Family Residential	536 dwelling units
	Multi-Family Resort	536 dwelling units
	Shopping Center	100,000 square feet (gross leasable area)
Kaonoulu Estates	Multi-Family Residential	191 dwelling units
Maui Lu Redevelopment	Resort Hotel	788 rooms
	Resort Hotel (existing to be demolished)	174 rooms
Silverswords Golf Estates	Single-Family Residential	182 dwelling units
Source: Austin, Tsutsumi & Associates, Inc.		

The TIAR prepared for the project has examined and evaluated traffic impacts of the project, as well as the other potential projects identified on Table 12. The projected peak hour traffic impact of these projects is presented on Table 1 of the TIAR. Based on the analysis the TIAR has recommended the implementation of applicable traffic mitigation measures and improvements. As noted in the TIAR, while these projects have been included in the traffic impact analysis, some are still in the planning and entitlement stage and for various reasons may be subject to delay or may not materialize at all within the time horizon of this project.

With regard to the availability of drinking water for the project, the applicant is pursuing several options, including surface water treatment and new well sources in central Maui. Maui County Ordinance No. 3502 requires that a long-term reliable supply of water be verified at the time of subdivision approval. The ordinance requires each applicant to provide a long-term reliable supply of water, which is defined as “the total water supplies from a private, non-County source that will meet the projected demand associated with a proposed development, in addition to existing and planned future demand”. In light of this requirement cumulative impacts will be addressed as new water sources are brought online as a condition of development. Other proposed projects will be required to similarly meet the requirements of this ordinance as their projects progress through the development process. Additionally, specific improvements to the water transmission and storage systems will be determined with the County for each project.

Sewage generated by the project will be treated at the KWRF. As indicated by the County Department of Environmental Management, wastewater system capacity is currently available for the project. The applicant will be required to make needed system improvements at the time of service. Also, applicable assessment fees for treatment plant expansion will be required. These system improvements and fees will also be applicable to other planned projects to mitigate impacts to the County sewer system and to maintain adequate system service.

The agricultural impact of this project is near negligible when taken in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands. In fact, much of the lands of these former plantations are still fallow. The proposed project will ultimately involve the use of approximately 94.3

acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui. Further, rather than the available land supply, more salient factors facing the agricultural industry include the market demand for products (access to markets and local purchasing patterns) and the overall profitability of crops grown in Hawai'i.

The mitigation of other potential adverse cumulative impacts resulting from infrastructure use will be resolved during the course of development either through the provision of additional facilities onsite and offsite (drainage, water, and park facilities) or through fair-share contributions (wastewater, school, and traffic facilities). Other planned projects will similarly be required to mitigate the impacts of their respective projects as they progress through the development process.

In general, processes and mechanisms for coordinating mitigation measures attributable to cumulative impacts are in place. An example of a process which addresses cumulative impacts is the scoping of infrastructure studies (including traffic impact) to include those projects which are anticipated to be implemented within a timeframe similar to that of the proposed action. Similarly, as noted, mechanisms for addressing impacts from more than a single project include impact fees or assessments which require fair-share contribution from the respective applicants.

The projects listed in Table 12 represent potential future developments identified in the Kihei-Makena Community Plan region. The implementation timeframes for these projects are dependent on their respective regulatory and market parameters which are not linked to the proposed Kihei Residential Project. It is in this context that the processes and mechanisms (noted above) for assuring cumulative evaluation have evolved. The proposed action is being planned and will be implemented within this framework.

Secondary impacts are those which have the potential to occur later in time or farther in distance, but are still reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. Secondary impacts from highway projects, for example, can occur because they can induce development by removing one of the impediments to growth-transportation access. Aside from the direct development impacts discussed in the previous sections of this chapter, secondary impacts may be attributed to project effects on the island's overall housing situation. That is, the provision of housing in North Kihei may affect demand and pricing in other areas of the island, depending on market

conditions at the time of project development. As noted previously, a significant increase in housing supply will be needed to accommodate the region's anticipated growth. **In comparison to some of the other planned projects listed in Table 12 which are geared toward the resort market, the project will provide resident housing opportunities for Maui residents in both the near and long term, which. This in turn is anticipated to result in a more balanced housing market. While the project is anticipated to add to the resident population of Maui, the proportion of in-migrants is expected to be modest given the pent up demand for housing by existing Maui residents and the residency requirements under the MRWHP. As noted previously, the project will result in construction-term expenditures, wages and taxes. Real property taxes will contribute to the County's revenue tax base to support the increase in public services. The project is not anticipated to have a significant adverse impact on the physical environment. As noted in previous sections, no adverse impacts to historic properties, cultural practices, or rare, threatened or endangered species are anticipated.** Necessary infrastructure systems and services can be reasonably provided to serve the project. The proposed action is not anticipated to result in significant adverse secondary impacts.

III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICT

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 as "Urban", "Rural", "Agricultural", and "Conservation". The project site is located within the "Agricultural" district. See **Figure 1214**.

A State Land Use District Boundary Amendment (DBA) for the 94.3-acre project site for reclassification from the "Agricultural" district to the "Urban" district is currently being requested as part of entitlement applications to enable implementation of the Kihei Residential project. The applicant filed the DBA petition with the Land Use Commission on March 2, 2007. Criteria considered in the reclassification of lands are set forth in the State Land Use Commission Rules (Chapter 15-15-18, Hawai'i Administrative Rules).

The proposed reclassification of the approximately 94.3 acres within the project site from Agricultural to Urban has been analyzed with respect to the criteria, as discussed below.

It shall include lands characterized by "city-like" concentrations of people, structures, streets, urban level of services, and other related land uses.

Comment:

The area proposed for reclassification is situated adjacent to the existing Hale Pi'ilani Subdivision and other residential subdivisions to the south and southwest, which are located on lands classified as "Urban." Infrastructure systems implemented in conjunction with the Kihei Residential project will serve all areas within the limits of the project site. The proposed development will include city-like concentrations of people in a community which will include single-family homes and apartments. An internal road network, a small commercial area, and park/open space will serve the needs of the community.

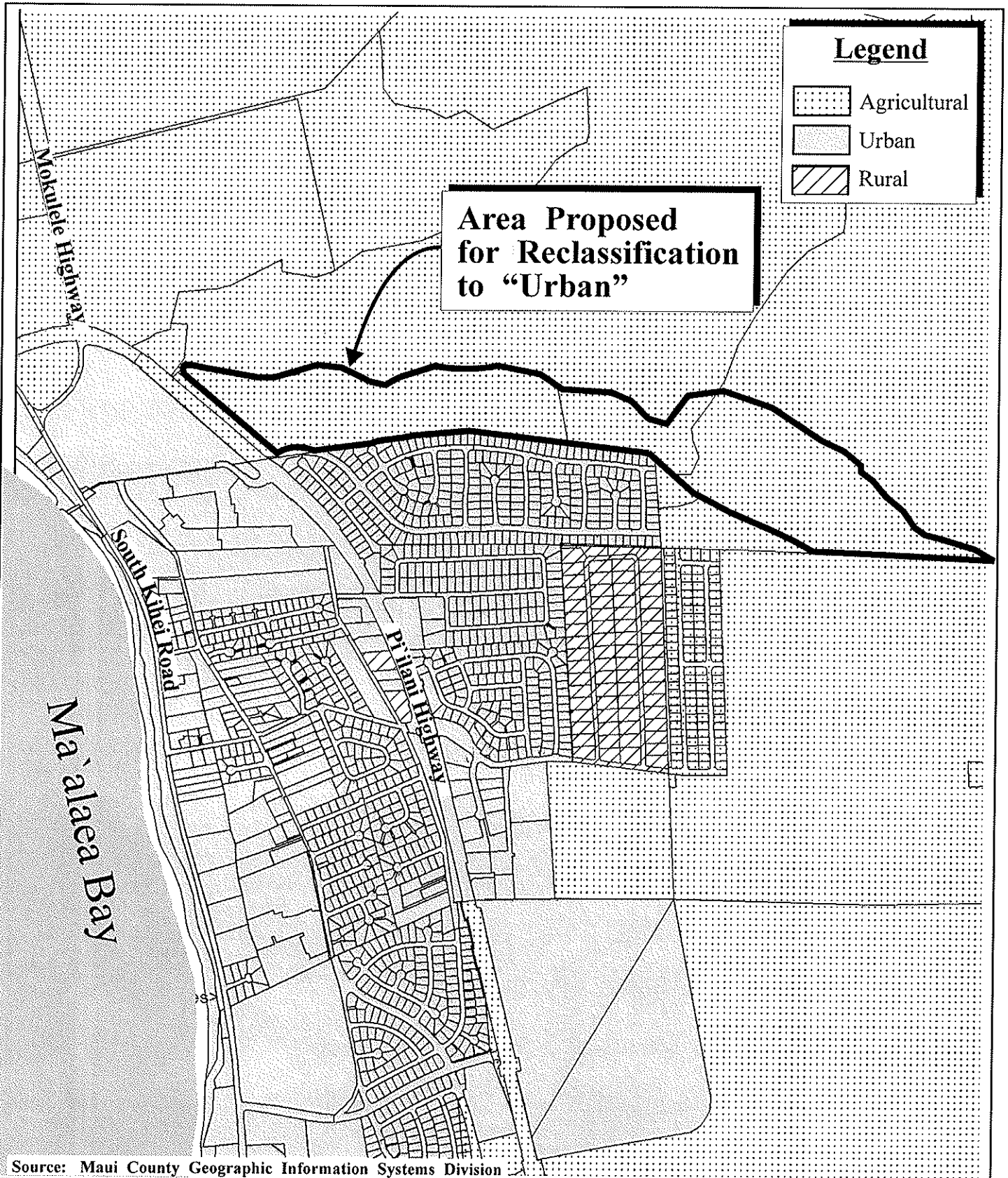


Figure 1214 Proposed Kihei Residential Project
 State Land Use District Map

NOT TO SCALE



It shall take into consideration the following specific factors:

- 1. Proximity to centers of trading and employment except where the development would generate new centers of trading and employment.**

Comment:

The area proposed for reclassification is proximately located to existing commercial and employment centers in Kihei. Numerous employment opportunities exist in the retail, resort, and service industries in the Kihei/Wailea area while Wailuku and Kahului serve as the central business districts of the island. Additionally, Federal, State, and County government offices and courts are located in Wailuku.

- 2. Availability of basic services such as schools, parks, wastewater systems, solid waste disposal, drainage, water, transportation systems, public utilities, and police and fire protection.**

Comment:

Domestic water supply, wastewater service, and solid waste collection for the project will be coordinated with the County of Maui, Departments of Water Supply, Public Works, and Environmental Management. The area is located in close proximity to major roadways, such as Pi'ilani Highway, Mokulele Highway, and North Kihei Road. Three (3) State Department of Education (DOE) schools are located in the Kihei area in addition to a charter high school. Health care facilities as well as police and fire protection services are available in Kihei.

- 3. Sufficient reserve areas for foreseeable urban growth.**

Comment:

As noted previously, a significant increase in housing supply will be needed to accommodate the region's anticipated growth. The project will provide resident housing opportunities in both the short and long term, which in turn is anticipated to result in a more balanced housing market. The proposed project involves the development of a master-planned community involving a range of different housing types, including both single-family and multi-family product varieties. The project will be constructed in phases over a period of approximately five (5) years. Completion of the project is expected to partially address the shortage of housing currently being experienced in Maui County.

It shall include lands with satisfactory topography, drainage, and reasonably free from the danger of any flood, tsunami, unstable soil conditions, and other adverse environmental effects.

Comment:

The project site has an average slope of approximately 3 percent and is suitable for the planned uses. The project site is situated within Zones B and C, areas of minimal flooding. The site is not situated within any tsunami inundation zone. Drainage improvements will be designed in consultation with applicable governmental agencies to mitigate potential runoff and adverse environmental impacts. No foreseeable adverse environmental effects are anticipated in conjunction with the project.

Land contiguous with existing urban areas shall be given more consideration than non-contiguous land, and particularly when indicated for future urban use on state or county general plans.

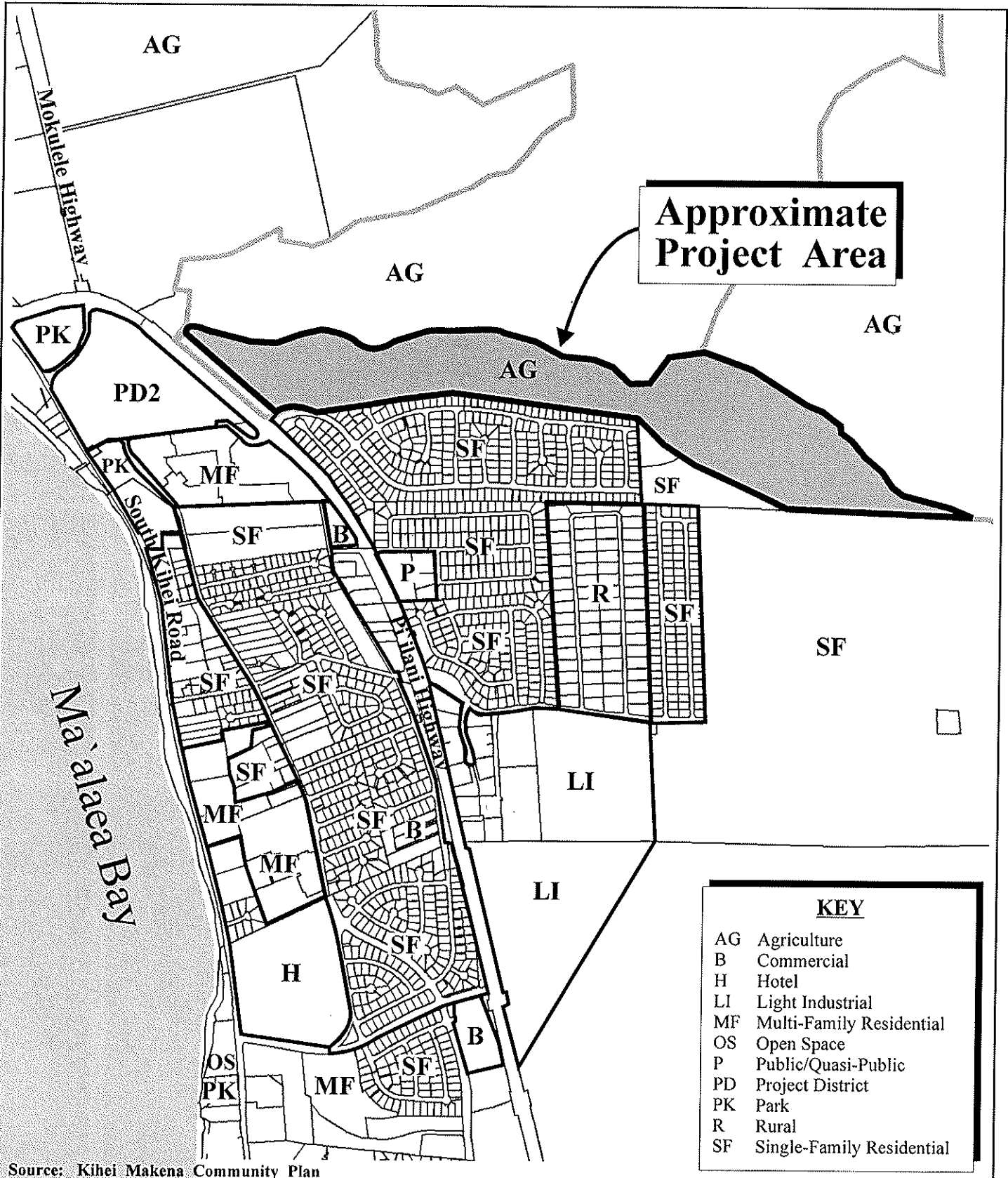
Comment:

The project site is contiguous with Urban district lands to the south. Additionally, the Kihei-Makena Community Plan designates adjacent lands for multi-family, business/commercial, light industrial and public/quasi-public land uses. See **Figure 1315**.

It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on the State and County plans.

Comment:

The project site is designated Agriculture by the Kihei-Makena Community Plan. The project area is in the vicinity of the residential land uses of the Hale Pi'ilani subdivision. The Kihei-Makena Community Plan also designates lands adjacent to the project site for business and commercial uses and for future residential development within Project District 2. The lands proposed for reclassification are, therefore, located within an area suitable for new urban growth as evidenced by the existing urban uses and land reserved for future residential development in the vicinity of the project area.



Source: Kihei Makena Community Plan

Figure 1315 Proposed Kihei Residential Project
Existing Community Plan Land Use Designations

NOT TO SCALE



It may include lands which do not conform to paragraphs (1) to (5):

When surrounded by or adjacent to existing urban development; and only when those lands represent a minor portion of this district.

It shall not include lands, the urbanization of which will contribute toward scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services.

It may include lands with a general slope of twenty percent (20%) or more if the commission finds that those lands are desirable and suitable for urban purposes and that the design and construction controls, as adopted by any Federal, State, or County agency, are adequate to protect the public health, welfare and safety, and the public's interest in the aesthetic quality of the landscape.

Comment:

As mentioned previously, the project site is located adjacent to areas of existing urban development. Existing Urban designated urban lands lie to the south and include the Hale Pi'ilani residential subdivision and various condominiums and single-family residences to the south and west. The development of the project will not necessitate an unreasonable investment in public infrastructure or support systems. All requisite infrastructure systems for the project will be provided. The project area has an average slope of approximately 3 percent and is suitable for the planned uses. Governmental regulations will be followed to ensure the protection of public health, safety, and welfare.

B. HAWAII STATE PLAN

Chapter 226, HRS, also known as the Hawai'i State Plan, is a long-range comprehensive plan which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. Examples of State objectives and policies relevant to the proposed project are as follows:

1. **Section 226-05, Objectives and policies for population. To achieve this objective, it shall be the State policy to:**
 - a. Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.

- b. Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.

2. **Section 226-13, Objectives and policies for physical environment-land, air, and water quality. To achieve this objective, it shall be the State policy to:**

- a. Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.
- b. Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.
- c. Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.
- d. Encourage urban developments in close proximity to existing service and facilities.

3. **Section 226-14, Objectives and policies for facility systems-in general. To achieve the general facility systems objective, it shall be the policy of the State to:**

- a. Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvements in consonance with State and County plans.
- b. Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.
- c. Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.

4. **Section 226-15, Objectives and policies for facility systems-solid and liquid wastes. To achieve the solid and liquid waste objectives, it shall be the policy of the State to:**

- a. Encourage the adequate development of sewage facilities that complement planned growth.
- b. Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.

5. **Section 226-16, Objectives and policies for facility systems-water. To achieve the facilities systems water objectives, it shall be the policy of the State to:**
 - a. Coordinate development of land use activities with existing and potential water supply.
 - b. Support research and development alternative methods to meet future water requirements well in advance of anticipated needs.
 - c. Reclaim and encourage the productive use of runoff water and wastewater discharges.
 - d. Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.
 - e. Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

6. **Section 226-17, Objectives and policies for facility systems-transportation. To achieve the facilities systems transportation objective, it shall be the policy of the State to:**
 - a. Encourage a reasonable distribution of financial responsibilities for transportation among participating government and private parties.
 - b. Encourage transportation systems that serve to accommodate present and future development needs of communities.

7. **Section 226-19, Objectives and policies for socio-cultural advancement – housing. To achieve the housing objectives, it shall be the policy of the State to:**
 - a. Effectively accommodate the housing needs of Hawai`i's people.
 - b. Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.
 - c. Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.

The Kihei Residential project is located in close proximity to existing public services and infrastructure. The project will provide a range of housing types which will serve to meet the varied housing needs of the region at an attractive and central location in North Kihei. Additional housing choices will provide healthy competition and allow for a more balanced

housing market. The applicant is exploring potential water source opportunities and offsite storage facilities with neighboring landowners, as well as the availability of non-potabledrinking water sources to reduce the demand on the potabledrinking water supply. The applicant will participate in transportation network improvements to alleviate the increased demands on area roadways. To this end, the proposed project is in conformance with the above-noted objectives and policies of the Hawai'i State Plan.

The State Functional Plans define actions for implementation of the Hawai'i State Plan through the identification of needs, problems and issues, and recommendations on policies and priority actions which address the identified areas of concern. The proposed reclassification request is consistent with the following State Functional Plans:

1. State Agricultural Functional Plan

The proposed project will reclassify approximately 94.3 acres of land from the State Agricultural district to the State Urban district. While the project site for the proposed subdivision was formerly used for sugar cane cultivation, approximately half of the site is now fallow and the balance of the site is used for seed corn and truck crop cultivation. The proximity of the project site to existing and planned urban land uses provides a reasonable nexus and an appropriate foundation for the proposed reclassification request, particularly in the context of meeting affordable housing needs of the community.

2. State Housing Functional Plan

The growing public demand for affordable housing indicates a current shortage of single-family and multi-family housing units on Maui. The proposed 600 residential units within the Kihei Residential project will help address a critical community need.

3. State Recreational Functional Plan

Outdoor recreation is recognized by the Hawai'i State Plan as an important part of life for Hawaii's residents. As the population rises and residential land uses increase, creating areas dedicated to outdoor recreation becomes increasingly vital. The State Functional Plan for Recreation urges the improvement and expansion of recreational

facilities in urban areas and local communities. The proposed project will address recreational needs through the provision of park/open space lands and walking trails.

4. State Transportation Functional Plan

The Hawai'i State Plan addresses the vital role of transportation, particularly in light of population increases and community growth. The State Functional Plan for transportation calls for a statewide transportation system consistent with planned growth objectives throughout the State. The proposed project's roadway system will be developed in consultation with the State Department of Transportation and the County Department of Public Works to insure consistency with the objectives of the State Transportation Functional Plan. Internal subdivision roads will be constructed to County of Maui design standards.

5. State Historic Preservation Functional Plan

The State Historic Preservation Functional Plan deals with the preservation of historic properties, the collection and preservation of historic records, artifacts and oral histories, and the provision of public information and education on the ethnic and cultural heritages and history of Hawai'i. An Archaeological Inventory Survey (AIS) Report has been completed for the project by Cultural Surveys Hawai'i, Inc. in compliance with applicable historic preservation requirements. Refer to **Appendix "CD"**. The AIS Report has been reviewed and approved by the State Historic Preservation Division (SHPD). Refer to **Appendix "CD-1"**. The proposed project is, therefore, consistent with the objectives outlined under the State Historic Preservation Functional Plan.

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 General Plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density, land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development."

The Maui County General Plan advances five (5) major themes that focus on the overall goals of the plan. The proposed project responds to the following General Plan themes:

Theme Number 2: Prepare a Directed and Managed Growth Plan

Amendments to the General Plan will preserve a desired quality of life where areas of urban settlement must be managed and directed within a framework that consistently and concurrently balances growth demands against human service needs and physical infrastructure supply.

Theme Number 5: Provide for Needed Resident Housing

Amendments to the General Plan will address the development of resident housing as a major social need in our community.

The proposed action is in keeping with the following General Plan objectives and policies:

POPULATION

Objective:

To plan the growth of resident and visitor population through a directed and managed growth plan so as to avoid social, economic, and environmental disruptions.

Policy:

Balance population growth by achieving concurrency between the resident employee work force, the job inventory created by new industries, affordable resident/employee housing, constraints on the environment and its natural resources, public and private infrastructure, and essential social services such as schools, hospitals, etc.

LAND USE

Objectives:

1. To preserve for present and future generations existing geographic, cultural, and traditional community lifestyles by limiting and managing growth through environmentally sensitive and effective use of land in accordance with the individual character of the various communities and regions of the County.
2. To use the land within the County for the social and economic benefit of all the County's residents.

Policies:

1. Provide and maintain a range of land use districts sufficient to meet the social, physical, environmental, and economic needs of the community.
2. Encourage land use methods that will provide a continuous balanced inventory of housing types in all price ranges.
3. Encourage programs to stabilize affordable land and housing prices.

HOUSING

Objective:

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

Policies:

1. Encourage the construction of housing in a variety of price ranges and geographic locations.
2. Ensure that each community plan region contains its fair share of affordable housing.

URBAN DESIGN

Objective:

To encourage developments which reflect the character and the culture of Maui County's people.

Policy:

Encourage community design which establishes a cohesive identity.

RECREATION AND OPEN SPACE

Objective:

To provide high-quality recreational facilities to meet the present and future needs of our residents of all ages and physical ability.

Policy:

Develop facilities that will meet the different recreational needs of the various communities.

The Kihei Residential project consists of approximately 600 residential units in an area that is an **infillurban growth** location, between an existing residential area and natural feature (Waiakoa Gulch). Necessary infrastructure systems and services are within close proximity, or can be reasonably provided to serve the project. Recreation needs of the proposed project are anticipated to be addressed through the provision of parks, open space, and walking trails. The proposed project is in conformance with the above-noted objectives and policies of the Maui County General Plan.

D. COUNTY OF MAUI COMMUNITY PLANS

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.

- **Kihei-Makena Community Plan**

The proposed Kihei Residential subdivision is located within the Kihei-Makena Community Plan region. The existing land use designations for the project area under the Community Plan are set forth in the Kihei-Makena Community Plan Land Use Map. Refer to **Figure 1315**. The lands underlying the subject property are designated as Agriculture by the Kihei-Makena Community Plan.

The proposed Kihei Residential residential subdivision would involve the development of a total of approximately 600 residential units which would necessitate changes to the Kihei-Makena Community Plan. See **Figure 1416**. The proposed project is also in conformance with the following, goals, objectives, and policies of the Kihei-Makena Community Plan:

LAND USE

Goal:

A well-planned community with land use and development patterns designed to achieve the efficient and timely provision of infrastructural and community needs while preserving and enhancing the unique character of Ma`alaea, Kihei, Wailea and Makena as well as the region's natural environment, marine resources and traditional shoreline uses.

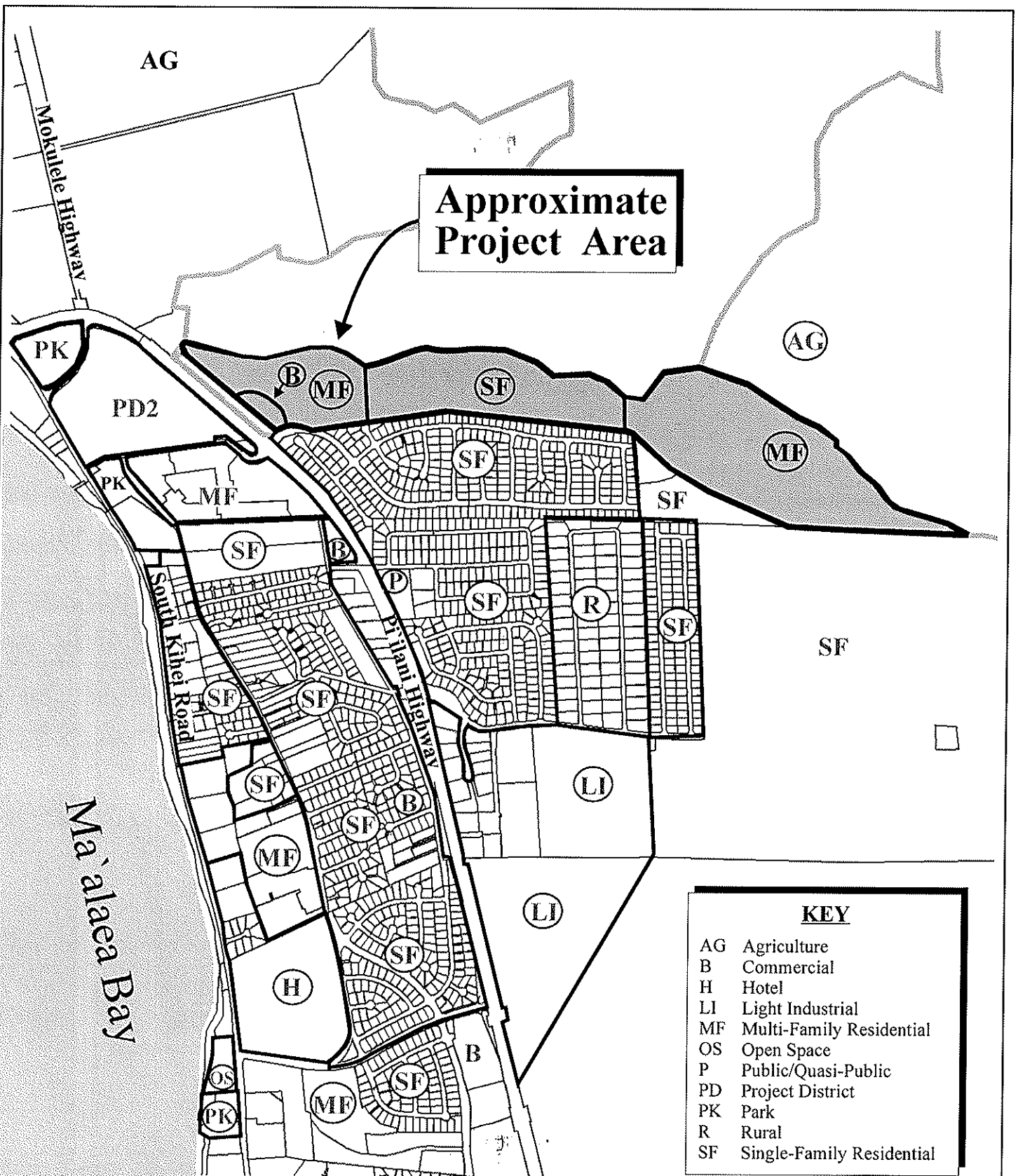
Objectives and Policies:

1. Identify priority growth areas to focus public and private efforts on the provision of infrastructure and amenities to serve existing residents and to accommodate new growth.
2. Encourage the establishment of single-family and multi-family land use designations which provide affordable housing opportunities for areas which are in close proximity to infrastructure systems and other urban services.
3. Limit commercial services to neighborhood business uses or other low-key business activities with a residential scale on those properties which abut single-family residential uses.

HOUSING AND URBAN DESIGN

Goal:

A variety of attractive, sanitary, safe and affordable homes for Kihei's residents, especially for families earning less than the median income for families within the County. Also, a built environment which provides complementary and aesthetically pleasing physical and visual linkages with the natural environment.



KEY	
AG	Agriculture
B	Commercial
H	Hotel
LI	Light Industrial
MF	Multi-Family Residential
OS	Open Space
P	Public/Quasi-Public
PD	Project District
PK	Park
R	Rural
SF	Single-Family Residential

Source: Kihei-Makena Community Plan

Figure 416 Proposed Kihei Residential Project
Proposed Community Plan Amendments

NOT TO SCALE



Objectives and Policies:

1. Provide an adequate variety of housing choices and range of prices for the needs of Kihei's residents, especially for families earning less than the median income for families within the County, through the project district approach and other related programs. Choices can be increased through public/private sector cooperation and coordinated development of necessary support facilities and services.
2. Require a mix of affordable and market-priced housing in all major residential projects, unless the project is to be developed exclusively as an affordable housing project.

PHYSICAL AND SOCIAL INFRASTRUCTURE

Goal:

Provision of facility systems, public services, and capital improvement projects in an efficient, reliable, cost effective, and environmentally sensitive manner which accommodates the needs of the Kihei-Makena community, and fully support present and planned land uses, especially in the case of project district implementation. Allow no development for which infrastructure may not be available concurrent with the development's impacts.

Objectives and Policies:

1. Undertake transportation system improvements concurrently with planned growth of the Kihei-Makena region. Require adequate interregional highway capacity, including the widening of Pi'ilani and Mokulele Highways to four (4) lanes, prior to the construction of major projects south of Kilohana Road or mauka of Pi'ilani Highway.
2. Provide for appropriate water source and transmission improvements concurrent with planned growth of the Kihei-Makena region.
3. Provide efficient, safe, and environmentally sound systems for the reuse, recycling, and disposal of liquid and solid wastes.
4. Minimize the increase of discharge of stormwater runoff to coastal waters by preserving flood storage capacity in low-lying areas, and encouraging infiltration of runoff.

5. Encourage the provision of public utilities which will meet community needs in a timely manner.
6. Provide high-quality recreational facilities to meet the present and future needs of residents of all ages and physical ability.

The Kihei Residential project consists of approximately 600 residential units in an area that is an **infillurban growth** location, between an existing residential area and natural feature (Waiakoa Gulch). Necessary infrastructure systems and services are within close proximity, or can be reasonably provided to serve the project. Recreational needs of the proposed project are anticipated to be addressed through the provision of parks, open space, and walking trails. The proposed project is in conformance with the above-noted goals, objectives, and policies of the Kihei-Makena Community Plan.

E. COUNTY ZONING

The project site is currently zoned "Agricultural" by the County of Maui. As with the State Land Use designation, a change in zoning (CIZ) to establish the proposed Residential, Apartment, and Community Business District zoning designations will be required for the project site. The limits of the proposed County zoning designations are shown in **Figure 1517**. Coordination with the County of Maui, Department of Planning will be undertaken regarding the preparation and submission of the CIZ application for the proposed project.

According to Chapter 19.30A.020 of the Maui County Code, agricultural lands that meet at least two (2) of the following criteria should be given the highest priority for retention in the agricultural district:

1. Agricultural Lands of Importance to the State of Hawai'i (ALISH);
2. Lands not classified by the ALISH system whose agricultural land suitability, based on soil, topographic, and climatic conditions, supports the production of agricultural commodities, including but not limited to coffee, taro, watercress, ginger, orchard and flower crops, and non-irrigated pineapple. In addition, these lands shall include lands used for intensive husbandry, and lands in agricultural cultivation in five of the ten years immediately preceding the date of approval of this chapter; and
3. Lands which have seventy-five percent or more of their boundaries contiguous to lands within the agricultural district.

While portions of the project site partially meet Criteria "A" and Criteria "B", there are a number of factors which limit feasibility of the project site for active agriculture use.

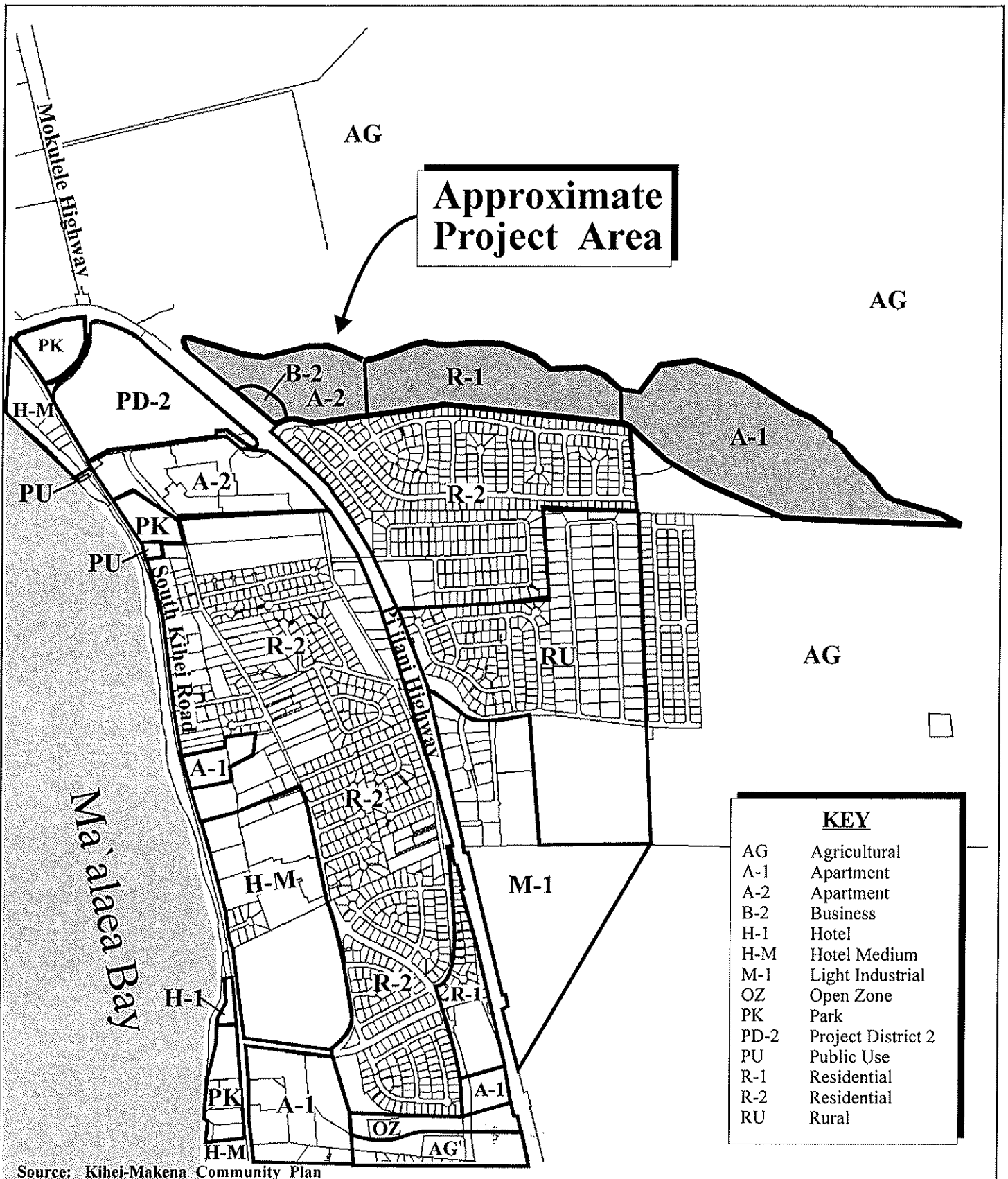


Figure 4517 Proposed Kihei Residential Project
Proposed County Zoning Designations

NOT TO SCALE



Although approximately half of the project area is designated as “Prime” agricultural lands, Waiakoa Gulch effectively isolates these lands from other lands farther north. The geometry of the subject property, with its relatively narrow north/south configuration defined by Waiakoa Gulch to the north and the Hale Pi`ilani residential subdivision to the south, poses logistical and compatibility challenges to long-term productive agricultural use. Refer to **Figure 3**. With the proposed project, Waiakoa Gulch would become the natural buffer between agricultural lands farther to the north and the proposed project and existing residential development to the south.

The agricultural impact of this project is near negligible when taken in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands. In fact, much of the lands of these former plantations are still fallow. The proposed project will ultimately involve the use of approximately 94.3 acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui.

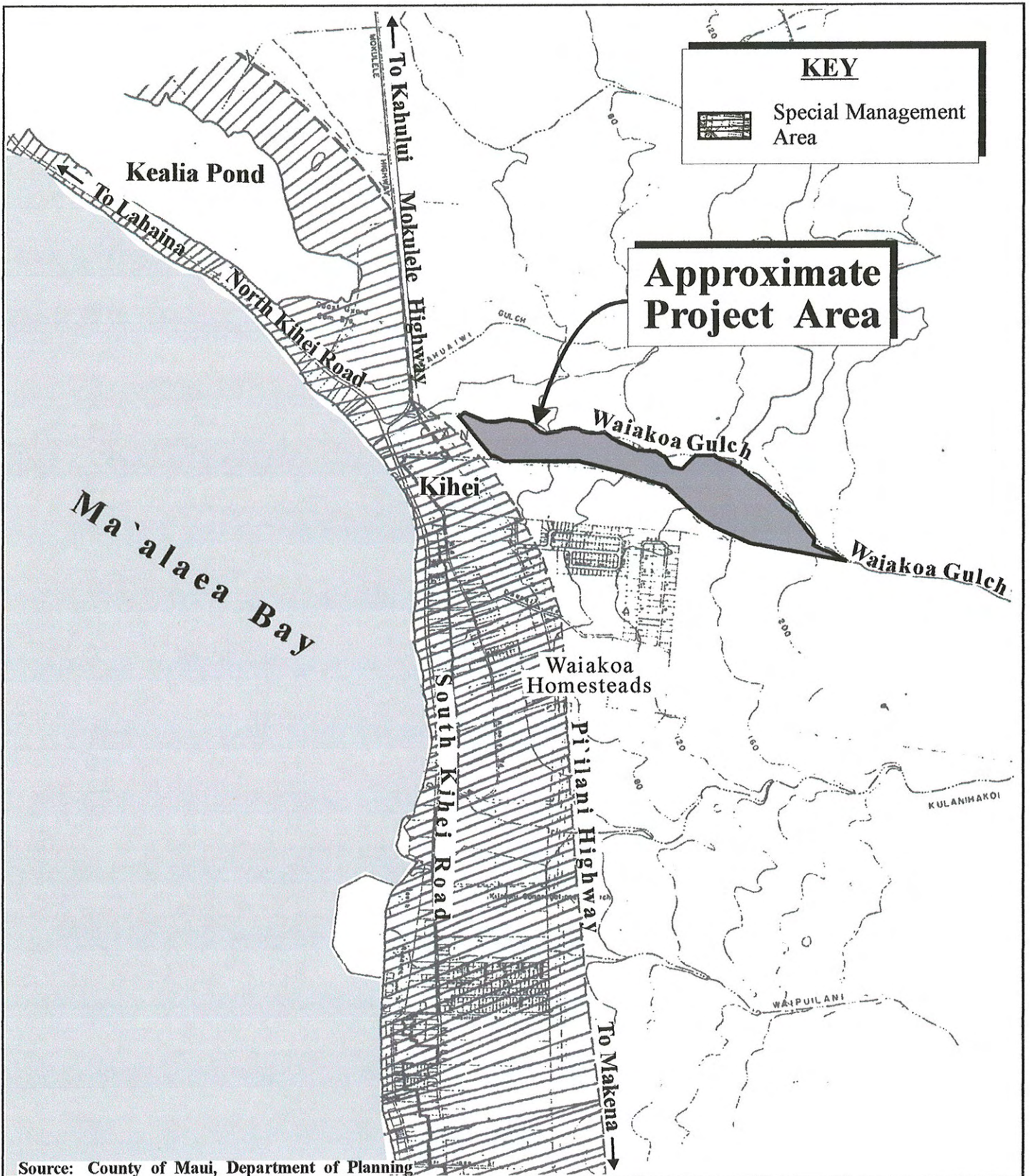
When evaluated based on the housing shortage that exists on Maui, coupled with the scarcity of entitled, undeveloped residential lands in South Maui, the conversion of the project’s agricultural lands into residential development presents a beneficial opportunity. The expansion of the urban district boundary in South Maui will allow residential use up to a natural buffer at Waiakoa Gulch. This project will supply additional housing units at a site deemed less than optimal for long-term agricultural use.

In terms of Criteria “C”, the boundaries of the 94.3-acre project site border both Urban and Agricultural designated lands. Less than 75 percent of the project site’s boundaries are contiguous to lands within the Agricultural district.

F. COASTAL ZONE MANAGEMENT/SPECIAL MANAGEMENT AREA

The Hawai`i Coastal Zone Management Program (HCZMP), as formalized in Chapter 205A, HRS, establishes objectives and policies for the preservation, protection, and restoration of natural resources of Hawai`i’s coastal zone. The project site is located outside of the County of Maui’s Special Management Area (SMA). See **Figure 1618**.

As set forth in Chapter 205A, HRS, this section addresses the project's relationship to applicable coastal zone management considerations.



Source: County of Maui, Department of Planning

Figure 16-18 Proposed Kihei Residential Project NOT TO SCALE
Special Management Area (SMA)
Boundary Map



Prepared for: A&B Properties, Inc.


MUNEKIYO & HIRAGA, INC.

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:
 - 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 uses 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 nonpoint 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, and county authorities; and crediting such dedication against the requirements of section 46-6.

Response: Recreational area needs of the proposed project are anticipated to be addressed through the provision of parks, open space, and walking trails. Based on its location and development parameters, the project is not anticipated to adversely impact coastal resources, including access to the shoreline.

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: As noted previously, archaeological inventory surveys and a cultural impact assessment report were completed for the proposed project to identify and issue recommendations regarding historic, cultural, and archaeological resources. Refer to **Appendix "CD"** and **Appendix "CD-1"**. No significant impacts to cultural or historic resources are anticipated from the proposed project. ~~Should human remains be inadvertently discovered during ground-altering activities, work will promptly cease in the immediate area of the find, and the find will be further protected from damage. The SHPD and the Maui/Lana'i Islands Burial Council will be notified immediately and procedures for the treatment of inadvertently discovered human remains will be followed pursuant to Chapter 6E, HRS, including stoppage of work in the immediate vicinity of the burial.~~ **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 applicant will contact the State Historic Preservation Division of the Department of Land and**

Natural Resources (SHPD/DLNR). Pursuant to their specific request, the Office of Hawaiian Affairs (OHA) will also be notified.

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 that are not coastal dependent to locate in inland areas.

Response: The subject property is located along the lower slope of Haleakala above Pi'ilani Highway at elevations ranging from approximately 30-feet above mean sea level (amsl) to approximately 230-feet amsl. The urban forms established by the proposed project plan will conform to height restrictions under Title 19 of the Maui County Code and will be buffered with landscaping and open space areas to mitigate visual impact. View corridors will not be adversely affected by the proposed project.

4. Coastal Ecosystems

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

Policies:

- a. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
- b. Improve the technical basis for natural resource management;

- c. Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
- d. 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
- e. Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: With implementation of Best Management Practices (BMPs), the proposed project should have minimal long-term adverse effects on the nearby coastal ecosystems. Appropriate BMPs and erosion-control measures will be implemented to ensure that coastal ecosystems are not adversely impacted by construction activities. Project-related drainage system improvements will be designed in accordance with applicable regulatory standards to mitigate potential adverse impact to surrounding properties.

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 industry 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 proposed project is not located at or near the coastline and will, therefore, not involve coastal development. The proposed action does not contravene the objective and policies for economic use.

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 source pollution hazards;
- c. Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
- d. Prevent coastal flooding from inland projects.

Response: Project-related drainage system improvements will be designed in accordance with applicable regulatory standards to mitigate potential adverse impact to surrounding properties.

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 or 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: Public input ~~will be~~was solicited in coordination with the processing of the Draft EIS, pursuant to the Chapter 343, HRS environmental assessment review process. All aspects of development will be conducted in accordance with applicable Federal, State, and County standards. Opportunities for review of the proposed action are offered through the regulatory review process for construction and development permits, as well as the State Land Use Commission District Boundary Amendment (DBA) and County Change in Zoning (CIZ) and Community Plan Amendment processes.

8. **Public Participation**

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

Policies:

- a. Promote public involvement in coastal zone management processes;
- 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 issues, developments, and government activities; and
- c. Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: The EIS document ~~will be~~was processed in accordance with Chapter 343, HRS, and opportunity for comment by agencies and the public ~~will be~~was provided. As previously mentioned, public input opportunities will also be provided through the State Land Use Commission District Boundary Amendment (DBA) and County Community Plan Amendment (CPA) and Change in Zoning (CIZ) 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, minimize interference with natural shoreline processes, and 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 proposed project is situated inland, away from the shoreline and no adverse effect on beach processes is anticipated. Appropriate Best Management Practices (BMPs) will be implemented to mitigate storm water runoff associated with the project and to ensure that downstream and adjoining properties will not be adversely affected.

10. **Marine Resources**

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

- a. Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- b. Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
- c. 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;
- d. 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

- e. Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: The proposed project is situated inland, away from the ocean and no adverse effect on marine or coastal resources is anticipated. Appropriate BMPs and erosion control measures will be implemented to ensure that coastal resources are not adversely impacted by construction activities.

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.

Response: The proposed subdivision is not located on or near the shoreline. The preliminary lighting plan for the project will be designed to ensure that no lighting is directed across property boundaries towards the shoreline.

G. OTHER REGULATORY APPROVALS

Activities necessitating requirements for Department of the Army permitting and Section 401 Water Quality Certification are not anticipated. Additionally, there are no other Federal permits or licenses required which would prompt the need for a Coastal Zone Management Consistency review.

IV. ALTERNATIVES TO THE PROPOSED ACTION

IV. ALTERNATIVES TO THE PROPOSED ACTION

The following potential alternatives to the proposed action have been examined.

A. NO ACTION ALTERNATIVE

Under the “no action” alternative, the site would not be developed for residential and commercial use, and portions of the site would continue in either limited agricultural use or remain vacant for the time being. **The “no action” alternative would involve neither a commitment of resources nor short- and long-term adverse environmental effects related to residential and commercial development. Under this alternative, there would be no additional demands on infrastructure (e.g. sewer, water, roadways, and educational facilities and resources) or public services (e.g. police and fire protection) associated with project implementation.**

~~However, t~~The “no action” alternative would not take advantage of the site’s high suitability for residential use. The site is situated adjacent to an existing residential neighborhood, with available infrastructure systems in close proximity. The development of the project as proposed will not necessitate an unreasonable investment in public infrastructure or support systems. Waiakoa Gulch would serve as a natural buffer between agricultural lands farther to the north and the proposed project and existing residential development to the south. As noted previously, the geometry of the subject property, with its relatively narrow north/south configuration defined by Waiakoa Gulch to the north and the Hale Pi’ilani residential subdivision to the south, poses logistical and compatibility challenges to long-term productive agricultural use. ~~With the proposed project, Waiakoa Gulch would become the natural buffer between agricultural lands farther to the north and the proposed project and existing residential development to the south.~~

The “no action” alternative would not address the urgent need for additional housing units for Maui residents. Over the past five (5) years, the demand for housing on Maui has intensified due to steady population growth, high employment and historically low interest rates. This strong demand, coupled with limited supply, has led to rising housing prices. The Hawai’i Housing Policy Study Update 2003 estimated a deficit of approximately 3,755

needed resident housing units as of 2006. This deficit was projected to further increase to approximately 4,156 units by 2024. The long-term projection of housing conditions in South Maui indicates that the increase in households over the next five (5) years will outnumber the existing supply of new homes. A significant increase in housing supply will be needed to accommodate the region's anticipated growth. In light of the current and projected housing market conditions, the proposed residential use of the site could provide a significant community benefit by offering residents new opportunities to secure needed housing. The "no action" alternative will not address the urgent need for housing on Maui.

B. OTHER USES OF THE SITE

The "other uses of the site" alternative considers uses of the project site other than the proposed use.

Similar to the "no action" alternative, agricultural use would involve neither a commitment of resources nor short- and long-term adverse environmental effects related to residential and commercial development. As a result, aside from potential water use impacts, the agricultural use alternative would not involve an increase of infrastructure or public service demands associated with project implementation. Agricultural use at the project site would increase the potential for locally grown food crops.

However, as discussed in other sections of this document, the site is not deemed conducive to long-term agricultural use. The geometry of the subject property, with its relatively narrow north/south configuration defined by Waiakoa Gulch to the north and the Hale Pi'ilani residential subdivision to the south, poses logistical and compatibility challenges to long-term productive agricultural use. The narrow configuration of the site limits agricultural activities and requires a buffer from the neighboring residential subdivision to the south. As proposed, Waiakoa Gulch would become the natural buffer between agricultural lands farther to the north and the proposed project and existing residential development to the south. Due to the presence of the Waiakoa Gulch to the north, Pi'ilani Highway to the west, and the Hale Pi'ilani subdivision to the south, agricultural activities would be confined, with no allowance for expansion and limited access. The mauka portion of the site has remained vacant and fallow since the termination of sugar cultivation.

The agricultural impact of this action is near negligible when viewed in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands and much of these former plantations lands remain fallow. The proposed project will ultimately involve the use of approximately 94.3 acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui. **Further, rather than the available land supply, more salient factors facing the agricultural industry include the market demand for products (access to markets and local purchasing patterns) and the overall profitability of crops grown in Hawai'i.**

Use of the site for commercial/industrial purposes was also examined, **which would result in economic benefit to the community in terms of the creation of jobs and increased commerce. Commercial and industrial uses of the site would likely result in similar short and long-term environmental effects as the proposed action.** ~~however, again~~ Due to the site's configuration and proximity to existing residences, these **alternatives** were not deemed to be compatible with the existing environment. The geometry of the parcel offers little highway frontage and its proximity to adjacent residences poses issues of compatibility. Also, existing commercial areas at Ohukai Road and Pi'ilani Highway, at Pi'ikea Street and Pi'ilani Highway, and along South Kihei Road, are available to serve the region. A small, limited commercial area, to provide convenience goods and services, was deemed appropriate for the needs of the proposed development and immediate neighborhood. The small commercial site would serve to mitigate residents' need for vehicular travel from the site for such convenience goods and services.

Potential use of the site for government services and/or office buildings has not been expressed and would pose some of the same compatibility issues as commercial/industrial uses. Many civic uses would not be compatible with the residential and agricultural uses bordering the subject property. The County of Maui's government seat is located in Wailuku and many of the County's satellite offices in Kihei are located closer to the town's center, such as the Kihei Community Center on Lipoa Street. The County has expressed interest in expanding its presence in areas farther to the south in Kihei. The planned Kihei Regional Park is such an example. There has been no interest expressed by the Federal, State, or County governments concerning any lease or purchase of the property.

C. ALTERNATIVE PROJECT LOCATION

This alternative considers other locations for the planned project.

Over the past five (5) years, the demand for housing on Maui has intensified due to steady population growth, high employment and historically low interest rates. This strong demand, coupled with limited supply, has led to rising housing prices. The Hawai'i Housing Policy Study Update 2003 estimated a deficit of approximately 3,755 needed resident housing units as of 2006. This deficit was projected to further increase to approximately 4,156 units by 2024. The long-term projection of housing conditions in South Maui indicates that the increase in households over the next five (5) years will outnumber the existing supply of new homes. A significant increase in housing supply will be needed to accommodate the region's anticipated growth.

In view of the strong demand for housing, a significant increase in housing supply to accommodate the region's anticipated growth will be required. This demand will require housing from the planned project, as well as others within the region. In evaluating potential housing sites the Applicant considered the following factors, which support development of the project at this location.

- The site is situated at an attractive and central location in North Kihei, in close proximity to employment centers in South and Central Maui.
- The site is an ~~infill location~~ **urban growth area**, between an existing residential area and natural feature (Waiakoa Gulch). Waiakoa Gulch forms a natural buffer between the site and agricultural lands to the north.
- Necessary infrastructure systems and services are within near proximity, or can be reasonably provided to serve the project.
- Residential development at the site is not anticipated to have a significant adverse impact on the physical environment.
- The site is suitable for the development of a range of housing types to meet the housing needs of the region.

D. ALTERNATIVE SITE LAYOUTS

Other potential project designs and site layouts were considered in the development of the project master plan. These included alternatives with greater single-family detached dwellings similar to the adjacent Hale Pi'ilani subdivision and alternatives with a greater proportion of multi-family attached dwellings. One of the factors considered in the preparation of the master plan was to provide a mix of housing types. By offering a range of housing types, it was felt that the project would attract and serve a wider range of the housing market.

The unit mix does reflect an assumed market preference for single-family detached units. As proposed, the plan includes multi-family attached units on the makai portion of the site and single-family detached units on the central and mauka portions of the site. The mauka portion of the site is planned for higher density single-family detached residential use which is aimed to meet buyers' preference for single-family detached units, but at a lower price point. Compatibility and consistency with adjacent residential use was also considered in the master plan. It was felt that single-family residential use consistent with the adjacent Hale Pi'ilani subdivision would be appropriate for that central portion of the site.

The project's single-family area is planned to be consistent with the adjacent Hale Pi'ilani subdivision (single-family dwellings on subdivided lots of approximately 6,000 square feet). Higher density multi-family use was deemed more appropriate closer to the primary vehicular access points on the makai portion of the site. The potential for some residential use at the planned neighborhood commercial site is acknowledged and will continue to be evaluated as the project progresses. A primary consideration is the market's acceptance of a mixed use concept at this location. The master plan seeks to address these factors without significant alteration to the existing land form.

It is acknowledged that the substitution of additional multi-family units for a portion of the single-family units would result in less overall water demand for the project. This is due to the lower average daily water demand factor for multi-family units (560 gallons per day) versus that for single-family units (1,000 gallons per day). However, the substitution of higher density multi-family units at the eastern (mauka) portion of the site would entail more vehicular trips traversing the entire project site. As currently proposed, affordable housing opportunities will be provided through a mix

of multi-family attached and single-family detached units. This will provide greater diversity of affordable housing units.

**V. SUMMARY OF
UNAVOIDABLE IMPACTS
AND COMMITMENTS OF
RESOURCES**

V. SUMMARY OF UNAVOIDABLE IMPACTS AND COMMITMENTS OF RESOURCES

The development of the project will result in certain unavoidable construction-related environmental impacts as outlined in Chapter II.

In the short term, construction associated with the proposed development will generate noise impacts. These impacts will be limited to the immediate vicinity of the project construction areas. Sound attenuating construction equipment will be used, where practicable, to mitigate noise impacts caused by construction.

Unavoidable air quality impacts will also arise as a result of construction activities, such as the generation of dust and other airborne pollutants. Appropriate BMPs will be incorporated in the construction process to mitigate adverse impacts, including frequent watering of exposed surfaces and regular maintenance of construction equipment to minimize construction-related impacts.

The project will commit approximately 94.3 acres of agricultural land formerly used for sugar cane cultivation to an urban use. The production of sugar cane ceased in the 1980's and a portion of the parcel is now being utilized for seed corn cultivation. In anticipation of the project, and the potential removal of 38 acres from seed corn cultivation, replacement lands have been provided in the near vicinity. **Approximately 12 acres currently farmed (truck crops) in the central portion of the site will be impacted by the project. The applicant will work with the farmer to explore potential locations for relocation.** The mauka portion of the property is vacant and has been fallow since the termination of sugar cultivation.

Development of the project will alter the existing landscape, but is not anticipated to have an adverse impact upon scenic or open space resources. The proposed residential community will be developed as an architecturally integrated master planned area with low-rise residential structures. Landscaping will be installed as part of the development improvements to ensure visual buffering and softening of the built landscape. The project will incorporate park and open space areas that will contribute to view corridors within and through the project.

From an infrastructure use perspective, project implementation will result in alteration of existing hydrology (drainage), largely due to the increase in impervious surface area, and other impacts related to wastewater, water, park, school, and roadway usage. However, these

impacts will be mitigated either through the provision of additional resources onsite and offsite (drainage, water, and park) or through the payment of fair-share contributions (wastewater, school, and traffic).

As noted in the TIAR (Appendix "E"), overcapacity conditions are projected to occur by the Base Year (2016) even without the proposed project. Build-out of the project will add to peak hour traffic conditions at intersections along Pi'ilani Highway near the site. The TIAR recommends improvements to address conditions without the project, as well as with the project. These are outlined in the recommendations section of the TIAR.

The proposed drainage improvements are intended to reduce the post-development peak runoff through the creation of several detention basins. These detention basins will accommodate the increased, post-development runoff volume, thereby limiting the peak rate of runoff. Opportunities to further reduce post-development flows below existing drainage conditions will be evaluated during the design phase of the proposed development. The use of drainage basins is expected to mitigate offsite drainage runoff and impacts to coastal waters. Opportunities to direct runoff from parking lots and driveways to nearby landscaped areas and detention basins will be pursued. Also, native plants which require less water will be sought for the landscaped areas within the project.

As mentioned, the applicant is exploring several potential drinking water source opportunities, including surface water treatment and new well sources in Central Maui. The timing of completion of the source development projects will, in large part, determine the particular water source for the project. The applicant acknowledges that both source alternatives will require further discussion, review, and approval by applicable governmental agencies and expects to continue discussions as the planning and design for the project proceeds. Nonetheless, the applicant is committed to develop source, storage, and transmission facilities to serve this project.

The applicant has been in coordination with the County of Maui, Department of Parks and Recreation to ensure satisfactory compliance with parks and playgrounds assessment requirements. Preliminarily, it is estimated that the park assessment would amount to just under seven (7) acres for a 600-unit residential subdivision in South Maui. The applicant is currently exploring the possibility of creating a new park adjacent and north of the existing Hale Pi'ilani neighborhood park to satisfy its park assessment requirements.

The project site is located within the Wastewater Reclamation Division's Kihei Assessment Area No. 3 and, as such, the applicant will be required to pay assessment fees. The assessment fees will be used for the treatment plant expansion as well as any necessary off-site improvements to the collection system and wastewater pump stations.

The 2007 Legislature passed a bill establishing school impact fees. Under this new law, the project may be required to pay a fair-share fee, which will be used to mitigate the educational demands stemming from the project. The applicant will work with the Department of Education in formulating an appropriate fair-share agreement for the subject project.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The traffic impact fees will be used to provide a method of sharing the growth-related costs incurred by the county for road and traffic infrastructure improvements made necessary by expanded population levels. The final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

To minimize potential adverse impacts to natural resources in building design, the Office of Environmental Quality Control's publication entitled "Guidelines for Sustainable Building Design in Hawai'i" has been reviewed. As a result, the following measures to conserve natural resources and to promote energy efficiency will be undertaken in the planning, design, construction, and operation of the project.

- Site buildings to take advantage of natural features and maximize their beneficial effects by providing for solar access, daylighting, and natural cooling.
- Design south, east, and west shading devices to minimize solar heat gain.
- Locate buildings to encourage bicycle and pedestrian access and pedestrian oriented uses.
- Consolidate utility and infrastructure in common corridors to minimize site degradation and cost, improve efficiency, and reduce impermeable surfaces.
- Provide tenant sub-metering to encourage utility use accountability.
- Design space for recycling and waste diversion opportunities during occupancy.

**VI. RELATIONSHIP
BETWEEN THE SHORT-
TERM USES OF THE
ENVIRONMENT AND THE
MAINTENANCE AND
ENHANCEMENT OF
LONG-TERM
PRODUCTIVITY**

VI. RELATIONSHIP BETWEEN THE SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The subject property was in sugar cane cultivation prior to the mid-1980's. However, subsequent residential development south of the project site has occurred since that time and now poses logistical and compatibility challenges to long-term productive agricultural use of the subject site. The narrow configuration of the site limits agricultural activities and requires a buffer from the neighboring residential subdivision to the south. Due to the presence of Waiakoa Gulch to the north, Pi'ilani Highway to the west, and the Hale Pi'ilani subdivision to the south, agricultural activities are confined, with no allowance for expansion and limited access. Almost half of the site has remained unused and fallow since the cessation of sugar cane cultivation.

In light of the housing shortage that exists on Maui, coupled with the scarcity of entitled, undeveloped residential lands in South Maui, the conversion of the project's agricultural lands for housing presents a beneficial opportunity. In the overall perspective, the project's 94.3 acres of land represent 0.03 percent of the roughly 246,000 acres of State Agricultural lands on the island of Maui.

The project's anticipated short- and long-term housing and economic benefits are expected to outweigh that from the current short-term uses at the site. The project's estimated construction cost of onsite/offsite infrastructure and site work is approximately \$59 million (2007 dollars). In addition, building construction cost is estimated at approximately \$92 million (2007 dollars). As a result, the development of the project is anticipated to inject over \$150 million into the local economy. Further, the project will contribute an estimated \$341,000.00 in annual real property tax.

It is unlikely that short-term uses of the subject property will yield more than limited agricultural cultivation, considering its limitations for productive long-term agricultural use. In evaluating the conversion of underutilized agricultural lands against the prospect of providing affordable and market housing for residents who will sustain the local economy, the latter is anticipated to result in greater long-term productivity for the region.

VII. UNRESOLVED ISSUES

VII. UNRESOLVED ISSUES

As noted in the Traffic Impact Analysis Report, intersections along Pi'ilani Highway in the vicinity of the project are anticipated to experience increasing traffic congestion in the future, even without the proposed project. The TIAR recommends applicable mitigation measures to address these future conditions. Included among these is the concept of a mauka roadway parallel to and mauka of the existing Pi'ilani Highway. The project's roadway system, including any connection to existing and future roadways, will be developed in consultation with the State Department of Transportation and the County Department of Public Works. Applicable traffic mitigation measures will be developed and implemented in consultation with the State Department of Transportation and the County Department of Public Works.

The applicant will participate in the funding and construction of adequate water source, storage, and transmission facilities and improvements to accommodate water use generated by the project. The applicant is exploring several potential source opportunities, including surface water treatment and new well sources in Central Maui. To meet the water storage needs of the project, the applicant is in discussions with neighboring landowners concerning the location of such a tank, as well as potential joint development opportunities. The County's Makai Heights Reservoir has an estimated remaining capacity of 339,000 gallons which could be used to service a portion of the project. However, further consultation will be undertaken with the County Department of Water Supply during the design phase to determine whether any of this storage capacity would be available for the project. All water system improvements will be developed with the cooperation and consent of the Department of Water Supply.

Other unresolved issues for the project, which will be decided prior to project implementation, include a fair-share educational contribution, parks and playgrounds contribution, traffic impact fees, participation in Kihei wastewater system improvements, the potential presence of arsenic at the property, and an affordable housing agreement.

The 2007 Legislature passed a bill establishing school impact fees. Under this new law, the project may be required to pay an impact fee. The State Department of Education noted that they do not know the fee amount per residential unit at this time, but may have a better idea of the fee amount in early 2008. The applicant will work with the Department of Education in formulating an appropriate fair-share agreement for the subject project.

The applicant has been in coordination with the County of Maui, Department of Parks and Recreation to ensure satisfactory compliance with parks and playgrounds assessment requirements. Preliminarily, it is estimated that the park assessment would amount to just under seven (7) acres for a 600-unit residential subdivision in South Maui. The applicant is currently exploring the possibility of creating a new park adjacent and north of the existing Hale Pi'ilani neighborhood park to satisfy its parks and playgrounds assessment requirements.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The Kihei Residential Project may be subject to the provisions of Chapter 14.62. Although the specific traffic impact fee schedule for the South Maui region has not yet been adopted by ordinance, the final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

The project site is located within the Wastewater Reclamation Division's Kihei Assessment Area No. 3 and, as such, the applicant will be required to pay assessment fees for treatment plant expansion costs. The applicant remains in coordination with the Wastewater Reclamation Division regarding assessment fees for the treatment plant expansion, as well as any necessary off-site improvements to the collection system and wastewater pump stations. The applicant will consult with the Wastewater Reclamation Division staff concerning the extension of the R-1 water line for non-drinking water usage. The applicant will also explore the availability of other non-drinking water sources.

The applicant acknowledges that the State Department of Health, Hazard Evaluation, and Emergency Response (HEER) Office noted the potential for arsenic and other residual pesticides in former agricultural lands that are proposed for urban use and the applicant has contacted the HEER Office regarding an appropriate soil testing program. It should be noted that there is no specific evidence of hazardous materials at the property. In its letter of November 19, 2007, the HEER Office stated that detailed guidance for the investigation of former agricultural lands is currently under preparation. The applicant will continue to work with the HEER Office to develop and implement a mutually acceptable soils testing program for this site prior to development with the understanding that corrective actions may be necessary.

The applicant has been in discussion with the County of Maui, Department of Housing and Human Concerns to develop an appropriate affordable housing program pursuant to the provisions of the Maui Residential Workforce Housing Policy (MRWHP). As provided under the MRWHP, the sales prices for affordable units will be established at the time of

development, and based on Maui's median family income at that time. The applicant must formulate and execute an affordable housing agreement with the Department of Housing and Human Concerns prior to project implementation.

VIII. FINDINGS AND CONCLUSIONS

VIII. 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 will have significant impacts to the environment. The following criteria and preliminary analysis are provided.

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

As mentioned in Chapter II of this document, the cultural impact assessment of the project area concluded that no significant impacts to cultural practices were anticipated, while the archaeological inventory survey concluded that no historic properties would be affected. The archaeological inventory survey report was submitted to the State Historic Preservation Division (SHPD) for review. The SHPD concurred with the report's findings and recommendations and accepted the report in a letter dated June 7, 2006. Refer to **Appendix "CD"** and **Appendix "CD-1"**. Flora and fauna surveys of the property found the site generally limited to non-native, abundant species, and the proposed project is not anticipated to have significant adverse impact on the biological resources in the area. **The proposed project will result in the conversion of agricultural lands to urban use and the termination of seed corn and truck crop cultivation at the site.**

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

The proposed project will not curtail the range of beneficial uses of the environment. Development of specific site plans will allow for the identification of applicable Best Management Practices (BMPs) to minimize any construction-related impacts. While the project will alter the existing landscape, it will provide needed housing for Maui residents in close proximity to existing residential neighborhoods, employment centers, and infrastructure. Park and open space, along with a trail system, will provide access to and through the project.

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 proposed project does not conflict with the State’s Environmental Policy and Guidelines as set forth in Chapter 344, Hawai`i Revised Statutes (HRS).

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

On a short-term basis, the project will support construction and construction-related employment and have a beneficial impact on the local economy during the period of construction. Construction-related wages resulting from the project is estimated at approximately \$60.4 million (2007 dollars). Additionally, State general excise taxes in the amount of approximately \$6.3 million are estimated over the development and construction period.

From a long-term perspective, project residents will require services related to family maintenance, goods, and services which are expected to further support local business owners. Real property taxes generated by the project residents will contribute to the County’s revenue tax base to support the increase in regional public services over time.

The project will provide housing opportunities to meet the anticipated short- and long-term demand for resident housing. A range of housing types will serve to meet the varied housing needs of the region, at an attractive and central location in North Kihei. Additional product choices will provide healthy competition and allow for a more balanced housing market and home ownership opportunities.

5. **Substantially affects public health.**

The proposed project is not anticipated to have any significant adverse impacts to public health.

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

While the proposed project will add to resident population in the Kihei-Makena region, it is not anticipated to result in significant adverse secondary impacts. The

site is an **infillurban growth** location, between an existing residential area and natural feature (Waiakoa Gulch). Waiakoa Gulch forms a natural buffer between the site and agricultural lands to the north. Necessary infrastructure systems and services are within near proximity, and can be reasonably provided to serve the project. Impacts upon public services and facilities will be addressed with the applicable governmental agencies.

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

The project is not anticipated to have a significant adverse impact upon the natural environment. During construction, recommended Best Management Practices (BMPs) will be implemented for erosion and sedimentation control. Design of the project will incorporate the use of drainage basins to mitigate offsite drainage runoff and impacts to coastal waters. Other appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the project design process.

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

The proposed project is not anticipated to have a cumulative adverse impact on the environment, nor involve a commitment to larger actions. As previously noted, the project site is an **infillurban growth** location, between an existing residential area and natural feature (Waiakoa Gulch). Waiakoa Gulch forms a natural buffer between the site and agricultural lands farther to the north. Due to its location near existing residential areas, infrastructure systems and services are within near proximity, or can be reasonably provided to serve the project. Residential development at the site is not anticipated to have a significant adverse impact on the physical environment.

While the impacts assessed in this document are based on the entire action, the design of the project considers long-range planning opportunities as discussed in the “Cumulative and Secondary Impacts” Section II.E. herein.

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

Flora and fauna surveys of the property found the site generally limited to non-native, abundant species, and the proposed project is not anticipated to have significant

negative impact on the biological resources in the area. No rare, threatened, or endangered species were observed during the surveys.

10. Detrimentially affects air or water quality or ambient noise levels.

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, and installation of dust screens will be implemented to minimize wind-blown emissions. Noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance, will be used during construction activities. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawai'i, Department of Health Administrative Rules Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules.

11. 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 site is situated inland of the shoreline and is not anticipated to have any adverse impact upon coastal waters or resources. The project site is situated within Zones B and C, areas of minimal flooding. The site is not situated within a tsunami inundation zone. The use of drainage basins is expected to mitigate offsite drainage runoff and impacts to coastal waters. Further appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the design process. During construction, recommended Best Management Practices (BMPs) will be implemented for erosion and sedimentation control.

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

The proposed project will not adversely affect any previously identified scenic vistas or viewplanes. Landscaping will be implemented as part of the development improvements to ensure visual buffering and softening of the built landscape. The project will incorporate park and open space areas that will provide view corridors within and through the project. Adverse impacts to scenic or open space resources resulting from the project are not anticipated.

13. **Requires substantial energy consumption.**

The proposed project will involve the commitment of fuel for construction equipment, vehicles, and machinery during construction and maintenance activities. 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. Where feasible, energy saving measures will be incorporated into the project design. The project's central location in North Kihei, in close proximity to employment centers in South and Central Maui, will result in lower long term transportation/fuel costs than other more distant locations.

In summary, the site is situated at an attractive and central location in North Kihei, in close proximity to employment centers in South and Central Maui. The site is an **infillurban growth** location, between an existing residential area and natural feature (Waiakoa Gulch). Waiakoa Gulch forms a natural buffer between the site and agricultural lands farther to the north. Necessary infrastructure systems and services are within near proximity, or can be reasonably provided to serve the project. Residential development at the site is not anticipated to have a significant adverse impact on the physical environment. The site is suitable for the development of a range of housing types to meet the housing needs of the region.

IX. LIST OF PERMITS AND APPROVALS

IX. LIST OF PERMITS AND APPROVALS

The following list of permits and approvals are anticipated to be needed for project implementation.

1. State of Hawai'i

- A. State Land Use District Boundary Amendment.
- B. NPDES Permits, as applicable.

2. County of Maui

- A. Community Plan Amendment.
- B. Change in Zoning.
- C. Subdivision.
- D. Construction Permits.

The estimated time schedule for the application and approval for project implementation is presented below.

Permit or Approval	Anticipated Submission Date	Anticipated Approval Date
District Boundary Amendment	2007	2008
Community Plan Amendment	2008	2010
Change in Zoning	2008	2010
Subdivision Approval	2010	2010
NPDES Permits, as applicable	2010	2011
Construction Permits	2011-2016	2011-2016

**X. PARTIES CONSULTED
DURING THE
PREPARATION OF THE
DRAFT ENVIRONMENTAL
IMPACT STATEMENT;
LETTERS RECEIVED AND
RESPONSES TO
SUBSTANTIVE
COMMENTS**

X. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during preparation of the Draft Environmental Impact Statement (EIS). Agency comments and responses to substantive comments are included herein.

FEDERAL AGENCIES

1. 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
2. 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
3. Robert P. Smith
Field Supervisor
U. S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122, Box 50088
Honolulu, Hawai'i 96813
5. Ed Texeira, Vice Director
Hawai'i State Civil Defense
3949 Diamond Head Road
Honolulu, Hawai'i 96816-4495
6. Russ Saito, State Comptroller
Department of Accounting and General Services
1151 Punchbowl Street, #426
Honolulu, Hawai'i 96813
7. Sandra Lee Kunimoto
Department of Agriculture
1428 South King Street
Honolulu, Hawai'i 96814-2512
8. Theodore Liu, Director
Department of Business, Economic Development and Tourism
220 South King Street
Honolulu, Hawai'i 96813
9. Patricia Hamamoto, Superintendent
Department of Education
P. O. Box 2360
Honolulu, Hawai'i 96804

STATE AGENCIES

4. Barry Fukunaga, Director of Transportation
Hawai'i Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097
10. Genevieve Salmonson, Director
Office Of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawai'i 96813

11. Haunani Apoliona, Chairman
Office of Hawai'ian Affairs
711 Kapiolani Blvd, Suite 500
Honolulu, Hawai'i 96813
12. Micah Kane, Chairman
Department of Hawai'ian Home Lands
P. O. Box 1879
Honolulu, Hawai'i 96805
13. Melanie Chinen, Administrator
State Historic Preservation Division
601 Kamokila Boulevard
Suite 555
Kapolei, Hawai'i 96707
14. Peter Young, Chairperson
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
15. Mary Lou Kobayashi
Planning Program Administrator
Office of Planning
P. O. Box 2359
Honolulu, Hawai'i 96804
16. Ken Nomura
Complex Area Superintendent
(Central/Upcountry Maui)
Department of Education
54 High Street, 4th Floor
Wailuku, Hawai'i 96793
17. Ron Okumura
Complex Area Superintendent
(Lanai/Molokai/Hana/Lahaina)
Department of Education
54 High Street, 4th Floor
Wailuku, Hawai'i 96793
18. Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawai'i
Department of Health
54 High Street
Wailuku, Hawai'i 96793
19. Wes Lo, CEO
Maui Memorial Medical Center
221 Mahalani Street
Wailuku, Hawai'i 96793

COUNTY AGENCIES

20. Jo-Ann Ridao, Housing Commissioner
Office of the Mayor
200 South High Street
Wailuku, HI 96793
21. Gen Iinuma, Administrator
Maui Civil Defense Agency
200 South High Street
Wailuku, Hawai'i 96793
22. Carl Kaupalolo, Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawai'i 96732
23. Vanessa Medeiros, Director
County of Maui
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawai'i 96793
24. G. Riki Hokama, Council Chair
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
25. Councilmember Danny Mateo
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
26. Councilmember Michelle Anderson
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
27. Councilmember Gladys Baisa
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
28. Councilmember JoAnne Johnson
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793

- 29. Councilmember Bill Medeiros
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 30. Councilmember Michael Molina
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 31. Councilmember Joseph Pontanilla
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 32. Councilmember Michael Victorino
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 33. Jeff Hunt, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawai'i 96793
- 34. Tamara Horcajo, Director
County of Maui
Department of Parks and Recreation
700 Hali'a Nakoia Street, Unit 2
Wailuku, Hawai'i 96793
- 35. Thomas Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawai'i 96793
- 36. Milton Arakawa, Director
County of Maui
**Department of Public Works
and Environmental Management**
200 South High Street
Wailuku, Hawai'i 96793
- 37. Don Medeiros, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawai'i 96793

- 38. Jeff Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai'i 96793

OTHER CONSULTED PARTIES

- 39. Neal Shinyama, Manager - Engineering
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawai'i 96732
- 40. **Hawaiian Telecom**
60 South Church Street
Wailuku, Hawai'i 96793
- 41. **Oceanic Time Warner Cable**
350 Hoohana Street
Kahului, Hawai'i 96732
- 42. **Kihei Community Association**
P. O. Box 662
Kihei, Hawai'i 96753
- 43. Zandra Souza-Amaral
365 Hoalike Street
Kihei, Hawai'i 96753

APR 19 2007

LINDA LINGLE
GOVERNOR



BARRY FUKUNAGA
INTERIM DIRECTOR

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

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

IN REPLY REFER TO:

STP 8.2461

April 16, 2007

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

Dear Mr. Ginoza:

Subject: Proposed Kihei Residential Project
Environmental Impact Statement (EIS) Preparation Notice
TMK: 3-8-004; pors. 002, 022 and 030, Kihei, Maui

We have received your request of April 4, 2007, for our review of the EIS Preparation Notice on the subject residential project. This is to advise you that we have already commented on the project in response to an earlier request from the State Office of Planning. A copy of our reply to the Office of Planning is attached for your reference.

It is our understanding that A & B Properties, Inc. is the landowner/petitioner/developer of the residential project. Based on your request, we assume that your firm will be acting as A & B's planning consultant.

We look forward to working with your firm and A & B Properties on the project's impacts on our State transportation facilities.

Very truly yours,

A handwritten signature in black ink, appearing to read "Barry Fukunaga", written over the typed name.

BARRY FUKUNAGA
Interim Director of Transportation

Attach.

c: Laura Thielen, Office of Planning – DBEDT (w/incoming)
Anthony Ching, Land Use Commission

LINDA LINGLE
GOVERNOR



BARRY FUKUNAGA
INTERIM DIRECTOR

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

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

IN REPLY REFER TO:

STP 8.2446

April 4, 2007

TO: MS. LAURA H. THIELEN, DIRECTOR
OFFICE OF PLANNING
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND
TOURISM

FROM: BARRY FUKUNAGA
INTERIM DIRECTOR OF TRANSPORTATION

SUBJECT: EIS PREPARATION NOTICE WITH PETITION DOCKET NO. A07-772
A & B PROPERTIES, INC.
PROPOSED KIHEI RESIDENTIAL PROJECT, MAUI
TMK: 3-8-04: POR. 2, POR. 22 AND POR. 30

We have the following initial comments on the announcement of the proposed land development by the subject petitioner:

1. The project will impact our transportation facilities, particularly our highways in the Kihei area.
2. The petitioner should provide in its environmental and land use district petition submittals a detailed description and plan for its proposed residential development, accompanied by a traffic impact analysis report (TIAR) and engineering report on the project's drainage plan.
3. One of the flight tracks for aircraft using Kahului Airport crosses over the project. The overflights of aircraft, may cause single event noise affecting the residents of the project. The appropriate disclosure to prospective buyers may be necessary.

We appreciate the opportunity to provide our early comments on the project and land use petition. As an interested party on the project, we request that the petitioner provide us with at least four (4) copies of its future submittals for our distribution to and review by the appropriate divisional staff of our department.

DS:km



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

MARK ALEXANDER ROY

August 27, 2007

Barry Fukunaga, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Fukunaga:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated April 16, 2007, on the EISPN for the subject project.

A detailed project description and a traffic impact analysis report (TIAR) will be included as part of the Draft EIS. Additionally, the applicant will consider appropriate disclosure to prospective buyers due to overflights of aircraft.

We appreciate the input we received from your office. Four (4) copies of the Draft EIS 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:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land Use Commission

F:\DATA\A&B\KiheiRes\EISPN\SDOT.EISPNres.wpd

MAY 10 2007

LINDA LINGLE
GOVERNOR



RUSS K. SAITO
COMPTROLLER

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

(P)1115.7

MAY - 9 2007

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

Dear Mr. Ginoza:

Subject: Proposed Kihei Residential Project
Environmental Impact Statement Preparation Notice
TMK 3-8-004:002, 022, and 030, Island of Maui

The project does not impact any of the Department of Accounting and General Services' projects or existing facilities and we have no comments to offer.

If there are any questions regarding the above, please have your staff call Mr. David DePonte of the Planning Branch at 586-0492.

Sincerely,

A handwritten signature in black ink, appearing to read "Ernest Y. W. Lau".

ERNEST Y. W. LAU
Public Works Administrator

DD:vca

c: Ms. Genevieve Salmonson, OEQC
Mr. Anthony Ching, State Land Use Commission
Mr. David Victor, DAGS Maui District Office



MICHAEL T. MUNEKIYO
GWEN ORASHI HIRAGA
MITSURU "MIKI" HIRANO
KARLYN KAWAHARA

MARK ALEXANDER ROY

August 27, 2007

Ernest Y. W. Lau
Public Works Administrator
**Department of Accounting
and General Services**
P. O. Box 119
Honolulu, Hawai'i 96810

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the
Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.)

Dear Mr. Lau:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated May 9, 2007, on the EISPN for the subject project.

We appreciate the input we received from your office. A copy of the Draft EIS 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,

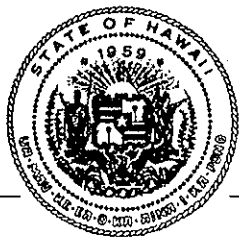
Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

F:\DATA\A&B\KiheiRes\EISPN\DAGS.EISPNres.wpd

MAY 10 2007



**DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM**

LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
MARK K. ANDERSON
DEPUTY DIRECTOR
LAURA H. THIELEN
DIRECTOR
OFFICE OF PLANNING

OFFICE OF PLANNING

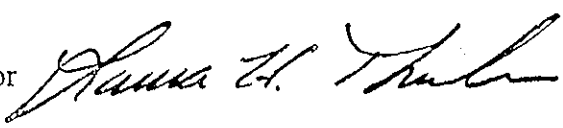
235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-11773

May 8, 2007

To: Anthony Ching, Executive Officer
Land Use Commission

From: Laura H. Thielen, Director 

Subject: Kihei Residential Project
Environmental Impact Statement Preparation Notice (EISPN)
State Land Use Commission Docket No. A07-772/A&B Properties, Inc.
TMK: (2) 3-8-004:002 (por.), 022 (por.), 030 (por.)
Kihei, Maui, Hawaii

Thank you for the opportunity to submit comments on the EISPN for the above referenced proposal to reclassify approximately 94.352 acres of land in north Kihei, Maui, Hawaii from the State Agricultural District to the State Urban District. The subject project proposes the development of approximately 600 residential units, with approximately 25.0 acres of land for single-family housing, 67.9 acres for multi-family dwellings, and 1.4 acres for supporting commercial uses. A network of open space, trails, and bike paths will be provided to connect with existing parks and open space in neighboring areas.

As the Office of Planning is responsible for coordinating the State's position on issues of crosscutting State concern, we submitted a letter dated March 19, 2007, addressed to the Petitioner's planning consultant with copy to your office, requesting that specific issues be considered in the development of the project's Draft Environmental Impact Statement (DEIS). Comments from that letter are reiterated below and supplemented with concerns that have been raised by other agencies since the submission of our original letter.

1. **Water Supply** – Water resource protection is a critical State issue, particularly for the island of Maui. The State Commission on Water Resource Management (CWRM) notes that the project is located within a water management area. The DEIS should include information on the availability and capacity of potable and non-potable water sources for the project, plans for transmission and storage, and efforts to promote water conservation, including, if applicable, the use of recycled water for landscaping and other non-potable uses. CWRM also notes that the projected water demand for the proposed project

seemed “a little high by Maui County standards.” We therefore ask that the Petitioner provide additional information regarding the calculation of those projections and any project features that are expected to increase water demand beyond the typical rates for a residential project. Finally, the DEIS should discuss coordination efforts and agreements reached with the Maui Department of Water Supply and, if necessary, CWRM.

2. **Agricultural Lands** – Preservation of important agricultural lands is a priority for the State and Counties. The EISPN states that a portion of the project site is identified as “Prime” agricultural land under the Agricultural Lands of Importance to the State of Hawaii (ALISH) classification system, with the remainder of the property designated as “Other.” The University of Hawaii’s Land Study Bureau rated the soil productivity within the project area at level “E,” the lowest class of productivity. We ask that the Petitioner provide information on the approximate acreage within each of the relevant ALISH classifications, and discuss how the loss of these lands can be justified or how other lands of equal importance can be protected. The EISPN also notes that the makai portion of the property is currently being used for cultivation of seed corn and truck crops. We recommend that the DEIS include estimates of the acreage currently being used for agriculture and provide information about the property’s farmer tenants and their plans for relocation upon development of the proposed project. We note that the project site encompasses a comparatively small portion of the relevant parcels of property and ask that the Petitioner discuss its plans for those portions of the property that lie outside of the project boundaries.
3. **Affordable Housing** – Increasing the supply of affordable housing is a critical State and County issue, particularly for the island of Maui, which has seen some of the highest home prices in the islands. Maui’s Residential Workforce Housing Policy establishes specific requirements for the provision of affordable housing when new residential projects are developed in the County. The Petitioner should discuss its plans to meet the County’s affordable housing requirements. To better estimate increases in the demand for public services, the DEIS should provide information on the number of single-family and multi-family units to be built, the income groups to be targeted, and the estimated price ranges for both affordable and market-priced units.
4. **Transportation** – The State and County have serious concerns about the traffic implications associated with new developments. We recommend the Petitioner provide a Traffic Impact Analysis Report (TIAR) that: assesses current traffic conditions based on actual counts; projects future traffic conditions, incorporating cumulative impacts associated with the proposed project and any other developments currently planned for the region; describes relevant transportation improvements planned by the State and/or County, along with the status of such efforts; and proposes measures to mitigate the traffic generated by the proposed project. The County Department of Public Works and Environmental Management (DPWEM) has specifically requested that the TIAR analyze the implications of a parallel mauka alignment to Piilani Highway and discuss how the

terminus of this future roadway system will be incorporated into the development. More broadly, the DEIS should discuss the Petitioner's efforts to coordinate project development and traffic mitigation with the State Department of Transportation (DOT) and DPWEM, specifying whether project roadways are planned for dedication to the State or County. The DOT has also expressed concerns about the impact of increased stormwater flow and flooding on highways and roadways within the region. We ask that the Petitioner provide an engineering report on the project's drainage plan to ensure that flows generated on-site are contained within the project area. In addition, the DOT has noted that noise levels associated with aircraft flyover may warrant disclosure to prospective homebuyers.

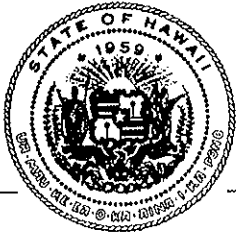
5. **Ocean Resources** – The subject property is located several hundred yards mauka of Maalaea Bay, a stretch of coastal waters that is rich in marine resources and comprises a portion of the Hawaiian Islands Humpback Whale National Marine Sanctuary. As noted above, the DEIS should provide detailed plans for a drainage system, and discuss measures that will be taken to minimize runoff and prevent the sedimentation of coastal waters. The EISPN notes that a National Pollutant Discharge Elimination System permit may be required during project development. The DEIS should discuss the relevant State Department of Health guidelines and Best Management Practices that will be implemented to minimize impacts during construction.
6. **Public Health** – If the project will have the potential to generate hazardous materials or result in the possible contamination of the air, soil or water, the DEIS should explain how public health and safety will be protected. The State Department of Health (DOH) has raised concerns about prior agricultural use of the property resulting in elevated levels of arsenic in its soil. At the request of DOH, we recommend that the Petitioner, in consultation with DOH's Hazard Evaluation and Emergency Response Office, conduct an analysis of soil in the project area to measure arsenic levels. We further recommend that the DEIS discuss the wastewater disposal systems for the project, including estimates of the wastewater flow to be generated by the project, current capacity at the Kihei Wastewater Reclamation Facility (KWRF), and the status of discussions with the County regarding contributions toward the expansion, maintenance, and improvement of KWRF and supporting regional infrastructure.
7. **Cultural/Historic Resources** – The EISPN states that an archaeological inventory survey and a cultural impact assessment have already been completed and will be included in the DEIS. We ask that the Petitioner discuss these findings, as well as monitoring and preservation plans approved by the State Historic Preservation Division. The DEIS should note, in particular, how access will be preserved for Native Hawaiian traditional and customary practices. Visual landmarks of cultural significance should be included in the discussion, if applicable.

Mr. Anthony Ching
Page 4
May 8, 2007

8. **Environmental, Recreational, and Scenic Resources** – The EISPN reports that an inventory of flora and fauna on the project site has already been completed. The DEIS should discuss the findings of those studies and any proposed protections for important species. These reports should include an assessment of any aquatic life associated with the Gulch that borders the northern edge of the project site. In addition, the Petitioner should provide a description of scenic resources and recreational uses on or near the project site.
9. **Education** – The EISPN briefly describes each of the public schools that serve the Kihei community. We ask that the Petitioner provide information in the DEIS about the projected increase in school enrollment associated with the project, and the status of negotiations with the Hawaii Department of Education (DOE) toward a fair-share contribution by the Petitioner.
10. **Coastal Zone Management** – The State oversees protection of natural and cultural resources within the coastal zone. The Petitioner should discuss any impact the proposed project may have on coastal and marine resources, and how the project will balance the competing values of economic development and preservation of coastal resources, including protection from flood hazard and soil erosion. The DEIS should include project site plans that denote 100-year flood inundation limits. DPWEM notes in particular that because portions of the project site are vulnerable to possible flood inundation, the project must conform to County requirements relating to flood hazard districts.

The Office of Planning looks forward to receiving the Petitioner's DEIS addressing potential impacts and mitigation measures relative to the issues raised above. We ask that copies of comments received during the EISPN process be submitted to the Office of Planning. If you have any questions, please call Koren Ishibashi in the Land Use Division at 587-2803.

c: Benjamin Matsubara, Matsubara, Lee & Kotake
✓ Rochelle Ka'ula, Munekiyo & Hiraga, Inc.



DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
MARK K. ANDERSON
DEPUTY DIRECTOR
LAURA H. THIELEN
DIRECTOR
OFFICE OF PLANNING

OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. 11700

March 19, 2007

Ms. Rochelle Kaula
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kaula:

Subject: Kīhei Residential Project
Environmental Impact Statement Preparation Notice (EISPN)
TMK: (2) 3-8-004:002 (por.), 022 (por.), 030 (por.)
Kīhei, Maui, Hawaii
(State Land Use Commission Docket No. A07-772/A&B Properties, Inc.)

Thank you for submitting your EISPN for the above referenced proposal to reclassify approximately 94.352 acres of land in north Kīhei, Maui, Hawaii from the State Agricultural District to the State Urban District. The subject project proposes the development of approximately 600 residential units, with approximately 25.0 acres of land for single-family housing, 67.9 acres for multi-family dwellings, and 1.4 acres for supporting commercial uses. A network of open space, trails, and bike paths will be provided to connect with existing parks and open space in neighboring areas.

The Office of Planning will be coordinating the State's position on issues of crosscutting State concern. I am writing to request that the Draft Environmental Impact Statement (DEIS) consider the impacts of the proposed project in the following areas:

1. **Water Supply** – Water resource protection is a critical State issue, particularly for the island of Maui. Please include information on the availability and capacity of potable and non-potable water sources for the project, plans for transmission and storage, and efforts to promote water conservation, including, if applicable, the use of recycled water for landscaping and other non-potable uses. In addition, please discuss coordination efforts and agreements reached with the Maui Department of Water Supply and, if necessary, the State Commission on Water Resource Management.

2. **Agricultural Lands** – Preservation of important agricultural lands is a priority for the State and Counties. The EISPN states that a portion of the project site is identified as “Prime” agricultural land under the Agricultural Lands of Importance to the State of Hawaii (ALISH) classification system, with the remainder of the property designated as “Other.” The University of Hawaii’s Land Study Bureau rated the soil productivity within the project area at level “E,” the lowest class of productivity. Please include information on the approximate acreage within each of the relevant ALISH classifications, and discuss how the loss of these lands can be justified or how other lands of equal importance can be protected. The EISPN also notes that the makai portion of the property is currently being used for cultivation of seed corn and truck crops. Please include estimates of the acreage currently being used for agriculture and provide information about the property’s farmer tenants and their plans for relocation upon development of the proposed project. We note that the project site encompasses a comparatively small portion of the relevant parcels of property. Please discuss the landowner’s plans for those portions of the property that lie outside of the project boundaries.
3. **Affordable Housing** – Increasing the supply of affordable housing is a critical State and County issue, particularly for the island of Maui, which has seen some of the highest home prices in the islands. Maui’s Residential Workforce Housing Policy establishes specific requirements for the provision of affordable housing when new residential projects are developed in the County. Please discuss how the Petitioner plans to meet the County’s affordable housing requirements.
4. **Transportation** – The State and County have serious concerns about the traffic implications associated with new developments. Please provide a Traffic Impact Analysis Report (TIAR) that: assesses current traffic conditions based on actual counts; projects future traffic conditions, incorporating cumulative impacts associated with the proposed project and any other developments currently planned for the region; describes relevant transportation improvements planned by the State and/or County, along with the status of such efforts; and proposes measures to mitigate the traffic generated by the proposed project. In addition, please discuss the Petitioner’s efforts to coordinate project development and traffic mitigation with the State Department of Transportation and the County Department of Public Works and Environmental Management.
5. **Ocean Resources** – The subject property is located several hundred yards mauka of Maalaea Bay, a stretch of coastal waters that is rich in marine resources and comprises a portion of the Hawaiian Islands Humpback Whale National Marine Sanctuary. The EISPN states that the project site is bordered on its northern edge by Waiakoa Gulch, which serves as a major mauka–makai drainage channel, carrying waters from the slopes of Haleakalā to Maalaea Bay. Please discuss measures that will be taken to minimize the flow of project-related runoff into the Gulch and the ocean beyond. In addition, please

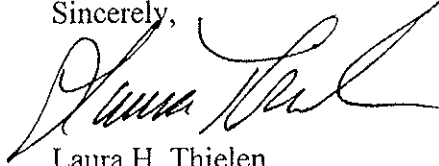
provide detailed plans for a drainage system to ensure that stormwater generated on site does not impact downstream properties and coastal waters. The EISPN notes that a National Pollutant Discharge Elimination System permit may be required for the project. Please discuss the types of project-related work that might require such a permit, along with relevant State Department of Health guidelines and Best Management Practices that will be implemented to address potential problems.

6. **Public Health** – If the project will have the potential to generate hazardous materials or result in the possible contamination of the air, soil or water, the DEIS should explain how public health and safety will be protected. Please discuss the wastewater disposal systems for the project, including estimates of the wastewater flow to be generated by the project and current capacity at the Kīhei Wastewater Reclamation Facility (KWRF). In addition, please note the status of any discussions with the County regarding contributions toward the funding of KWRF's maintenance and improvement.
7. **Cultural/Historic Resources** – The EISPN states that an archaeological inventory survey and a cultural impact assessment have already been completed and will be included in the DEIS. Please discuss these findings, as well as monitoring and preservation plans approved by the State Historic Preservation Division. Please note, in particular, how access will be preserved for Native Hawaiian traditional and customary practices. Visual landmarks of cultural significance should be included in the discussion, if applicable.
8. **Environmental, Recreational, and Scenic Resources** – The EISPN reports that an inventory of flora and fauna on the project site has already been completed. Please discuss the findings of those studies and any proposed protections for important species. Please include in these reports an assessment of any aquatic life associated with the Gulch that borders the northern edge of the project site. In addition, please include a description of scenic resources and recreational uses on or near the project site.
9. **Education** – The EISPN briefly describes each of the public schools that serve the Kīhei community. Please provide information in the DEIS about the projected increase in school enrollment associated with the project, and the status of negotiations with the Hawaii Department of Education (DOE) toward a fair-share contribution by the Petitioner.
10. **Coastal Zone Management** – The State oversees protection of natural and cultural resources within the coastal zone. Please discuss any impact the proposed project may have on coastal and marine resources, and how the project will balance the competing values of economic development and preservation of coastal resources, including protection from flood hazard and soil erosion.

Ms. Rochelle Kaula
Page 4
March 19, 2007

The Office of Planning looks forward to receiving the DEIS addressing potential impacts and mitigation measures relative to the issues raised above. Please submit copies of all comments received during the EISPN process to the Office of Planning. If you have any questions, please call Koren Ishibashi in the Land Use Division at 587-2803.

Sincerely,

A handwritten signature in black ink, appearing to read "Laura Thielen", written in a cursive style.

Laura H. Thielen
Director

c: Anthony Ching, Land Use Commission
Benjamin Matsubara, Matsubara, Lee & Kotake



MICHAEL T. MUNEKIYO
GWEN DRASHI HIRAGA
MITSURU "MICK" HIRANO
KARL OBI KAWAHARA

MARK ALEXANDER BOY

August 27, 2007

Mary Lou Kobayashi, Administrator
Office of Planning
P. O. Box 2359
Honolulu, Hawai'i 96804

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Ms. Kobayashi:

Thank you for your office's letter dated March 19, 2007 and memo dated May 8, 2007, providing comments on the EISPN for the subject project. The applicant, A&B Properties, Inc., acknowledges that your office will be coordinating the State of Hawai'i's position on areas of concern. On behalf of the applicant, we would like to provide the following information to help address your office's comments.

1. Water Supply

The applicant has initiated dialogue with the County of Maui, Department of Water Supply (DWS) to discuss potable and non-potable water source and transmission coordination efforts. The applicant intends to dedicate the water supply system to the DWS upon completion of the improvements. The Draft Environmental Impact Statement (Draft EIS) will address issues relating to water provision, including source, storage, and transmission. With regard to your comment that the water demand calculations seem a little high by Maui County standards, as noted in the project's preliminary engineering report (included in the Draft EIS), during consultation with the DWS, the DWS advised that for single-family units a water demand rate of 1,000 gallons per unit, per day, should be used to estimate demand, due to Kihei's drier climate. The Maui County water demand standard for single-family units is 600 gallons per unit per day. This accounts for the higher estimated water demand. The applicant plans to undertake water conservation measures where appropriate, including exploring the availability of non-potable water sources for landscape irrigation to reduce the demand on the potable water supply.

2. Agricultural Lands

The Draft EIS will include approximate acreages of "Prime" versus "Other" lands, as well as a discussion of current and future agricultural uses of the parcels of interest.

3. Affordable Housing

The proposed development will comply with the County of Maui workforce housing policies. The applicant has been coordinating with the County of Maui, Department of Housing and Human Concerns and the County of Maui Housing Commissioner to ensure the fulfillment of affordable housing requirements.

4. Transportation

The applicant has contracted with Austin, Tsutsumi & Associates, Inc. for preparation of a Traffic Impact Analysis Report (TIAR), which will address issues relating to traffic impacts generated and traffic mitigation measures proposed by the project. The Draft EIS will include the findings of the report and a copy of the report will be attached as an appendix. Additionally, the applicant has been in discussions with the State of Hawai'i, Department of Transportation and the County of Maui, Department of Public Works to coordinate project development and traffic mitigation measures. The Draft EIS will include a discussion of these efforts.

5. Ocean Resources

The applicant recognizes the importance of the ocean resources in the vicinity of the subject project, particularly the Hawaiian Islands Humpback Whale National Marine Sanctuary. National Pollutant Discharge System (NPDES) and/or other permits will be obtained, as applicable, during the building permit and subdivision review processes. A more detailed discussion regarding State of Hawai'i, Department of Health guidelines and engineering Best Management Practices (BMPs), which will be utilized to mitigate potential drainage and runoff impacts to downstream properties, the Waiakoa Gulch, and coastal ecosystems, will be discussed in the Draft EIS.

6. Public Health

As applicable, appropriate mitigation measures will be implemented and BMPs will be utilized where possible, to minimize infiltration and runoff from construction activities. The Draft EIS will include a discussion on the wastewater system

including estimates of flow. The applicant has initiated discussions with the County of Maui, Department of Environmental Management regarding wastewater capacity and project requirements. The Draft EIS will include a discussion of these efforts. The applicant is in consultation with the State Department of Health, Hazard Evaluation and Emergency Response (HEER) Office concerning their comment regarding appropriate soils analysis and testing to evaluate the potential presence of arsenic. The applicant will work with the HEER to develop a mutually acceptable soil testing program to address these concerns.

7. Cultural/Historic Resources

The Archaeological Inventory Survey report was submitted to the State Historic Preservation Division (SHPD). The SHPD's findings, as well as the Archaeological Inventory Survey report, will be included in the Draft EIS. Moreover, the Draft EIS will include a discussion of the Native Hawaiian traditional and customary practices in the area, including visual landmarks, as applicable. The Cultural Impact Assessment report will be included in the Draft EIS.

8. Environmental, Recreational, and Scenic Resources

The Draft EIS will include a discussion of the inventory of flora and fauna at the project site. Additionally, a copy of the flora and fauna study will be included in the Draft EIS as an appendix. There is no aquatic life associated with the Waiakoa Gulch that borders the project to the north, as the gulch is normally dry. Lastly, the Draft EIS will include a discussion of the scenic resources and recreational uses on or near the project site.

9. Education

The applicant distributed a copy of the EISPN to the State of Hawai'i, Department of Education (DOE) and has since initiated dialogue with the DOE concerning the formulation of an appropriate fair-share agreement for the proposed project. The Draft EIS will include a discussion on the projected increase in school enrollment associated with this development.

10. Coastal Zone Management

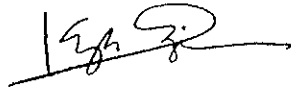
The Draft EIS will include a discussion of any potential impact to coastal and/or marine resources, economic development, and preservation of coastal resources, including protection from flood hazard and soil erosion, associated with the proposed project.

Mary Lou Kobayashi, Administrator
August 27, 2007
Page 4

We appreciate the input we received from your office. A copy of the Draft EIS will be provided for your review and comment. The Draft EIS will include copies of all comments received during the EISPN process.

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

Very truly yours,

A handwritten signature in black ink, appearing to read 'Kyle Ginoza', with a horizontal line extending to the right from the end of the signature.

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

May 1, 2007

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

Dear Mr. Ginoza:

Subject: Environmental Impact Statement Preparation Notice for Kihei Residential Project
TMK: 3-8-004: por. 2, por. 22 and por. 30, Kihei, Maui

The Department of Education (DOE) is concerned with the enrollment growth at Lokelani Intermediate School that would be generated by additional housing in the Kihei area.

The DOE estimates that the Kihei project will generate approximately 134 additional elementary school students, 71 additional middle school students, and 58 additional high school students when the project has reached maturity and enrollment stabilizes.

The two elementary schools that serve Kihei have enrollments that are currently below their facility capacities and are expected to remain that way for the next few years. We believe Kihei Elementary has sufficient capacity to accommodate the Kihei project's estimated enrollment.

Lokelani's enrollment is presently 46 students over its facility capacity and enrollment is expected to grow over the next six years.

The DOE will request that the State Land Use Commission impose a school fair-share contribution condition during the district boundary amendment process. This would enable the DOE to work with the developers of the Kihei project and other residential developments in Kihei to determine how enrollment growth can be addressed.

Thank you for the opportunity to raise these early considerations. If 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

c: Randolph Moore, Assistant Superintendent, OBS
Duane Kashiwai, Public Works Administrator, FDB
Ken Nomura, CAS, Baldwin/Kekaulike/Maui Complex Areas
Anthony Ching, SLUC



MICHAEL T. MUNEKIYO
GWEN ORASIE HIRAGA
MITSURU "MICK" HIRANO
KARLYN KAWAHARA

MADE ALEXANDER BOY

August 27, 2007

Patricia Hamamoto, Superintendent
Attention: Heidi Meeker
Facilities Development Branch
State of Hawai'i
Department of Education
P.O. Box 2360
Honolulu, Hawai'i 96804

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Ms. Hamamoto:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated May 1, 2007, providing comments on the EISPN for the subject project.

The applicant recognizes the need for additional enrollment capacity, particularly within the Lokelani Intermediate School district area, and as such, is looking forward to working with the Department of Education in formulating an appropriate fair-share agreement for the subject project.

We appreciate the input provided by your office. A copy of the Draft EIS will be provided for your review and comment.

Patricia Hamamoto, Superintendent
August 27, 2007
Page 2

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

Very truly yours,

A handwritten signature in black ink, appearing to read 'Kyle Ginoza', written over a horizontal line.

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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LINDA LINGLE
GOVERNOR OF HAWAII



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

April 23, 2007

Mr. Anthony J. H. Ching, Executive Officer
State Land Use Commission
235 South Beretania Street, 4th Floor
Honolulu, Hawai'i 96813

Dear Mr. Ching:

Subject: EISPN for Kihei Residential Project, Waiakoa, Maui, Hawaii

Our office has reviewed the EISPN for the project noted above. We have the following comments:

Page 12, Section II, A. Physical Environment, 1. Surrounding Land Uses, a. Existing Conditions, line 7:
Please replace the word "further" by "farther." **Farther** refers to **length** or **distance**. It is the correct word when referring to distance. **Further** means "to a greater degree," "additional," or "additionally." It refers to **time** or **amount**. It is the correct word when meaning "much."

Page 17, Section 3, Topography and Soils, b. Potential Impacts and Proposed Mitigation Measures:
Please add a statement that the issues of runoff and erosion will be further discussed in the EIS.

Page 20, Section 5, Flood and Tsunami Hazards, b. Potential Impacts and Proposed Mitigation Measures,
lines 3-5:

A comparison of Figure 3, Conceptual Master Plan and Figure 11, reveals that a portion of the project will be built in Zone AO, an area of 100-year shallow flooding. Please include documentation in the EIS that a subsequent increase of impervious surfaces from this project and subsequent adjacent projects will not result in flooding in the Zone AO portion of the project site.

Page 22, Section 7, Streams, Wetlands and Reservoirs, a. Existing Conditions, lines 3-4:

This comment is the same as the one above. A comparison of Figure 3, Conceptual Master Plan and Figure 11, reveals that a portion of the project will be built in Zone AO, an area of 100-year shallow flooding. Please include documentation in the EIS that a subsequent increase of impervious surfaces from this project and subsequent adjacent projects will not result in flooding in the Zone AO portion of the project site.

Page 23, Section 8, Archaeological and Historical Resources, b. Potential Impacts and Proposed Mitigation Measures: Please include a caveat in the EIS that all work will be halted and the SHPD will be contacted if any potential resources are uncovered during the construction phase.

Page 24, Section 10, Air and Noise Quality, b. Potential Impacts and Proposed Mitigation Measures, paragraph 3, lines 4-7: Please address in the EIS any potential noise impacts to the existing and proposed single-family residences fronting the proposed New Collector Road from peak hour commuter traffic emanating from the multi-family A-1 proposed residential area.

Page 29, Section II, B. Socio-Economic Environment, 3. Educational Facilities, b. Potential Impacts and Proposed Mitigation Measures: This project has the potential to add approximately 1,200 students to the elementary school enrollment. OEQC suggests that the project proponent include mitigation measures in the EIS to address this impact.

Page 33, Section 4, Drainage System, a. Existing Conditions, lines 4-6:
This comment is the same as one above. A comparison of Figure 3, Conceptual Master Plan and Figure 11, reveals that a portion of the project will be built in Zone AO, an area of 100-year shallow flooding. Please include documentation in the EIS that a subsequent increase of impervious surfaces from this project and subsequent adjacent projects will not result in flooding in the Zone AO portion of the project site.

Page 35, Section III. Relationship to Land Use Plans, Policies and Controls, A. State Land Use District, paragraph 2, lines 1-4:
Figure 4 of the EISPN depicts the project site to be totally within an Agricultural Zone. The sentence referred to (in lines 1-4) states that only a portion of the site is within the Agricultural Zone. Please address this discrepancy.

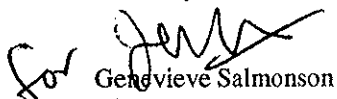
Page 44, Section F, Coastal Zone Management, 3. Scenic and Open Space Resources, Response, lines 2-4:
Please include photos of current views to the site from public areas (at the shoreline, etc.) and photo simulations to the site from these same locations after completion of the project.

Page 44-45, Section 4, Coastal Ecosystems, Response: Please include discussion in the EIS concerning potential impacts to coastal waters and ecosystems from automotive oils and road tar in storm water runoff generated by the long-term uses of the residences at the project.

Page 49, Section 10, Marine Resources, Response: Please address potential impacts to the coastal waters and marine resources through the flow of contaminated ground-water from long-term fertilizer usage of the lawns and landscaping included in the project.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185.

Sincerely,


Genevieve Salmonson
Director

c: Mr. Dan Yasui, A&B Properties, Inc.
Mr. Kyle Ginoza, Munekiyo & Hiraga, Inc.



MICHAEL T. MUNEKIYO
GWEN ORASHI HIRAGA
MITSURU "MICK" HIRANO
KARL W. KAWAHARA

MARK A. KATZBERG, BSA

August 27, 2007

Laurence K. Lau, Interim Director
Office Of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Lau:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your office's letter dated April 23, 2007, on the EISPN for the subject project.

On behalf of the applicant, A&B Properties, Inc., we offer the following responses to your office's comments, which are arranged below in the same order as they appear in your office's letter:

Page 12, Section II:

The suggested revision will be reflected in the Draft Environmental Impact Statement (EIS).

Page 17, Section 3:

The issues of runoff and erosion will be addressed in the Draft EIS.

Page 20, Section 5:

Please note that the Flood Insurance Rate Map (FIRM) for this area of Maui was amended by a Letter of Map Revision (LOMR Case No. 03-09-0438P) that was approved by FEMA and effective as of July 1, 2004. The revised FIRM for this area of Maui designates the project site as being located within Zones B and C, areas of minimal flooding. The revised FIRM will be included in the Draft EIS. The Draft EIS will contain an analysis of the impact of the increase in impervious surface as a result of the project.

Page 22, Section 7:

See comment regarding Page 20, Section 5.

Page 23, Section 8:

The suggested revision will be reflected in the Draft EIS.

Page 24, Section 10:

A discussion on the potential noise impacts caused by the project will be included in the Draft EIS.

Page 29, Section II:

The applicant has been in contact with the State Department of Education (DOE) regarding the impact the project will have on DOE public school enrollment. The DOE has provided a comment letter which will be included and addressed in the Draft EIS.

Page 33, Section 4:

See comment regarding Page 20, Section 5.

Page 35, Section III:

The project site is located wholly within the Agricultural District. The Draft EIS will consistently reflect this designation.

Page 44, Section F:

The Draft EIS will address the project's impact upon scenic and open space resources and include photos of the site. Please note that the subject property is not visible from the Kihei shoreline.

Page 44-45, Section 4:

The Draft EIS will address the project's impact to coastal ecosystems. Appropriate Best Management Practices (BMPs) and erosion-control measures will be implemented to ensure that coastal ecosystems are not adversely impacted by construction activities. The use of drainage basins is expected to mitigate offsite drainage runoff and impacts to coastal waters.

Laurence K. Lau, Interim Director
August 27, 2007
Page 3

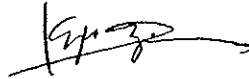
Page 49, Section 10:

A discussion of fertilizer usage of lawns and landscaping will be included in the Draft EIS.

We appreciate the input we received from your office. A copy of the Draft EIS 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:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

F:\DATA\A&B\Kihei\Res\EISP\NIOEQC.EISP\Nres.wpd



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

HRD07/2946B

May 8, 2007

Kyle Ginoza
Munekiyo and Hiraga
305 High Street, Suite 104
Wailuku, HI 96793

RE: Environmental Impact Statement Preparation Notice for the Proposed Kihei Residential Project, Kihei, Maui, TMK: (2) 3-8-004: 002 (por.), 022 (por.) and 030 (por.).

Dear Mr. Ginoza,

The Office of Hawaiian Affairs (OHA) is in receipt of your April 9, 2007 submission and offers the following comments:

While the limited amount of pertinent information in the Environmental Impact Statement Preparation Notice makes it difficult for our staff to make substantive recommendations at this time, it is clear to our staff that the applicant will have a difficult time presenting the proposed project as one that will have a net benefit for the Island of Maui.

As you well know, Kīhei's natural and cultural landscapes have been completely and irrevocably transformed by the various developments which have been allowed there. Kīhei is now barely recognizable as a Hawaiian place; it has been wholeheartedly dedicated to tourism and upscale housing for part-time and transplant residents. As the applicant knows, OHA has made similar comments in the past regarding the Kīhei-Mākena coastal corridor.

Although our staff looks forward to reviewing the Environmental Impact Statement upon completion, we have serious doubts about the professed benefits that such a project will have on current Maui residents, namely Native Hawaiians.

OHA asks that, in accordance with Section 6E-46.6, Hawaii Revised Statutes 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.

Kyle Ginoza
May 8, 2007
Page 2

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck, Native Rights Policy Advocate, at (808) 594-0239 or jessey@oha.org.

Aloha,



Clyde W. Nāmu'o
Administrator

C: Thelma Shimaoka
OHA Community Affairs Coordinator (Maui)
140 Hoozana St., Ste. 206
Kahului, HI 96732



MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICK" HIRANO
KARENS KAWAGABA

MARK ALEXANDER BOY

August 27, 2007

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

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Namu`o:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated May 8, 2007, providing comments on the EISPN for the subject project.

We confirm that should any significant cultural deposits or human skeletal remains be encountered during development, work in the immediate vicinity will stop and the State Historic Preservation Division (SHPD/DLNR) will be contacted.

We appreciate the input we received from your office. A copy of the Draft EIS 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:yp

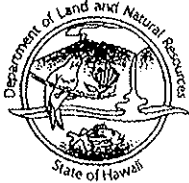
cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land Use Commission

F:\DATA\A&B\KiheiRes\EISPN\OHA.EISPNres.wpd

LINDA LINGEE
GOVERNOR OF HAWAII



*Dandy Aletas comming
VCO-Bea*



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

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

April 9, 2007

Mr. Anthony Ching, Executive Officer
Land Use Commission
Box 2359
Honolulu, Hawaii 96804

Dear Mr. Ching:

Subject: Proposed Kihei Residential Project, Kihei, Maui, Tax Map Key: (2) 3-8-4:portion 2, 22, 30

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Engineering Division, Division of Water Resource Management, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Russell Y. Tsuji
Administrator

RECEIVED
APR 10 2007
LAND DIVISION
HONOLULU, HAWAII

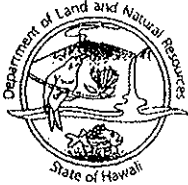
LINDA LINGEE
GOVERNOR OF HAWAII



PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

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



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 9, 2007

MEMORANDUM

TO: DLNR Agencies:
 Div. of Aquatic Resources
 Div. of Boating & Ocean Recreation
 Engineering Division
 Div. of Forestry & Wildlife
 Div. of State Parks
 Div. of Water Resource Management
 Office of Conservation & Coastal Lands
 Land Division – Maui District

RECEIVED
LAND DIVISION
2007 APR 12 A 9 54
DEPT OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

FROM: Russell Y. Tsuji
SUBJECT: Environmental Impact Statement Preparation Notice
LOCATION: Kihei, Maui, TMK: (2) 3-8-4:portion 2, 22, 30
APPLICANT: Munekiyo & Hiraga, Inc. on behalf of A & B Properties, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by April 24, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *C. T. Young*
Date: 4/11/07

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/RYT
Ref.: EISPNKiheiResidentialProject
Maui.355

COMMENTS

- (X) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zones C and AO. The National Flood Insurance Program does not have any regulations for developments within Zone C, however, it does regulate developments within Zones AO as indicated in bold letters below.
- () Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is also located in Zone ____.
- () Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ____.
- (X) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- () Mr. Robert Sumimoto at (808) 523-4254 or Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
- () Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
- (X) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
- () Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

- () The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
- () The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

() Additional Comments: _____

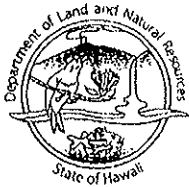
() Other: _____

Should you have any questions, please call Ms. Alyson Yim of the Planning Branch at 587-0259.

Signed: 
ERIC T. HIRANO, CHIEF ENGINEER

Date: 4/11/07

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

MEMBER REPRESENTATIVE
HAWAIIAN ASSOCIATION OF CREATORS
BUREAU OF CONSERVATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND ESTABLISH LANDS
CONSERVATION AND RESOURCES ESTABLISHMENT
INSTITUTIONS
FORESTRY AND WILDLIFE
HAWAIIAN PRESERVATION
KAHOOLAWE BUSINESS SERVICE COMMISSION
LAND
STATE PARKS

April 9, 2007

MEMORANDUM

TO: DLNR Agencies:
 Div. of Aquatic Resources
 Div. of Boating & Ocean Recreation
 Engineering Division
 Div. of Forestry & Wildlife
 Div. of State Parks
 Div. of Water Resource Management
 Office of Conservation & Coastal Lands
 Land Division -- Maui District

FROM: Russell Y. Tsuji
SUBJECT: Environmental Impact Statement Preparation Notice
LOCATION: Kihei, Maui, TMK: (2) 3-8-4:portion 2, 22, 30
APPLICANT: Munekiyo & Hiraga, Inc. on behalf of A & B Properties, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by April 24, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- () We have no objections.
- () We have no comments.
- () Comments are attached.

Signed: _____
Date: _____

RECEIVED
07 APR 10 8:10:43
COMMISSION ON WATER
RESOURCE MANAGEMENT

LINDA LINGLE
GOVERNOR OF HAWAII



PETER T. YOUNG
CHAIRPERSON
MEREDITH J. CHING
JAMES A. FRAZIER
NEAL S. FUJIWARA
CHIYOME I. FUKINO, M.D.
LAWRENCE H. MIKE, M.D., J.D.
STEPHANIE A. WHALEN

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

April 18, 2007

RECEIVED
LAND DIVISION
2007 APR 18 10 3 20
DEPT OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

TO: Russell Y. Tsuji, Administrator
Land Division

FROM: W. Roy Hardy, Hydrologic Program Manager
Commission on Water Resource Management *RH*

SUBJECT: Waiakoa (Kihei) 600 SF/MF du SLUDBA and EIS Prep Notice

FILE NO.: P-11682

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at <http://www.hawaii.gov/dlnr/cwrm>.

Our comments related to water resources are checked off below.

- 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
- 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
- 3. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM: Additional information and forms are available at www.hawaii.gov/dlnr/cwrm/forms.htm.

- 4. The proposed water supply source for the project is located in a designated ground-water management area, and a Water Use Permit is required prior to use of ground water.
- 5. A Well Construction Permit(s) is (are) required before the commencement of any well construction work.
- 6. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

- 7. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.
- 8. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
- 9. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a stream channel.
- 10. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.
- 11. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.
- 12. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.
- 13. We recommend that the report identify feasible alternative non-potable water resources, including reclaimed wastewater.
- OTHER:

The documents project demand of 530,000 gpd, which seems a little high by Maui County standards, although the location is a dry region. The water source for this project is a Ground Water Management Area. Uses existing as of July 2003 are mostly approved. Uses arising since that date are subject to County applications for water use permits. No water related applications for this project have been filed.

If there are any questions, please contact Charley Ice at 587-0251.



MICHAEL T. MUNEKIYO
GWEN ORASHI HIRAGA
MITSURU "MICK" HIRANO
KAREN KAWAHARA

MAIL ADDRESS BOX

August 27, 2007

Laura Thielen, Acting Chairperson
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawai'i 96809

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Ms. Thielen:

Thank you for your department's letter dated April 9, 2007, providing comments on the EISPN for the subject project.

On behalf of the applicant, A&B Properties, Inc., we offer the following responses to your department's comments.

Please note that the Flood Insurance Rate Map (FIRM) for this area of Maui was amended by a Letter of Map Revision (LOMR Case No. 03-09-0438P) that was approved by FEMA, and effective as of July 1, 2004. The revised FIRM for this area of Maui designates the project site as being located within Zones B and C, areas of minimal flooding. The revised FIRM will be included in the Draft EIS.

With regard to your comment that the water demand calculations seem a little high by Maui County standards, as noted in the project's preliminary engineering report (included in the Draft EIS), during consultation with the County Department of Water Supply (DWS), the DWS advised that for single-family units a water demand rate of 1,000 gallons per unit per day, should be used to estimate demand due to Kihei's drier climate. The Maui County water demand standard for single-family units is 600 gallons per unit per day. This accounts for the higher estimated water demand. The applicant is exploring several potential source opportunities, including surface water treatment and new well sources in Central Maui. Any future source development will be coordinated with the applicable regulatory agencies. As recommended, the applicant will coordinate with the DWS to incorporate this project into the County's Water Use and Development Plan. Further, the applicant will engage DWS staff in discussions about utilization of water source in the Ground Water Management Area.

Laura Thielen, Acting Chairperson
August 27, 2007
Page 2

We appreciate the input we received from your department. A copy of the Draft EIS 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,

A handwritten signature in black ink, appearing to read 'Kyle Ginoza', with a horizontal line extending to the right.

Kyle Ginoza
Project Manager

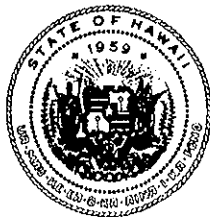
KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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MAR 3 1 2008

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESEERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

LAURA H. THELEN
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

March 20, 2008

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

LOG NO: 2007.1415
DOC NO: 0803JP16
Archaeology

Dear Mr. Ginoza:

**SUBJECT: Chapter 6E-42 Historic Preservation Review [State/County/Planning] -
Environmental Impact Statement Preparation Notice for the
Proposed Kihei Residential Project
Pulehunui Ahupua'a, Wailuku District, Island of Maui
TMK (2) 3-8-004: Portions of 002, 022 and 030**

The subject action consists of an environmental impact statement preparation notice for the proposed Kihei Residential Project. We have provided comments for the amendment to the State Land Use District Boundaries with respect to the project (LOG NO: 2007.0929/ DOC NO: 0712JP14). This letter reiterates our former comments.

The overall project involves a change from agricultural to urban districts and the proposed use involves 600 residential dwelling units. The total area of the subject parcel is 94.352 acres of previously cultivated sugar cane lands. We have accepted an archaeological inventory survey for the subject area entitled *An Archaeological Inventory Survey Report for an Approximately 100 Acre Parcel, Pulehu Nui Ahupua'a, Wailuku District, Maui Island, TMK: [2] 3-9-004: 002 por., 022 por., and 030 (Lee-Greig et al. 2006.)*. The survey was completed by Cultural Surveys Hawai'i, Inc., ms.

Archaeological Inventory Survey documented two Statewide Inventory of Historic Places (SIHP) numbers within the subject area. SIHP 50-50-09-5744 consists of a bridge and flume related to agricultural and transportation activities during the early sugar plantation era. The bridge contains several component features including a north and south abutment, three concrete bridge support piers, and a bridge bed. The bridge and flume are both constructed entirely of concrete with stacked basalt cobbles. This historic property has been evaluated as a component of the Kihei Sugar Railroad and worked to connect the Kihei plantation camps and sugar cane fields with nearby Pu'unene Mill as well as areas within Central Maui. SIHP 50-50-09-5745 consists of a well and construction is estimated during the same time period as SIHP 50-50-09-5744. The well is hand excavated and rimmed with large basalt cobbles. Both historic properties were deemed significant under Criterion "D" for their information content. Based on the prior review, both sites have yielded an adequate amount of information (LOG NO: 2006.1514/ DOC NO: 0605MK29).

Mr. Kyle Ginoza

Page 2

We concur that ~~no~~ ^{document} historic properties will be affected by this ~~undertaking~~ ^{project} because:

- Intensive cultivation has altered the land
- Residential development/urbanization has altered the land
- Previous grubbing/grading has altered the land
- An accepted archaeological inventory survey (AIS) found no historic properties
- SHPD previously reviewed this project and mitigation has been completed
- Other: *We have previously accepted an archaeological inventory survey report for the subject area and indicated that archaeological mitigation has been completed (LOG NO: 2006.1514/ DOC NO: 0605MK29). Based on the previously accepted archaeological inventory survey review, it is unlikely that any historic properties will be affected by the proposed undertaking.*

In the event that historic resources, including historic era ceramics, glass, historic fire vestiges, midden deposits (shells, basalt, artifacts etc.), animal and/or human skeletal remains, are identified during construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, Maui Section, needs to be contacted immediately at (808) 243-1285 or (808) 243-4641. Please feel free to contact us immediately if there are any questions or concerns.

Aloha,



Nancy McMahon, Lead Archaeologist and Acting Archaeology Branch Chief
State Historic Preservation Division

JP:

C: Anthony Ching, Land Use Commission, P.O. Box 2359, Honolulu, HI 96804
County of Maui, DSA, (808) 270-7972
Director, Dept of Planning, 250 S. High Street, Wailuku, HI 96793
Maui Cultural Resources Commission, Dept. of Planning, 250 S. High Street, Wailuku HI 96793



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

MARK ALEXANDER ROY
KYLE GINOZA
April 23, 2008

Nancy McMahon
Acting Archaeology Branch Chief
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, Hawai'i 96707

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Ms. McMahon:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated March 20, 2008, regarding the EISPN for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

We offer the following comments in response to your remarks:

1. We acknowledge that the State Historic Preservation Division (SHPD) has accepted the archaeological inventory survey report for the subject area and the SHPD has indicated that archaeological mitigation has been completed.
2. We further acknowledge that the SHPD has determined that no historic properties will be affected by the project.

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.
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APR 18 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

April 17, 2007

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

Dear Mr. Ginoza:

Subject: **Proposed Kihei Residential Project**
TMK: (2) 3-8-004: 002 (por.) and 030 (por.)

Thank you for the opportunity to comment on the proposed Kihei Residential Project. The following comments are offered:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage is required for this project. The Clean Water Branch should be contacted at 808 586-4309.
2. The project is in close proximity of the County Sewer System. Wastewater disposal shall be through the County System.
3. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work.
4. HAR, Chapter 11-46 sets maximum allowable sound levels from stationary equipment such as compressors and HVAC equipment. The attenuation of noise from these sources may depend on the location and placement of these types of equipment. This should be taken into consideration during the planning, design, and construction of the building and installation of these types of equipment.
5. The proposed subdivision will have an impact on the operations of the Clean Air Branch's air monitoring station.

Mr. Kyle Ginoza
April 17, 2007
Page 2

6. The Ameron Concrete Batching Plant is situated adjacent to the subdivision site. The industrial activities of the batching plant will have an impact on the proposed residential project.

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

c: EPO
Anthony Ching



MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICK" HIRANO
KAROLYN KAWAGARA

MARK ALEXANDER BOY

August 27, 2007

Herbert S. Matsubayashi, Chief
Maui District Health Office
54 High Street
Wailuku, Hawai'i 96793

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Matsubayashi:

Thank you for your letter dated April 17, 2007, providing comments on the EISPN for the subject project. On behalf of the applicant, A&B Properties, Inc., we would like to offer the following responses to your comments:

1. 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.
2. The project will connect to the County sewer system. The applicant has been in discussions with the County of Maui, Department of Public Works and Environmental Management in this regard. Pertinent information regarding provisions for wastewater disposal will be included in the Draft Environmental Impact Statement (EIS).
3. Pursuant to Hawai'i Administrative Rules (HAR), Chapter 11-46, "Community Noise Control", a noise permit will be secured prior to commencement of construction, as applicable.
4. The planning, design, and construction of the project will be undertaken in accordance with the maximum allowable sound levels as set forth by HAR, Chapter 11-46.
5. The applicant's civil engineer will contact the Clean Air Branch to address any impacts on the operations of its air monitoring station.

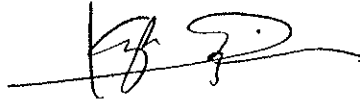
Herbert S. Matsubayashi, Chief
August 27, 2007
Page 2

6. According to Ameron Hawai'i, its concrete batching plant, located near the project site, is no longer in operation. However, Ameron Hawai'i has been in discussions to re-establish a concrete batching plant in the general vicinity. Pertinent information regarding the concrete batching plant will be included in the Draft EIS.

We appreciate the input from your office. A copy of the Draft EIS 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:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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LINDA LINGLE
GOVERNOR OF HAWAII



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

Sandy - file as comments
NO BATT
JULY 2006 L. FUKINO, M.D.
DIRECTOR OF HEALTH
2007 APR 11 A 8 51

In reply, please refer to:
EPO-07-061

April 5, 2007

Ms. Laura H. Thielen, Director
Office of Planning
Department of Business,
Economic Development & Tourism
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Dear Ms. Thielen:

SUBJECT: Environmental Impact Statement (EIS) Preparation Notice for Proposed Kihei Residential Project, Kihei, Maui, Hawaii
TMK: (2) 3-8-004: 001, 022 and 030

Thank you for allowing us to review and comment on the subject documents. The documents were routed to the various branches of the Department of Health (DOH) Environmental Health Administration. We have the following Wastewater Branch, Clean Water Branch, Hazard Evaluation & Emergency Response Office and General comments.

Wastewater Branch

We have no objections to the development as long as wastewater from the project will be disposed of through the County's sewer system. We encourage the developer to work with the County to utilize recycled water for irrigation and other non-potable water purposes such as major common areas, parks, golf courses and other open spaces or landscaping areas.

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.

Ms. Thielen
April 5, 2007
Page 2

Clean Water Branch (CWB)

The CWB has reviewed the limited information contained in the subject document and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 for this project. Pursuant to Federal Water Pollution Control Act (commonly known as the "Clean Water Act" (CWA) Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40, Code of Federal Regulations (CFR), Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.
2. In accordance with HAR, Sections 11-55-04 and 11-55-34.05, the Director of Health may require the submittal of a Notice of Intent (NOI) for general permit coverage authorized under the National Pollutant Discharge Elimination System (NPDES). An NOI to be covered by an NPDES general permit is to be submitted at least 30 days before the commencement of the respective activity. A separate NOI is needed for coverage under each NPDES general permit. 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/forms/genl-index.html>
 - a. Storm water associated with industrial activities, as defined in Title 40, CFR, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).
[HAR, Chapter 11-55, Appendix B]
 - b. 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 commencement of the construction activities.** [HAR, Chapter 11-55, Appendix C]
 - c. Discharges of treated effluent from leaking underground tank remedial activities.
[HAR, Chapter 11-55, Appendix D]
 - d. Discharges of once through cooling water less than one (1) million gallons per day.
[HAR, Chapter 11-55, Appendix E]
 - e. Discharges of hydrotesting water. [HAR, Chapter 11-55, Appendix F]

Ms. Thielen
April 5, 2007
Page 3

- f. Discharges of construction dewatering effluent. [HAR, Chapter 11-55, Appendix G]
 - g. Discharges of treated effluent from recycled water distribution systems.
[HAR, Chapter 11-55, Appendix J]
 - h. Discharges of storm water from a small municipal separate storm sewer system.
[HAR, Chapter 11-55, Appendix K]
3. In accordance with HAR, Section 11-55-38, the applicant for an NPDES permit is required to either submit a copy of the new 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 DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. If applicable, please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.
 4. Any discharges related to project construction or operation activities, with or without a Section 401 WQC or NPDES permit coverage, shall comply with the applicable State Water Quality Standards as specified in HAR, Chapter 11-54.

The Hawaii Revised Statutes, Subsection 342D-50(a), requires that "[n]o person, including any public body, shall discharge any water pollutants into state waters, or cause or allow any water pollutant to enter state waters except in compliance with this chapter, rules adopted pursuant to this Chapter, or a permit or variance issued by the director."

If you have any questions, please contact the Engineering Section, CWB, at 586-4309.

Hazard Evaluation & Emergency Response Office (HEER)

As a common practice, lands formerly used for sugarcane production are now being developed into communities where residential home, schools and commercial businesses are being constructed. Chemicals associated with the sugarcane industry persist in soils today and may be a threat to public health and the environment. Elevated arsenic levels were discovered in soil at formerly sugarcane production areas on the islands. The HEER Office has identified former sugarcane production areas for assessment throughout the state and plans to work with property owners to conduct environmental assessment to identify and address elevated soil arsenic levels prior to finalizing development plans for the properties.

The parcels were used for sugarcane production and should be assessed for arsenic. The DOH recommends multi-incremental sampling conducted by a qualified environmental professional, in consultation with the HEER office for each residential lot. If total arsenic is detected above the background screening level of 20 mg/kg found in Hawaiian soils, then additional assessment is needed to determine potential risks and need for remedial action. Removal or remedial plans

Ms. Thielen
April 5, 2007
Page 4

must comply with Chapter 128D, Environmental Response Law, HRS, and Title 11, Chapter 451, HAR, State Contingency Plan.

If you have any questions, please contact HEER Office at 586-4250.

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 Jiakai Liu with the Environmental Planning Office at 586-4346.

Sincerely,



KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
WWB
CWB
HEER
Anthony Ching, State Land Use Commission



MICHAEL T. MUNEKIYO
GWEN ONASIO HIRAGA
MITSURU "MICK" HIRANO
KAROLYN KAWANABA

MAHE ALEXANDER ROY

August 27, 2007

Chiyome L. Fukino, M.D, Director
State of Hawaii
Department of Health
P. O. Box 3378
Honolulu, Hawai'i 96801-3378

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Dr. Fukino:

Thank you for your letter dated April 5, 2007, providing comments on the EISPN for the subject project. On behalf of the applicant, A&B Properties, Inc., we would like to offer the following responses to your comments:

1. The project will connect to the County sewer system. The applicant has been in discussions with the County of Maui, Department of Public Works and Environmental Management in this regard. All wastewater plans will meet Hawai'i Administrative Rules (HAR), Chapter 11-62, Department of Health, "Wastewater Systems". Pertinent information regarding provisions for wastewater disposal will be included in the Draft Environmental Impact Statement (EIS). The applicant will further investigate non-potable water usage, if available, during the civil design phase of the project.
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. The NPDES permit application or NOI will also be submitted for review by the State Historic Preservation Division of the Department of Land and Natural Resources.
3. 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. Discharges will be kept to a minimum through the application of engineering Best Management Practices (BMP's).

Chiyome L. Fukino, M.D, Director
August 27, 2007
Page 2

4. The applicant is in consultation with the State Department of Health, Hazard Evaluation and Emergency Response (HEER) Office concerning their comment regarding appropriate soils analysis and testing to evaluate the potential presence of arsenic. The applicant will work with the HEER to develop a mutually acceptable soil testing program to address these concerns.

We appreciate the input from your office. A copy of the Draft Environmental Impact Statement (EIS) 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:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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APR 16 2007



DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

CHARMAINE TAVARES
Mayor

VANESSA A. MEDEIROS
Director

LORI TSUHAKO
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165 • EMAIL director.hhc@mauicounty.gov

April 10, 2007

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

Dear Mr. Ginoza:

**SUBJECT: PROPOSED KIHEI RESIDENTIAL PROJECT AT
TMK (2)3-8-004:002 (por.) 022 (por.) and 030 (por.)**

We have reviewed the Environmental Impact Statement Preparation Notice (EISPN) for the subject project and note the following:

1. The project will be developed on approximately 94.3 acres and will include a mix of single-family detached and multi-family residential units, as well as a small neighborhood commercial area.
2. The project will meet the requirements of the County's Residential Workforce Housing Policy.
3. The applicant has stated that it will coordinate with the Department of Housing and Human Concerns to develop an appropriate affordable housing program.
4. Preliminary price ranges and income target groups for the affordable housing program are being developed and will be addressed in the draft Environmental Impact Statement.

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Mr. Kyle Ginoza
Page 2
April 10, 2007

Therefore, we do not have any other comments to offer at this time.

Thank you for the opportunity to comment.

Sincerely,



VANESSA A. MEDEIROS
Director of Housing and Human Concerns

xc: Edwin Okubo, Housing Administrator
Mr. Anthony Ching, LUC



MICHAEL T. MURKINO
GWEN CHASIE HIRAGA
MITSURU "MICK" HIRANO
KARLINA KAWAHARA

MARK ALEXANDER ROY

August 27, 2007

Vanessa A. Medeiros, Director
County of Maui
**Department of Housing
and Human Concerns**
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Ms. Medeiros:

Thank you for your letter dated April 10, 2007, providing comments on the EISPN for the subject project.

On behalf of the applicant, A&B Properties, Inc., we would like to note that the project will comply with all applicable County of Maui affordable housing policies, and will continue its coordination with your department concerning an appropriate affordable housing program.

We appreciate the input from your office. A copy of the Draft Environmental Impact Statement (EIS) 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

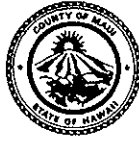
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cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land Use Commission

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Council Chair
G. Riki Hokama

Director of Council Services
Ken Fukuoka



Vice-Chair
Danny A. Mateo

Council Members
Michelle Anderson
Gladys C. Balsa
Jo Anne Johnson
Bill Kauakea Medeiros
Michael J. Molina
Joseph Pontanilla
Michael P. Victorino

COUNTY COUNCIL
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793
www.mauicounty.gov/council

April 18, 2007

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

Dear Mr. Ginoza:

SUBJECT: Proposed Kihei Residential Project at
Tax Map Key (2)3-8-004:002 (por.), 022 (por.) and 030 (por.)

Thank you for the opportunity to review the Environmental Impact Statement Preparation Notice for the Proposed Kihei Residential Project at Tax Map Key (2)3-8-004:002 (por.), 022 (por.) and 030 (por.).

After review of the document, I have no comments at the present time.

Sincerely,


JOSEPH PONTANILLA,
COUNCIL MEMBER

Cc: Anthony Ching, Land Use Commission



MICHAEL T. MUNEKIYO
GWEN ORASHI HIRAGA
MITSURU "MICK" HIRANO
KARLANN KAWAHARA

MARK ALEXANDER ROY

August 27, 2007

Councilmember Joseph Pontanilla
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the
Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.)

Dear Councilmember Pontanilla:

We are writing to you today, on behalf of our client, A&B Properties, Inc., to thank you for your letter dated April 18, 2007, on the EISPN for the subject project.

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

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

Very truly yours,

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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CHARMAINE TAVARES
Mayor



Elmody-Aire
VCC-Bert

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

April 24, 2007

Mr. Anthony Ching, Executive Officer
State of Hawaii
Land Use Commission
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Ching:

**SUBJECT: Proposed Kihei Residential Project at TMK: 3-8-004:002
(por.), 022 (por.) and 030 (por.)**

We have met with the applicant to discuss the park assessment requirements for the proposed project. The project would potentially generate approximately 600 residential units. Based on this, the park assessment requirement would be approximately 7 acres. We are continuing discussions with the applicant in locating and planning for dedication, land for a large active park for the proposed development.

Thank you for the opportunity to review and comment on this matter. Please feel free to contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development at 270-7931 should you have any other questions.

Sincerely,

A handwritten signature in cursive script that reads "Tamara Horcajo".

TAMARA HORCAJO
Director, Parks & Recreation

cc: Patrick Matsui, Chief of Parks Planning and Development

TH:PM:do



MICHAEL T. MUNEKIYO
GWEN ORASHI HIRAGA
MITSURU "MICK" HIRANO
KARLINA KAWAHARA

MARIE ALEXANDER BOY

August 27, 2007

Tamara Horcajo, Director
Department of Parks and Recreation
700 Hali'a Nako'a Street, Unit 2
Wailuku, Hawai'i 96793

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Ms. Horcajo:

Thank you for your letter dated April 24, 2007, providing comments on the EISPN for the subject project. As mentioned in your letter, the applicant, A&B Properties, Inc., will continue to work with your department to satisfy the park assessment requirement.

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

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

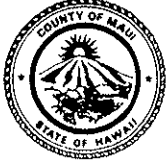
Very truly yours,

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land Use Commission

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CHARMAINE TAVARES
MAYOR

OUR REFERENCE
tj
YOUR REFERENCE

POLICE DEPARTMENT

COUNTY OF MAUI

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

May 3, 2007

MAY 08 2007



THOMAS M. PHILLIPS
CHIEF OF POLICE

GARY A. YABUTA
DEPUTY CHIEF OF POLICE

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

Dear Mr. Ginoza:

SUBJECT: Proposed Kihei Residential Project at
TMK (2) 3-8-004:1002 (por.), 022 (por.) and 030 (por.)

Thank you for your letter of April 4, 2007, requesting comments on the above subject.

We have reviewed the information submitted for this project and have enclosed a copy of our comments. We are also returning the Environmental Impact Statement (EIS) Preparation Notice which was submitted for our review. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Wayne T. Ribao
for: Thomas M. Phillips
Chief of Police

c: Jeff Hunt, Planning Department (w/o EIS Notice)
Anthony Ching, State Land Use Commission (w/o EIS Notice)

Enclosures

COPY

TO : THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI
VIA : CHANNELS
FROM : ALAN BROWN, POLICE OFFICER III, DISTRICT VI KIHEI
SUBJECT : PROPOSED KIHEI RESIDENTIAL PROJECT AT TAX MAP KEY (2)3-8-004 (POO.), 022 (POR) AND 030 (POR)

CONCUR WITH OFC. BROWN

AC Wayne [signature] 05/03/07

This To-From is in response to a request for pre-assessment consultation request for a proposed residential project in Kihei. This project is being proposed by A&B Properties and will consist of approximately 600 residential units on 94.3 acres.

IMPACT ON POLICE:

The size of this project with 600 units will have a definite impact on police services for the Kihei Community. According to 2000 Census Bureau data there is 6170 residential units in Kihei with a population of 16,749. This project would cause an increase in units by about 10% and using Census data that the average family size is 3.3 this would be a 13% increase to the Kihei population. Further when combined this project with other developments in the Kihei District a definite impact will be placed upon police services.

TRAFFIC IMPACT:

At this time no traffic study has been done or submitted yet. It can only be obvious that this project will contribute heavily to traffic on Piilani Hwy. Some sort of traffic mitigation plans will need to be addressed.

COMMENT:

Any further comment will be held pending further information about the project.

Noted
il/lt [signature] 05/07
5-1-07

Forward for review.
A/Capt Wayne [signature] 05/01/07

Respectfully Submitted

[Signature]

Officer Alan Brown E1505
050107 @ 1330 hrs



MICHAEL T. MUNEKIYO
GWEN ONASHI HIRAGA
MITSURU "MICK" HIRANO
KARL M. KAWAHARA

MARK ALEXANDER ROY

August 27, 2007

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

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Chief Phillips:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated May 3, 2007, providing comments on the EISPN for the subject project.

We note your concern on the definite impact that will be placed upon police services by this project. We hope that a portion of the tax revenues generated by the project will be used toward the expansion of the area police force.

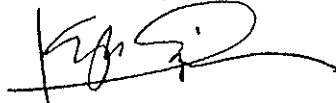
A traffic impact analysis report (TIAR) will be included in the Draft EIS. Further, traffic mitigation plans will be a part of the TIAR.

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

Chief Thomas M. Phillips
August 27, 2007
Page 2

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

Very truly yours,

A handwritten signature in black ink, appearing to read 'K. Ginoza', with a long horizontal flourish extending to the right.

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

F:\DATA\A&B\Kihei\Res\EISP\NMPD.EISP\res.wpd

MAY 1 2007

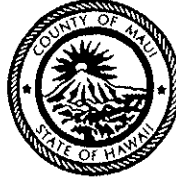
RALPH NAGAMINE, L.S., P.E.
Development Services Administration

DAVID TAYLOR, P.E.
Wastewater Reclamation Division

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

TRACY TAKAMINE, P.E.
Solid Waste Division



COUNTY OF MAUI
**DEPARTMENT OF PUBLIC WORKS
AND ENVIRONMENTAL MANAGEMENT**
200 SOUTH HIGH STREET, ROOM 322
WAILUKU, MAUI, HAWAII 96793

CHARMAINE TAVARES
Mayor

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

MICHAEL M. MIYAMOTO
Deputy Director

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

May 11, 2007

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

Dear Mr. Ginoza:

**SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION
NOTICE FOR THE PROPOSED KIHEI RESIDENTIAL
PROJECT; TMK: (2) 3-8-004:002, 022, 030**

We reviewed the subject application and have the following comments:

1. Although wastewater system capacity is currently available as of April 4, 2007, the developer should be informed that wastewater system capacity cannot be ensured until the issuance of the building permit.
2. Provide discussion and calculations (sewer impact study) to substantiate that the existing wastewater system is adequate to serve this project. May require upgrades of Kihei Pump Station No. 2, force main, and other sewer facilities. Also, flow conditions of all gravity lines upstream of Pump Station No. 6 to Piilani Highway will need to be checked and verified.
3. Wastewater contribution calculations are required before building permit is issued.
4. Developer shall pay assessment fees for treatment plant expansion costs in accordance with ordinance setting forth such fees (Kihei Assessment Area No. 3).

5. Developer is required to fund any necessary off-site improvements to collection system and wastewater pump stations.
6. Plans should show the installation of a single service lateral and an advance riser for each lot.
7. Non-contact cooling water, condensate, etc. should not drain to the wastewater system.
8. Indicate on the plans the ownership of each easement (in favor of which party). Note: County will not accept sewer easements that traverse private property.
9. Commercial kitchen facilities within the proposed project shall comply with pre-treatment requirements (including grease interceptors, sample boxes, screens etc.).
10. The architect and owner are advised that the project is subject to possible flood inundation. As such, said project must conform to Ordinance No. 1145, pertaining to flood hazard districts.
11. Road-widening lot/lots may be required to provide for future right-of-way and improved to County standards, and may include, but not be limited to pavement widening, construction of curb, gutter and sidewalk, street lights and relocation of utilities underground. Said lot shall be dedicated to the County upon completion of the improvements.
12. An existing subdivision road, Kaiolohia Street, may be severely impacted by the increased traffic being generated by the project. The traffic impact assessment report should analyze the functionality of the street once the development is fully occupied as its current classification may be insufficient for the future build-out.
13. A future collector road that parallels Piilani Highway is being considered as part of a regional traffic master plan. The proposed alignment may impact the development and should be addressed in the traffic impact assessment report.
14. All structures such as walls, trees, etc., shall be removed or relocated from the road-widening strip. The rear boundaries of the

road-widening strip shall be clearly marked to determine if said structures have been properly removed and relocated.


15. A 30 foot radius shall be provided at the intersection of the proposed driveway and the adjoining County and State roads.
16. 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.
17. 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.
18. All existing features such as structures, driveways, drainage ways, edge of pavement, etc. shall be shown on the project plat plan.
19. A site plan and a sight distance report to determine required sight distance and available sight distance at existing and proposed street intersections shall be provided for our review and approval.
20. A detailed final Traffic Impact Assessment Report for the entire development shall be submitted for our review and approval. The report shall also address regional traffic impacts and include assessments from the local community police officer.
21. For all infrastructure that may be dedicated to the County, preliminary construction plan submittal shall include a completed technical assistance review performed by the Disability and Communication Access Board (DCAB) for compliance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for all facilities. All technical and structural infeasible assessments shall be the responsibility of the developer and an agreement

Mr. Kyle Ginoza
May 11, 2007
Page 4

waiving the County of Maui of any future liability, including redesign and reconstruction for said facility, shall be recorded with the State Bureau of Conveyances.

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 and
Environmental Management

MMA:MMM:jso

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MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MIKI" HIRANO
KAROLYN KAWAHARA
MARK ALEXANDER BOY

August 27, 2007

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

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Arakawa:

Thank you for your letter dated May 11, 2007, providing comments on the EISPN for the subject project.

On behalf of the applicant, A&B Properties, Inc., we offer the following responses to your comments Nos. 10 through 21, which are arranged below in the same order as they appear in your letter. Please note that responses to comments Nos. 1 through 9 have been sent directly to the Department of Environmental Management.

10. Please note that the Flood Insurance Rate Map (FIRM) for this area of Maui was amended by a Letter of Map Revision (LOMR Case No. 03-09-0438P) that was approved by FEMA and effective as of July 1, 2004. The revised FIRM for this area of Maui designates the project site as being located within Zones B and C, areas of minimal flooding. The revised FIRM will be included in the Draft EIS. The Draft EIS will address measures taken by the applicant to ensure proper conformance to Ordinance No. 1145, which pertains to flood hazard districts, if applicable.
11. It is noted that road-widening lots may be required by the County to provide for future right-of-way and will be improved to County standards. The said lots will be dedicated to the County upon completion of the improvements.
12. A Traffic Impact Assessment Report (TIAR) has been prepared by Austin Tsutsumi & Associates for the subject project. A copy of the TIAR will be included in the Draft EIS for review. The TIAR did not find Kaiolohia Street to be impacted; its current classification is sufficient for the future build-out scenario.

13. The TIAR mentioned above takes into account in its analysis proposed roadways, which are reasonably certain to be constructed by the end of the project build-out. The proposed future collector road that parallels Pi'ilani Highway is discussed in the TIAR, but was not factored into the analysis, due to its uncertainty with regards to completion of construction by 2016, the anticipated project build-out year.
14. All structures such as walls, trees, etc., will be removed from the road-widening strip. In addition, the rear boundaries of the road-widening strip will be clearly marked to ensure that said structures have been properly removed and relocated.
15. A 30-foot radius will be provided at the intersections of the proposed access points and the adjoining County (Kaiwahine Street) and State (Pi'ilani Highway) roadways.
16. The Preliminary Drainage Report (PDR), prepared by R.M. Towill Corporation in May 2007, verifies that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties. The PDR will be included in the Draft EIS.
17. 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.
18. All existing features will be shown on the project plat map.
19. A site plan and a sight distance report to determine required and available sight distances at the proposed intersections of the subject project will be provided to the Department during the construction plans review process.
20. The Maui Police Department commented in a letter dated May 3, 2007, that they will make assessments after receiving the TIAR. Their assessments, in addition to responses to their comments, will be included in the Final EIS.
21. Preliminary construction plan submittal will include a technical assistance review performed by the Disability and Communication Access Board (DCAB) for

Milton Arakawa, Director
August 27, 2007
Page 3

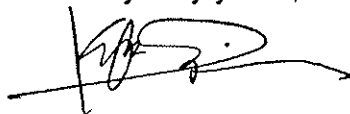
compliance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for all infrastructure elements that may be dedicated to the County. The applicant acknowledges that all technical and structural infeasibility assessments are the responsibility of the developer and that an agreement waiving the County of Maui of any future liability, including redesign and reconstruction of said facility, will be recorded with the State Bureau of Conveyances.

Please note, we responded to the questions involving the environmental management section of your former department directly to the Department of Environmental Management.

We appreciate the input we received from you. A copy of the Draft EIS 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:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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MICHAEL T. MUNEKIYO
GWEN ONASIE HIRAGA
MITSURU "MICHI" HIRANO
KAROLYN KAWABARA

MAHE ALEXANDER ROY

August 27, 2007

Cheryl Okuma, Director
County of Maui
Department of Environmental Management
One Main Plaza
2200 Main Street, Suite 176
Wailuku, Hawai'i 96793

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Ms. Okuma:

We received a letter from the former Department of Public Works and Environmental Management (DPWEM) dated May 11, 2007, providing comments on the EISPN for the subject project.

On behalf of the applicant, A&B Properties, Inc., we offer the following responses to comments Nos. 1 through 9, which are arranged below in the same order as they appear in the letter we received. Please note that responses to comments Nos. 10 through 21 have been sent directly to the Department of Public Works.

1. It is noted that wastewater system capacity cannot be ensured until the issuance of the building permit.
2. The Preliminary Engineering Report (PER) prepared by R.M. Towill Corporation contains a discussion and relevant calculations to substantiate that the existing wastewater system is adequate to serve this project. The PER will be included in the Draft Environmental Impact Statement (EIS). In addition, flow conditions of all gravity lines upstream of Pump Station No. 6 to Pi'ilani Highway will be checked and verified.
3. Wastewater contribution calculations will be provided as required before the building permit is issued.

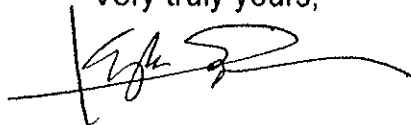
Cheryl Okuma, Director
August 27, 2007
Page 2

4. The applicant is committed to paying all applicable assessment fees for treatment plant expansion in accordance with the ordinance setting forth such fees (Kihei Assessment Area No. 3).
5. The applicant will fund necessary off-site improvements to the collection system and the wastewater pump stations.
6. The construction plans will show the installation of a single service lateral and an advance riser for each lot.
7. Non-contact cooling water, condensate, etc. will not drain to the County wastewater system.
8. The construction plans will indicate the ownership of each easement (in favor of which party). It is noted that the County will not accept sewer easements that traverse private property.
9. Commercial kitchen facilities, if applicable, will comply with pre-treatment requirements, including grease interceptors, sample boxes, screens, etc.

We appreciate the input we received from the former DPWEM office. Comments provided involving the public works section have been responded directly to the Department of Public Works. A copy of the Draft EIS 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

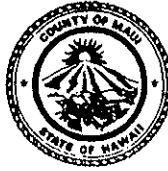
KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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JUN 22 2007

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
Telephone (808) 270-7816 • Fax (808) 270-7833

June 18, 2007

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

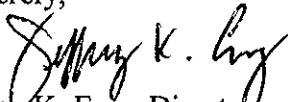
Subject: Proposed Kihei Residential Project at
TMK: 3-8-04: por 002, por. 022 and por. 030

Dear Mr. Ginoza:

Please find attached a copy of our May 9, 2007 letter commenting on this project. We would like to make the following correction: Based on system per-acre standards, daily demand for this project would be 422,900 gallons and not 1,097,900 gallons as stated in the May 9, 2007 letter.

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

Sincerely,


Jeffrey K. Eng, Director
emb

c: Anthony Ching, State of Hawaii Land Use Commission
engineering division

attachment:

May 9, 2007 letter

C:\WPdocs\EA EIS SLUD\Kihei Residential Expansion EISPN supp.wpd

By Water All Things Find Life

MAY 16 2007

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
Telephone (808) 270-7816 • Fax (808) 270-7833

May 9, 2007

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

Subject: Proposed Kihei Residential Project at
TMK: 3-8-04: por 002, por. 022 and por. 030

Dear Mr. Ginoza:

Thank you for the opportunity to comment on this Environmental Impact Statement (EIS) Preparation Notice.

Source Availability and Consumption

We understand the applicant proposes to develop 200 multi-family units on 67.9 acres, 400 single family units on 25 acres and 1.4 ac commercial space. Parcel 002 is served by an 1 ½-inch water meter. The EIS should identify sources and expected potable and non-potable demand. Based on system per-acre standards, daily demand for this project would be 1,097,900 gallons. Based on system residential per-unit standards, demand would be 352,400 gallons. We have notified the applicant that new source development is needed to meet cumulative demand. The applicant could contribute to planned source development projects including Waikapu South well and Maluhia well, or to surface water treatment at a site satisfactory to the Department and with reasonable delivery charges. Source should be developed based on redundancy factors according to Department standards.

System Infrastructure

The project site is served by a 12-inch waterline along Kawaihine Street, and an 18-inch waterline traversing the West portion of the property. A 36-inch transmission line traverses the mid-section of the property. The applicant will be required to provide for water service and fire protection in accordance with system standards. System improvements and storage requirements will be reviewed in the building permit process.

By Water All Things Find Life

Conservation

We recommend that conservation measures be included in the EIS to be implemented in project design and construction. Outdoor water use in the Kihei area can have a significant effect on demand for this project. The following conservation measures should be considered:

Use Non-potable Water: Use brackish or reclaimed water for irrigation of common areas and dust control during construction where available. Potential irrigation sources includes Kihei Shaft on an adjacent parcel and reclaimed water available at the Kihei Sewage Treatment Plant.

Use Climate-adapted Plants: The project is located in the "Maui County Planting Plan" - Plant Zone 3. Native plants adapted to the area conserve water and protect the watershed from degradation due to invasive alien species. We encourage use of native plants in all common areas. Please distribute the attached planting brochure to future homeowner.

Prevent Over-Watering By Automated Systems: Provide rain-sensors on all automated irrigation controllers in common areas. Check and reset controllers at least once a month to reflect the monthly changes in evapo-transpiration rates at the site. As an alternative, provide the more automated, soil-moisture sensors on controllers.

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.

Maintain Fixtures to Prevent Leaks: A simple, regular program of repair and maintenance can prevent the loss of hundreds or even thousands of gallons a day.

Pollution Prevention

The project overlies the Paia aquifer. DWS strives to protect water resources by encouraging adoption of Best Management Practices (BMPs) designed to minimize infiltration and runoff. The following mitigation measures should be implemented during construction:

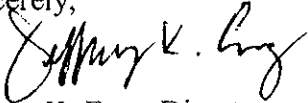
1. Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the water.
2. Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work.
3. Retain ground cover until the last possible date.
4. Stabilize denuded areas 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 regarding system improvements for this project, please contact our

Kyle Ginoza
Page 3

engineering division at 270-7835. For questions on water resources, please contact our Water Resources and Planning Division at 244-8550.

Sincerely,



Jeffrey K. Eng, Director
emb

c: Anthony Ching, State of Hawaii Land Use Commission
engineering division

attachments: (w/original letter)

A Checklist of Water Conservation Ideas for the Home
A Checklist of Water Conservation Ideas for Condominiums
Plant Brochure: "Saving Water in the Yard"

C:\WPdocs\EA EIS SLUD\Kihei Residential Expansion EISPN.wpd

A Checklist of Conservation Ideas for the Yard



Limit Lawn Size

Most turf grasses require 30% to 50% more water than shrubs and ground covers. Limit the use of grass and lawns to active picnicking and play areas. Shade in these areas will reduce moisture loss and make a cool area for children to play. If you do have a lawn, mow at least once per week, and try to cut no more than 1/4 of the grass blade, or 1/2 to 3/4 of an inch at a time. Adjust your lawn mower to a higher setting. Taller blades of grass actually hold up better in the heat, because that little bit of extra shade helps to more moisture in the soil. If you mow the grass too short, root shock will cause your grass to turn yellow despite your watering!

Designing for Irrigation Zones

Avoid putting thirsty exotics with plants that do well in dry weather. Zone your plants so that each area has similar water needs. This will enable you to water more efficiently, and keep the plants healthier. Limit thirsty plants to small decorative borders around the house itself or in specific viewing areas or shady areas. While you're at it, call the Board of Water Supply at 270-7199 for more information.

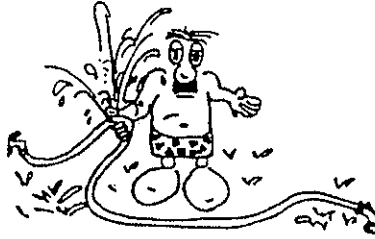
Choosing Native Plants: A Hawaiian Sense of Place

An out-of-place, thirsty landscape can slurp up 3/4 of your home's water use. Plant shrubs and trees that nature designed to look green and full here on Maui without a lot of water. Make sure they get regular watering in the first year or two, to help them establish good, deep roots. Then, once they are grown in, you can cut back or stop watering, depending upon your location. At worst, in our hot, low southern areas an occasional, slow, deep watering placed right at the roots should be enough to keep a climate adapted plant looking good even through the hot summer.



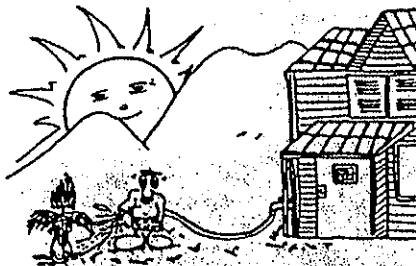
Find and Repair Leaks

Your garden hose and irrigation lines can carry thousands of gallons per day, so you can imagine a leak outdoors wastes a lot of water! Check and repair all of your outdoor fixtures regularly.



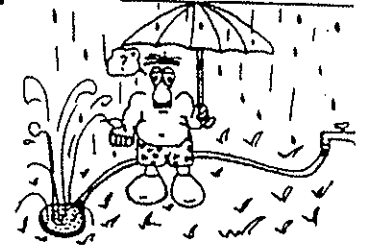
Irrigation Systems

Drip irrigation is designed to get water slowly and directly to the roots of plants. This not only saves water, but for some plants it helps to reduce the risk of diseases. Sprinklers with fine, high sprays lose a lot of water to evaporation. So, if you do use a sprinkler for certain plants, go for the sort with low, flat spray patterns and larger drops of water. Check timers on irrigation controllers and adjust them monthly to water appropriately for the season. For small grassy areas, watering by hand can actually reduce waste! But if you use a hose, set a kitchen timer or buy a timer attachment that hooks on between the faucet and hose. This will help remind you not to over-water one area. Use a soaker hose on slopes to reduce run-off.



Watering

If you do have a lawn, water only when it needs it. A good deep soaking is better than a light sprinkling. If you water too frequently and lightly, plants develop shallower roots and become less drought resistant! A good way to see if your lawn needs watering is to step on the grass. If it springs back up when you move, it doesn't need water. If it stays flat, it could use a bit. Avoid watering in the heat of the day. By 10 A.M., the sun is up and so is the heat. This will rob your lawn's moisture. In dry areas you can also choose evenings to water.



Watching the Weather...

As simple-minded as it soundsnever water while it's raining! Many people forget to follow this simple rule. Install rain-shutoffs or soil moisture sensors on automated systems. Teach your family to turn off your irrigation in the rain. You also create "weather conditions" by how and where you plant. Sunny exposed areas and slopes need to be watered more frequently than shady areas. Place your plants appropriately.

Getting to the Root

Root feeder or water aerator probes around trees and bushes will help direct water where it is needed. Even for the biggest trees, you don't need to go any deeper than 18 inches. 8 to 12 inches is big enough for small trees and shrubs. You can also build a watering basin in the soil around the base of your plants to help the water to soak in deeply. Drip systems are good for this too.

Soils & Mulch

Soils are not all alike. Clay soils can typically take from 1/4 to 1/2" of water per hour before water starts running off and is wasted. Sandy soils require more frequent, shorter watering. You can have your soils tested. Call the Ag Extension Service at MCC for advice (244-3242). Compost or other organic material will also help soils hold moisture and support heartier, more drought-tolerant plants. Try leaves, grass clippings, manure, aged sawdust, wood chips, or humic acid. Mulching is an excellent way to hold moisture; keep the ground from overheating and discourage weeds. You should also loosen the soil by rototilling or spading while you add the organic matter. Looser soil can make a healthier lawn.





A Checklist of Conservation Ideas for the Home



Vise Water Habits

1) Shaving & Brushing Teeth

If you leave the water running while you shave or brush your teeth, you are wasting a gallon a minute! Stopper the sink and fill the basin half way when you shave, and you use just 1/2 a gallon! Turn off the water while brushing your teeth!

2) Bathing & Showering

Which uses more water, a shower or a tub bath? That depends! A partially filled tub uses less water than a long shower, but a short shower with a low flow showerhead uses much less than a brimful tub! You can compare for yourself. Try plugging the tub while you shower and see how high the water gets. Make a habit of showering quickly or using a partially filled tub. Or try the "navy shower". Turn on the water to get wet, turn it off to soap up, and turn it back on to rinse off. It's a great conservation technique, especially in drought emergencies.



House plants & Fish Tanks

If you have a fish tank, you probably clean it regularly. Use the dirty water to water your House plants. It saves using the same water twice, and the plants love the water, which is rich in nitrogen and phosphorous!

Washing Smart

Some washing machines use 40 or more gallons whether you're washing a full load, or only a few pairs of socks. Use full washloads, especially for older machines. If your machine is adjustable, use the proper setting. You'll save electricity as well as water.

Food Prep

If you like to rinse off vegetables and fruits, stopper the sink instead of using running water. And when you're finished, turn on the garbage disposal as you pull the plug, rather than running water just for the disposal.

Doing Dishes

Which is more efficient, washing dishes in the sink or in a dishwasher? You can check by testing how much water your full sink basin holds compared with the 9.5 to 12 gallons dishwashers use during a regular cycle. Either way, it is more water efficient to wash full loads. If you do wash dishes by hand, stopper the sink and run the disposal as you pull the plug.



Washing the Car

Do you wash your car at home? Use a bucket, or a hose with a trigger nozzle to avoid wasting water. Wet the car thoroughly, and then turn off the hose while you wash the car! Swab the car with soapy water from a bucket. You can use the hose again for a final rinse. Better still, take your car to a car wash. Most of the car washes on Maui are fitted with recirculating water.



For a Cold Glass of Water

Keep a pitcher of cool water in the refrigerator. Running the water until it turns cool can waste a gallon for each glass. Letting the water sit in the fridge can also allow any chlorine to dissipate, and improve the taste.

Don't Use the Toilet for Trash!!

Some people toss and flush away tissues, cigarettes or bits of trash in the toilet. Use a wastebasket instead. If everyone in the U.S. flushed just once less per day, we could save a sea full of water a mile wide, a mile long and four feet deep, every day!



Water Saving Devices

Showerheads

Replacing your old showerhead with a low flow can save as much as 7.2 gallons per person per day. You can get showerheads and other low flow fixtures from the Maui County Board of Water Supply (270-7199), or the Public Works Department (270-7417).

Toilets

Installing A New Water Conserving Toilet can save as much as 17 gallons per person per day. Even a low cost installing a toilet flapper can save more than 5 gallons per person per day.

Faucets

Replacing your old faucets with more efficient models can save 4 gallons per person per day. Faucet aerators or spray taps can also help, by mixing air with water. This cuts the flow and reduces splashing, while leaving enough pressure to cut the soap and grease.

Washing Machines

A water-efficient washing machine can save up to 20 gallons per load. With the average household washing 6 loads per week, that's a lot of water! In fact, within 2 years, these can save as much water as the average person drinks in a lifetime! And that's not all. Statistics on energy savings potential indicate that highly efficient washing machines save from 35% to 65% on energy used for washing!

Maintenance

Check for Leaks!

Leaking faucets cost you money! Even a slow drip wastes 15 gallons per day. A 1/8" stream can waste 400 gallons per day! Think about it. A single dripping faucet can waste more water in one day than a person needs for drinking for an entire week! Unfortunately, the average non-conserving home loses more than 10% of the water it pays for to leaks! Check for leaks regularly. Try putting 10 drops of food coloring in your toilet tank. Don't flush, just wait 15 minutes. If colored water shows up in the bowl, your tank is leaking. Check your water meter while no water is running in your house. If the meter is registering, you have a leak somewhere.



After toilets, most indoor leaks are caused by worn washers in faucets. Check your faucets twice a year. If any drip after you've turned them off firmly, turn off the supply line, take the faucet apart and replace the washer. And don't forget the faucets on the side of the house.

A Clean Sweep

Did you know that 5 minutes of unnecessary hosing will waste 25 gallons of water? Try sweeping sidewalks and driveways. This will get them clean without wasting water.

Pipes Break - Be Prepared

Do you know where your master shut-off valve is located? If a pipe breaks in your home, you could experience flooding and property damage as well as huge water waste unless you quickly shut your valve. Locate your valve and mark it for quick easy identification. Learn how to shut it properly, and teach your family to do so as well.

Cover Pools and Jacuzzis

They're fun, but they can waste a lot of water! An average sized pool loses about 1,000 gallons of water per month to evaporation. A pool cover can cut these losses by 90%!



Saving Water in The Yard

What and How to Plant in Your Area



- 1 Wet Windward Areas
- 2 Cool Dry Upper Elevations
- 3 Warm to Hot Low Elevations
- 4 Wetter Low Areas Near Mountains
- 5 Windward Coastal Salt Spray Zones

Plant Zone Map Adapted From
The Maui County Planting Plan

Tips From The Maui County Department of Water Supply
By Water All Things Find Life

Zone-specific Native and Polynesian plants for Maui County

Zone 1

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	<i>Psilotum nudum</i>	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	<i>Sadleria cyatheoides</i>	'ama'u, ama'tuma'u				
Gr - Sh	<i>Lipochaeta succulenta</i>	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	<i>Cocos nucifera</i>	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	<i>Pritchardia arecina</i>	io'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	<i>Pritchardia forbesiana</i>	io'ulu	15'			
P	<i>Pritchardia hillebrandii</i>	io'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	<i>Mariscus javanicus</i>	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	<i>Bidens hillebrandiana</i> ssp. <i>hillebrandiana</i>	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	<i>Cordylone fruticosa</i>	ti, ki	6'			
Sh	<i>Hedyotis</i> spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh - Tr	<i>Broussonetia papyrifera</i>	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Tr	<i>Acacia koa</i>	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	<i>Aleurites moluccana</i>	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	<i>Calophyllum inophyllum</i>	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	<i>Charpentiera obovata</i>		15'			
Tr	<i>Cordia subcordata</i>	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Hibiscus furcellatus</i>	'akiohala, hau-hele	8'			
Tr	<i>Metrosideros polymorpha</i> var. <i>macrophylla</i>	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Morinda citrifolia</i>	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	<i>Pandanus tectorius</i>	hala, pu'aha (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
V	<i>Alyxia oliviformis</i>	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub S Sedge P Palm Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	<i>Psilotum nudum</i>	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	<i>Sadleria cyatheoides</i>	'ama u, ama'uma'u				
G	<i>Eragrostis monticola</i>	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
Gr	<i>Ipomoea tuboides</i>	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	<i>Peperomia leptostachya</i>	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	<i>Plumbago zeylanica</i>	'lile'e	1'			
Gr - Sh	<i>Hibiscus calyphyllus</i>	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	<i>Lipochaeta rockii</i>	nehe	2'	2'	sea to 3,000'	Dry to Medium
Sh	<i>Argemone glauca</i> var. <i>decipiens</i>	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	<i>Artemisia mauiensis</i> var. <i>diffusa</i>	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	<i>Chenopodium oahuense</i>	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	<i>Dianella sandwicensis</i>	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	<i>Lipochaeta lavarum</i>	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	<i>Osteomeles anthyllifolia</i>	'ulei, etuehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	<i>Senna gaudichaudii</i>	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	<i>Styphelia tameiameia</i>	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	<i>Vitex rotundifolia</i>	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh - Tr	<i>Myoporum sandwicense</i>	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	<i>Notofrichium sandwicense</i>	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	<i>Dodonaea viscosa</i>	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	<i>Acacia koa</i>	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	<i>Charpentiera obovata</i>		15'			
Tr	<i>Erythrina sandwicensis</i>	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	<i>Metrosideros polymorpha</i> var. <i>macrophylla</i>	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	<i>Nestegis sandwicensis</i>	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	<i>Pleomele auwahiensis</i>	halepepe	20'			
Tr	<i>Rauwolfia sandwicensis</i>	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	<i>Santalum ellipticum</i>	coastal sandalwood, 'ii-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	<i>Sophora chrysophylla</i>	mamane	15'	15'	1,000' to 3,000'	Medium
V	<i>Alyxia oliviformis</i>	matie	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	<i>Psilotum nudum</i>	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
G	<i>Colubrina asiatica</i>	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	<i>Eragrostis monticola</i>	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	<i>Eragrostis variabilis</i>	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	<i>Fimbristylis cymosa</i> ssp. <i>spathacea</i>	mau'u aki'aki fimbriatylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	<i>Boerhavia repens</i>	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	<i>Chamaesyce celastroides</i> var. <i>laehiensis</i>	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	<i>Cressa truxillensis</i>	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	<i>Heliotropium anomalum</i> var. <i>argenteum</i>	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	<i>Ipomoea tuboides</i>	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	<i>Jacquemontia ovalifolia</i> ssp. <i>sandwicensis</i>	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	<i>Lipochaeta integrifolia</i>	nehe	1'	5'	sea to 1,000'	Dry to Medium
Gr	<i>Peperomia leptostachya</i>	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	<i>Plumbago zeylanica</i>	'iile'e	1'			
Gr	<i>Sesuvium portulacastrum</i>	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	<i>Sida fallax</i>	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	<i>Tephrosia purpurea</i> var. <i>purpurea</i>	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	<i>Hibiscus calyphyllus</i>	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	<i>Lipochaeta rockii</i>	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	<i>Lipochaeta succulenta</i>	nehe	2'	5'	sea to 1,000'	Dry to Wet
Gr - Sh	<i>Lycium sandwicense</i>	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	<i>Cocos nucifera</i>	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	<i>Pritchardia hillebrandii</i>	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	<i>Mariscus javanicus</i>	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium

Zone 3

Zone-specific Native and Polynesian plants for Maui County

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	<i>Argemone glauca</i> var. <i>decipiens</i>	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	<i>Bidens mauiensis</i>	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	<i>Bidens menziesii</i> ssp. <i>menziesii</i>	ko'oko'olau	1'	3'		
Sh	<i>Bidens micrantha</i> ssp. <i>micrantha</i>	ko'oko'olau	1'	3'		
Sh	<i>Chenopodium oahuense</i>	'aheahea, aweoweo	6'		sea to higher	Dry to Medium
Sh	<i>Dianella sandwicensis</i>	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	<i>Gossypium tomentosum</i>	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium
Sh	<i>Hedyotis</i> spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	<i>Lipochaeta lamarum</i>	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	<i>Osteomeles anthyllifolia</i>	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	<i>Scaevola sericea</i>	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	<i>Senna gaudichaudii</i>	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	<i>Solanum nelsonii</i>	'akia, beach solanum	3'	3'	sea to 1,000'	Dry to Medium
Sh	<i>Styphelia tameiameia</i>	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	<i>Vitex rotundifolia</i>	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	<i>Wikstroemia uva-ursi</i> <i>kauaiensis</i> <i>kauaiensis</i>	'akia, Molokai osmanthus				
Sh - Tr	<i>Broussonetia papyrifera</i>	wauke, paper mulberry	8'	8'	sea to 1,000'	Dry to Medium
Sh - Tr	<i>Myoporum sandwicense</i>	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	<i>Nototrichium sandwicense</i>	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh - Tr	<i>Dodonaea viscosa</i>	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	<i>Aleurites moluccana</i>	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	<i>Calophyllum inophyllum</i>	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	<i>Canthium odoratum</i>	Alahe'e, 'ohe'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	<i>Cordia subcordata</i>	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Diospyros sandwicensis</i>	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	<i>Erythrina sandwicensis</i>	williwili	20'	20'	sea to 1,000'	Dry
Tr	<i>Metrosideros polymorpha</i> var. <i>macrophylla</i>	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone 3

Zone-specific Native and Polynesian plants for Maui County

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	<i>Morinda citrifolia</i>	Indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	<i>Nesoluma polynesicum</i>	keahi	15'	15'	sea to 3,00'	Dry
Tr	<i>Nestegis sandwicensis</i>	piohua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	<i>Pandanus tectorius</i>	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Pleomele auwahiensis</i>	halapepe	20'			
Tr	<i>Rauvolfia sandwicensis</i>	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	<i>Reynoldsia sandwicensis</i>	'ohe makai	20'	20'	1,000' to 3,000'	Dry
Tr	<i>Santalum ellipticum</i>	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	<i>Thespesia populnea</i>	imilo	30'	30'	sea to 3,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	<i>Psilotum nudum</i>	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	<i>Sadleria cyatheoides</i>	'ama'u, ama'uma'u				
G	<i>Colubrina asiatica</i>	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	<i>Eragrostis monticola</i>	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	<i>Eragrostis variabilis</i>	'emo-foa	1'	2'	sea to 3,000'	Dry to Medium
G	<i>Fimbristylis cymosa</i> ssp. <i>spathacea</i>	mau'u'aki'aki fimbriстыlis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	<i>Chamaesyce celastroides</i> var. <i>laehiensis</i>	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	<i>Ipomoea tuboides</i>	Hawaiian moon flower, 'uiala	1'	10'	sea to 3,000'	Dry to Medium
Gr	<i>Jacquemontia ovalifolia</i> ssp. <i>sandwicensis</i>	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	<i>Lipochaeta integrifolia</i>	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	<i>Peperomia leptostachya</i>	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	<i>Plumbago zeylanica</i>	'iile e	1'			
Gr	<i>Sida fallax</i>	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	<i>Tephrosia purpurea</i> var. <i>purpurea</i>	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	<i>Hibiscus calyphyllus</i>	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	<i>Lipochaeta rockii</i>	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	<i>Lipochaeta succulenta</i>	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	<i>Cocos nucifera</i>	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	<i>Pritchardia arecina</i>	io'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	<i>Pritchardia forbesiana</i>	io'ulu	15'			
P	<i>Pritchardia hillebrandii</i>	io'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	<i>Mariscus javanicus</i>	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	<i>Argemone glauca</i> var. <i>deciplens</i>	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	<i>Artemisia australis</i>	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	<i>Artemisia mauiensis</i> var. <i>diffusa</i>	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	<i>Bidens hillebrandiana</i> ssp. <i>hillebrandiana</i>	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	<i>Bidens menziesii</i> ssp. <i>menziesii</i>	ko'oko'olau	1'	3'		
Sh	<i>Bidens micrantha</i> ssp. <i>micrantha</i>	ko'oko'olau	1'	3'		
Sh	<i>Cordylone fruticosa</i>	ti, ki	6'			
Sh	<i>Dianella sandwicensis</i>	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	<i>Lipochaeta lavarum</i>	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	<i>Osteomeles anthyllifolia</i>	'ulei, euehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	<i>Scaevola sericea</i>	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	<i>Solanum nelsonii</i>	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	<i>Styphelia tameiameia</i>	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	<i>Vitex rotundifolia</i>	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	<i>Wikstroemia uva-ursi kauaiensis kauaiensis</i>	'akia, Molokai osmanthus				
Sh - Tr	<i>Broussonetia papyrifera</i>	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Sh - Tr	<i>Myoporum sandwicense</i>	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	<i>Notofrichium sandwicense</i>	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh - Tr	<i>Dodonaea viscosa</i>	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	<i>Acacia koa</i>	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	<i>Aleurites moluccana</i>	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	<i>Calophyllum inophyllum</i>	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	<i>Canthium odoratum</i>	Alahe'e, 'oh'e'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	<i>Charpentiera obovata</i>		15'			
Tr	<i>Cordia subcordata</i>	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Diospyros sandwicensis</i>	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	<i>Hibiscus furcellatus</i>	'akiohala, hau-hele	8'			
Tr	<i>Metrosideros polymorpha</i> var. <i>macrophylla</i>	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Morinda citrifolia</i>	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	<i>Nestegis sandwicensis</i>	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	<i>Pandanus tectorius</i>	hala, puhaia (HALELIS I)	35'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Pleomele auwahiensis</i>	halapepe	20'			
Tr	<i>Rauvolfia sandwicensis</i>	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	<i>Santalum ellipticum</i>	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	<i>Sophora chrysophylla</i>	mamane	15'	15'	1,000' to 3,000'	Medium
Tr	<i>Thespesia populnea</i>	milo	30'	30'	sea to 3,000'	Dry to Wet
V	<i>Alyxia oliviformis</i>	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 5

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
G	<i>Colubrina asiatica</i>	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	<i>Eragrostis variabilis</i>	'emo-foa	1'	2'	sea to 3,000'	Dry to Medium
G	<i>Fimbristylis cymosa</i> ssp. <i>spathacea</i>	mau'u'aki'aki fimbriatylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	<i>Boerhavia repens</i>	atena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	<i>Chamaesyce celastroides</i> var. <i>laehiensis</i>	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	<i>Cressa truxillensis</i>	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	<i>Heliotropium anomalum</i> var. <i>argenteum</i>	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	<i>Jacquemontia ovalifolia</i> ssp. <i>sandwicensis</i>	pa'u o hii'aka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	<i>Lipochaeta integrifolia</i>	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	<i>Sesuvium portulacastrum</i>	'akuli'kuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	<i>Sida fallax</i>	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	<i>Tephrosia purpurea</i> var. <i>purpurea</i>	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	<i>Hibiscus calyphyllus</i>	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	<i>Lycium sandwicense</i>	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	<i>Cocos nucifera</i>	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	<i>Pritchardia hillebrandii</i>	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	<i>Mariscus javanicus</i>	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	<i>Argemone glauca</i> var. <i>decipiens</i>	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	<i>Artemisia australis</i>	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium
Sh	<i>Bidens hillebrandiana</i> ssp. <i>hillebrandiana</i>	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	<i>Bidens mauiensis</i>	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	<i>Chenopodium oahuense</i>	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	<i>Dianella sandwicensis</i>	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	<i>Gossypium tomentosum</i>	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium

Zone 5

Zone-specific Native and Polynesian plants for Maui County

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	<i>Hedyotis</i> spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	<i>Lipochaeta lavarum</i>	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	<i>Osteomeles anthyllidifolia</i>	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	<i>Scaevola sericea</i>	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	<i>Senna gaudichaudii</i>	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	<i>Solanum nelsonii</i>	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	<i>Vitex rotundifolia</i>	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	<i>Wikstroemia uva-ursi kauaiensis kauaiensis</i>	'akia, Molokai osmanthus				
Sh - Tr	<i>Myoporum sandwicense</i>	nalo, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh-Tr	<i>Dodonaea viscosa</i>	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	<i>Aleurites moluccana</i>	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	<i>Calophyllum inophyllum</i>	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	<i>Cordia subcordata</i>	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Hibiscus furcellatus</i>	'akiohala, hau-hele	8'			
Tr	<i>Morinda citrifolia</i>	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	<i>Pandanus tectorius</i>	hala, pu'uhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	<i>Thespesia populnea</i>	milo	30'	30'	sea to 3,000'	Dry to Wet
V	<i>Ipomoea pes-caprae</i>	beach morning glory, pohuehue	1			

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
black wattle	<i>Acacia mearnsii</i>	Mimosaceae
blackberry	<i>Rubus argutus</i>	Rosaceae
blue gum	<i>Eucalyptus globulus</i>	Myrtaceae
bocconia	<i>Bocconia frutescens</i>	Papaveraceae
broad-leaved cordia	<i>Cordia alliodora</i>	Boraginaceae
broomsedge, yellow bluestem	<i>Andropogon virginicus</i>	Poaceae
buffelgrass	<i>Cenchrus ciliaris</i>	Poaceae
butterfly bush, smoke bush	<i>Buddleia madagascariensis</i>	Buddleiaceae
cats claw, Mysore thorn, wait-a-bit	<i>Caesalpinia decapetala</i>	Caesalpinaceae
common ironwood	<i>Casuarina equisetifolia</i>	Caesalpinaceae
common velvet grass, Yorkshire fog	<i>Holcus lanatus</i>	Poaceae
fiddlewood	<i>Citharexylum spinosum</i>	Verbenaceae
fire tree, faya tree	<i>Myrica faya</i>	Myricaceae
glorybower	<i>Clerodendrum laponicum</i>	Verbenaceae
hairy cat's ear, gosmore	<i>Hypochoeris radicata</i>	Asteraceae
haole koa	<i>Leucaena leucocephala</i>	Fabaceae
ivy gourd, scarlet-fruited gourd	<i>Coccinia grandis</i>	Cucurbitaceae
jumper berry	<i>Citharexylum caudatum</i>	Verbenaceae
kahili flower	<i>Grevillea banksii</i>	Proteaceae
klu, popinac	<i>Acacia farnesiana</i>	Mimosaceae
logwood, bloodwood tree	<i>Haematoxylon campechianum</i>	Caesalpinaceae
loquat	<i>Eriobotrya japonica</i>	Rosaceae
meadow ricegrass	<i>Ehrharta stipoides</i>	Poaceae
melaleuca	<i>Melaleuca quinquenervia</i>	Myrtaceae
miconia, velvet leaf	<i>Miconia calvascens</i>	Melastomataceae
narrow-leaved carpetgrass	<i>Axonopus fissifolius</i>	Poaceae
oleaster	<i>Elaeagnus umbellata</i>	Elaeagnaceae
oriental mangrove	<i>Bruguiera gymnorhiza</i>	Rhizophoraceae
padang cassia	<i>Cinnamomum burmannii</i>	Lauraceae
palmgrass	<i>Setaria palmifolia</i>	Poaceae
pearl flower	<i>Heterocentron subtripinervium</i>	Melastomataceae
quinine tree	<i>Cinchona pubescens</i>	Rubiaceae
satin leaf, calmitillo	<i>Chrysophyllum oliviforme</i>	Sapotaceae
silkwood, Queensland maple	<i>Flindersia brayleyana</i>	Rutaceae
silky oak, silver oak	<i>Grevillea robusta</i>	Proteaceae
strawberry quava	<i>Psidium cattleianum</i>	Myrtaceae
swamp oak, saltmarsh, longleaf ironwood	<i>Casuarina glauca</i>	Casuarinaceae
sweet vernalgrass	<i>Anthoxanthum odoratum</i>	Poaceae
tree of heaven	<i>Ailanthus altissima</i>	Simarubaceae
trumpet tree, guarumo	<i>Cecropia obtusifolia</i>	Cecropiaceae
white ginger	<i>Hedychium coronarium</i>	Zingiberaceae
white moho	<i>Heliconia popayanensis</i>	Tiliaceae
yellow ginger	<i>Hedychium flavescens</i>	Zingiberaceae

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
	<i>Jasminum fluminense</i>	Oleaceae
	<i>Arthrostenia ciliatula</i>	Melastomataceae
	<i>Dissolites rotundifolia</i>	Melastomataceae
	<i>Erigeron karwinskianus</i>	Asteraceae
	<i>Eucalyptus robusta</i>	Myrtaceae
	<i>Hedychium gardnerianum</i>	Zingiberaceae
	<i>Juncus planifolius</i>	Juncaceae
	<i>Lophostemon confertus</i>	Myrtaceae
	<i>Medinilla cumingii</i>	Melastomataceae
	<i>Medinilla magnifica</i>	Melastomataceae
	<i>Medinilla venosa</i>	Melastomataceae
	<i>Melastoma candidum</i>	Melastomataceae
	<i>Melinis minutiflora</i>	Poaceae
	<i>Olea europaea</i>	Melastomataceae
	<i>Oxyspora paniculata</i>	Poaceae
	<i>Panicum maximum</i>	Poaceae
	<i>Paspalum urvillei</i>	Poaceae
	<i>Passiflora edulis</i>	Passifloraceae
	<i>Phormium tenax</i>	Agavaceae
	<i>Pinus taeda</i>	Pinaceae
	<i>Prosopis pallida</i>	Fabaceae
	<i>Pterolepis glomerata</i>	Melastomataceae
	<i>Rhodomyrtus tomentosa</i>	Myrtaceae
	<i>Schefflera actinophylla</i>	Araliaceae
	<i>Syzygium jambos</i>	Myrtaceae
	<i>Acacia melanoxylon</i>	Mimosaceae
Australian blackwood	<i>Cyathea cooperi</i>	Cyatheaceae
Australian tree fern	<i>Sphaeropteris cooperi</i>	Cyatheaceae
Australian tree fern	<i>Bidens pilosa</i>	Asteraceae
Beggar's tick, Spanish needle	<i>Brachiaria mutica</i>	Poaceae
California grass	<i>Ficus microcarpa</i>	Moraceae
Chinese banyon, Maylayan banyon	<i>Asystasia gangetica</i>	Acanthaceae
Chinese violet	<i>Schinus terebinthifolius</i>	Anacardiaceae
Christmasberry, Brazilian pepper	<i>Acacia confusa</i>	Mimosaceae
Formosan koa	<i>Senecio mikanioides</i>	Asteraceae
German ivy	<i>Lonicera japonica</i>	Caprifoliaceae
Japanese honeysuckle	<i>Clidemia hirta</i>	Melastomataceae
Koster's curse	<i>Lantana camara</i>	Verbenaceae
Lantana	<i>Furcraea foetida</i>	Agavaceae
Mauritius hemp	<i>Fraxinus uhdei</i>	Oleaceae
Mexican ash, tropical ash	<i>Hunnemannia fumarifolia</i>	Papaveraceae
Mexican tulip poppy	<i>Angiopteris evecta</i>	Marattiaceae
Mules foot, Madagascar tree fern	<i>Corynocarpus laevigatus</i>	Corynocarpaceae
New Zealand laurel, karakaranut	<i>Lepidospermum scoparium</i>	Myrtaceae
New Zealand tea	<i>Cortaderia jubata</i>	Poaceae
Pampas grass	<i>Castilleja elastica</i>	Moraceae
Panama rubber tree, Mexican rubber tree	<i>Ardisia elliptica</i>	Myrsinaceae
Shoeburton ardisia	<i>Passiflora mollissima</i>	Passifloraceae
banana poka		

Selection

As a general rule, it is best to select the largest and healthiest specimens. However, be sure to note that they are not pot-bound. Smaller, younger plants may result in a low rate of plant survival.¹ When selecting native species, consider the site they are to be planted in, and the space that you have to plant. For example: Mountain species such as koa and maile will not grow well in hot coastal areas exposed to strong ocean breezes. Lowland and coastal species such as wiliwili and Kou require abundant sunshine and porous soil. They will not grow well with frequent cloud cover, high rainfall and heavy soil.

Consider too, the size that the species will grow to be. It is not wise to plant trees that will grow too large.² Overplanting tends to be a big problem in the landscape due to the underestimation of a species' height, width or spread.

A large, dense canopied tree such as the kukui is a good shade tree for a lawn. However, its canopy size and density of shade will limit what can be planted in the surrounding area. Shade cast by a koa and ohia lehua is relatively light and will not inhibit growth beneath it.

Keep seasons in mind when you are selecting your plants. Not all plants look good year round, some plants such as ilima will look scraggly after they have flowered and formed seeds. Avoid planting large areas with only one native plant. Mixing plants which naturally grow together will ensure the garden will look good all year round.³ Looking at natural habitats helps to show how plants grow naturally in the landscape.

When planting an area with a mixed-ecosystem, keep in mind the size and ecological requirements of each plant. Start with the hardiest and most easily grown species, but allow space for fragile ones in subsequent plantings.

Acquiring natives

Plants in their wild habitat must be protected and maintained. It is best and easiest to get your plants from nurseries (see list), or friend's gardens. Obtain proper permits from landowners and make sure you follow a few common sense rules:

- ▶ collect sparingly from each plant or area.
- ▶ some plants are on the state or Federal Endangered Species list. Make sure you get permits (see app. A,B)

¹ K. Nagata, P.6

² K. Nagata, P.9

³ Nagata, P.9

Soil

Once you have selected your site and the plants you wish to establish there, you must look at the soil conditions on the site. Proper soil is necessary for the successful growth of most native plants, which perform poorly in hard pan, clay or adobe soils. If natives are to be planted in these types of soil, it would be wise to dig planting holes several times the size of the rootball and backfill with 50-75% compost.⁴ A large planting hole ensures the development of a strong root system. The plant will have a headstart before the roots penetrate the surrounding poor soil.⁵

It is recommended that native plants not be planted in ground that is more dense than potting soil. If there is no alternative, dig a hole in a mound of soil mixed with volcanic cinder which encourages maximum root development. Fill the hole with water, if the water tends to puddle or drain too slowly, dig a deeper hole until the water does not puddle longer than 1 or 2 minutes.⁶ Well-drained soil is one of the most important things when planting natives as you will see in the next section.

Irrigation

Most natives do very poorly in waterlogged conditions. Do not water if the soil is damp. Water when the soil is dry and the plants are wilting. Once established, a good soaking twice a week should suffice. Deep soaking encourages the development of stronger, and deeper root systems. This is better than frequent and shallow watering which encourage weaker, more shallow root systems.

The following is a watering schedule from Kenneth Nagata's Booklet, *How To Plant A Native Hawaiian Garden*:

WATER REQUIREMENT

Heavy
Moderate
Light

WATERING FREQUENCY

3x / week
2x / week
1x / week

Red clay soils hold more water for a longer period of time than sandy soils do. If your area is very sunny or near a beach, things will dry out faster. Even in the area of one garden, there are parts that will need more or less water. Soils can vary and amount of shade and wind differ. After plants are established (a month or two for most plants, up to a year for some trees), you can back off watering.

⁴ Nagata, p. 6.

⁵ Nagata, p. 8

⁶ Nagata, p. 8

Automatic sprinkler systems are expensive to install and must be checked and adjusted regularly. Above-ground systems allow you to monitor how much water is being put out, but you lose a lot due to malfunctioning of sprinkler heads and wind. The most efficient way to save water and make sure your plants get enough water, is to hand-water. This way you are getting our precious water to the right places in the right amounts.⁷

Fertilizer

An all-purpose fertilizer 10-10-10 is adequate for most species. They should be applied at planting time, 3 months later, and 6 months thereafter. Use half the dosage recommended for ornamentals and pay special attention to native ferns which are sensitive to strong fertilizers. Use of organic composts and aged animal manures is suggested instead of chemical fertilizers. In addition, use of cinders for providing trace minerals is strongly recommended.⁸

Natives are plants which were here hundreds of years before the polynesians inhabited the Hawaiian Islands. They were brought here by birds, or survived the harsh ocean conditions to float here. They are well-adapted to Hawaii's varying soil and environmental conditions. This is why they make prime specimens for a xeriscape garden. However, natives will not thrive on their own, especially under harsh conditions. On the other hand, like any other plant, if you over-water and over-fertilize them, they will die. Follow the instructions given to you by the nursery you buy the plant from, or from this booklet. Better yet, buy a book (suggested readings can be found in the bibliography in the back of this pamphlet), read it, and learn more about native plants. I guarantee that you will be pleased with the results.

⁷ Bornhorst, p. 19-20

⁸ Nagata, p. 6

Propagation

There are many ways to propagate and plant-out native Hawaiian species. One of the most thorough and helpful book is Heidi Bornhorst's book, *Growing Native Hawaiian Plants*. The easiest, and best way to obtain natives for the novice gardener is to get them from a reputable nursery (see appendix c). That way all you will have to do is know how to transplant (if necessary) and plant-out when you are ready. These are the two methods I have listed here.

Transplanting

1. Use pots that are one size bigger than the potted plant is in
2. Get your potting medium ready

Good potting medium is a ½, ½ mixture of peat moss and perlite. If the plant is from a dry or coastal area, add chunks of cinder or extra perlite. If it is a wet forest species, add more peat moss or compost. Be aware that peat moss is very acidic and certain plants react severely to acidity.

If the plant is to eventually be planted into the ground, make a mix of equal parts peat moss, perlite, and soil from the area in which the plant is to be planted. Slow-release fertilizer can be mixed into the potting medium.

3. Once pots, potting medium, fertilizer and water are ready, you can begin re-potting. Keep the plant stem at the same depth it was in the original pot. Avoid putting the plant in too large a pot, as the plant may not be able to soak up all the water in the soil and the roots may drown and rot.

Mix potting medium and add slow-release fertilizer at this time. Pre-wet the medium to keep dust down and lessen shock to the plant. Put medium in bottom of pot. Measure for the correct depth in the new pot. Make sure there is from ½ to 2 inches from the top of the pot so the plant can get adequate water. Try to stand the plant upright and center the stem in the middle of the pot.

Water the plant thoroughly after transplanting. A vitamin B-1 transplanting solution can help to lessen the transplant shock. Keep the plant in the same type of environment as it was before, sun or shade. If roots were broken, trim off some of the leaves to compensate for the loss.⁹

Planting out

1. Plant most native Hawaiian plants in a sunny location in soil that is well-drained.
 2. Make the planting hole twice as wide as the root ball or present pot, and just as deep.
- If the soil is clay-like, and drains slowly, mix in some coarse red or bland cinder, coarse perlite or

⁹ Bornhorst, p.20-21

coarse compost. Place some slow-release fertilizer at the bottom of the hole.

3. Carefully remove the plant from the container and place it in the hole.

The top of the soil should be at the same level as the top of the hole, if it is too high or too low, adjust the soil level so that the plant is at the right depth.

4. Water thoroughly after you transplant.

Mulch

Most natives cannot compete with weeds, and therefore must be weeded around constantly in order to thrive. Mulch is a practical alternative, which discourages and prevents weeds from growing.

Hawaii's hot, humid climate leads to the breaking down of organic mulches. Thick organic mulches such as wood chips and leaves, may also be hiding places for pests.

Stone mulches are attractive, permanent and can help to improve soil quality. Red or black cinder, blue rock chips, smooth river rocks and coral chips are some natural choices.¹⁰ Macadamia nut hulls are also easy to find and can make a nice mulch.¹¹

Never pile up mulch right next to the stem or trunk of a plant, keep it a few inches away.

¹⁰ Bornhorst, p. 24

¹¹ Nagata, p. 7

ZONES

The Maui County Planting Plan has compiled a system of 5 zones of plant growth for Maui County. The descriptions of zones and maps for these zones are as follows:

Zone 1:

Wet areas on the windward side of the island. More than 40 inches of rain per year. Higher than 3,000 feet.

Zone 2:

Cool, dry areas in higher elevations (above 1,000 feet). 20 to 40 inches of rain per year.

Zone 3:

Low, drier areas, warm to hot. Less than 20 inches of rain per year. Sea level to 1,000 feet.

Zone 4:

Lower elevations which are wetter due to proximity of mountains. 1,000 to 3,000 feet.

Zone 5:

Salt spray zones in coastal areas on the windward side.

These zones are to be used as a general guide to planting for Maui County. In addition to looking at the maps, read the descriptions of the zones and decide which zone best fits your area. Plants can be listed in more than one zone and can be planted in a variety of conditions. For best results, take notes on the rainfall, wind, sun and salt conditions of your site. Use the zones as a general guide for selection and read about the plants to decide which best fits your needs as far as care and or function.

PLACES TO SEE NATIVES ON MAUI:

The following places propagate native Hawaiian plants from seeds and/or cuttings. Their purpose is to protect and preserve these native plants. Please contact them before going to view the sites, they can provide valuable information and referral to other sources.

1. Hoolawa Farms 575-5099
P O Box 731
Haiku HI 96708
2. The Hawaiian Collection 878-1701
1127 Manu Street
Kula HI 96790
3. Kula Botanical Gardens 878-1715
RR4, Box 228
Kula HI 96790
4. Maui Botanical Gardens 249-2798
Kanaloa Avenue, Kahului
across from stadium
5. Kula Forest Reserve
access road at the end of Waipoli Rd
Call the Maui District Office 984-8100
6. Wailea Point, Private Condominium residence 875-9557
4000 Wailea Alanui, Kihei
public access points at Four Seasons Resort or
Polo Beach
7. Kahanu Gardens, National Tropical Botanical Garden 248-8912
Alau Place, Hana HI 96713
8. Kahului Library Courtyard 873-3097
20 School Street
Kahului HI 96732

PLACES TO BUY NATIVE PLANTS ON MAUI

1. Ho'olawa Farms
Anna Palomino
P O Box 731
Haiku HI 96708
575-5099

* The largest and best collection of natives in the state. They will deliver, but worth the drive to go and see!
Will propagate upon request
2. Kahanu Gardens
National Tropical Botanical Garden
Alau Place, Hana
248-8912
3. Kihana Nursery
1708 South Kihei Road
Kihei HI 96753
879-1165
4. Kihei Garden and Landscape
Waiko Road, Wailuku
P O Box 1058
Puunene HI 96784
244-3804
5. Kula Ace Hardware and Nursery
3600 Lower Kula Road
Kula HI 96790
876-0734
* many natives in stock
* get most of their plants from Ho'olawa Farms
* they take special requests
6. Kulamanu Farms - Ann Carter
Kula HI 96790
878-1801
7. Maui Nui Botanical Gardens
Kanaloa Avenue
(Across from stadium)
Kahului HI 96732
249-2798
8. Native Gardenscapes
Robin McMillan
1330 Lower Kimo Drive
Kula HI 96790
870-1421

* grows native plants and installs landscapes including irrigation.
9. Native Hawaiian Tree Source
1630 Piihola Road
Makawao HI 96768
572-6180
10. Native Nursery, LLC
Jonathan Keyser
250-3341
11. New Moon Enterprises - Pat Bily
47 Kahoea Place
Kula HI 96790
878-2441
12. Waiakoa Tree Farm - Kua Rogoff
Pukalani HI 96768
Cell - 264-4166

A Checklist of Water Conservation Ideas for Condominiums

COOLING

Cooling Towers

Cooling Towers are used to reject heat from air conditioning systems. In a cooling tower, a circulating stream of warm water contacts an air flow, causing evaporation of a portion of the water. When this water evaporates, the water which remains behind is cooled. The cooled water then circulates through a cooling system, warms and then returns to the tower.

- ☞ Understand Your System: Prepare an inventory of each cooling tower you have, its cooling capacity, and the equipment or processes that it serves
- ☞ If you purchase chemicals for the treatment of the recirculating cooling tower water, have the chemical vendor explain the purpose and action of each chemical.
- ☞ Have your chemical vendor provide a written report of each service call, and be sure that the vendor explains the meaning of each analysis performed, as well as the test results.
- ☞ Tell your chemical vendor that water conservation is a priority, and ask about alternatives that may reduce the amount of water bled-off from the towers.
- ☞ Have vendors bid for your facility's water cooling tower water treatment. Require a predetermined minimum level of water efficiency. Have them provide figures showing projected annual water and chemical consumption and costs.
- ☞ Consider incorporating sulfuric acid to reduce carbonate scale and achieve significantly higher cycles of concentration. If you use sulfuric acid, be sure to observe appropriate safety precautions.
- ☞ Ozone is another alternative that can help remove dissolved minerals and act as a biocide. Again, observe the appropriate safety precautions.
- ☞ If available, use reclaimed water as a source of cooling tower make-up water.
- ☞ Blow-down water is the release of some of the circulating water to remove suspended and dissolved solids left behind as pure water evaporates from the system. Re-use blow down where possible for non-potable uses.

Evaporative Coolers

Evaporative coolers lower air temperature by increasing the humidity of incoming air being drawn into a building. The air's ambient or "dry bulb" temperature is lowered when the air absorbs water vapor. After a short period of operation, the recirculating air in the cooler reaches wet bulb temperature, which is theoretically the lowest temperature to which the entering air may be cooled. Some evaporative coolers have recirculation pumps.

All evaporative coolers require either a small amount of bleed-off or regular cleaning to maintain and prevent damage to the coolers pads. The principle opportunity for conservation in evaporative cooling is to reduce the amount of water bled-off, and to reuse that water wherever possible.

- ☞ Be sure your coolers have pumps to recirculate the water. This decreases water consumption and increases cooling efficiency.
- ☞ Check to make sure you are not bleeding off an excessive amount of water. For a typical small cooler, anything more than a few gallons per hour may be excessive.
- ☞ Pipe the bleed-off water from your coolers to help water a landscaped area!

Eliminate Once Through Cooling!

Some coolers pass water through the equipment only once, and then discard it. "Single pass" technology is not good for two reasons. First, these single pass coolers use too much water! Secondly, they do not cool as effectively, because the water does not cool to wet bulb temperature. This type of cooling is illegal under Maui County Codes! Make sure your air conditioners, ice makers and other cooling systems are not single pass models!

- ☞ Replace single-pass cooling models with air-cooled or recirculating models
- ☞ Connect to a recirculating cooling water loop. Or retrofit models to be recirculating.
- ☞ If a piece of equipment can not be replaced immediately, remember, it is illegal to dump single pass cooling water into the sewer system. Re-use this water for landscaping or other non-potable uses.



A Checklist of Water Conservation Ideas for Condominiums

PLUMBING MEASURES FOR EACH UNIT

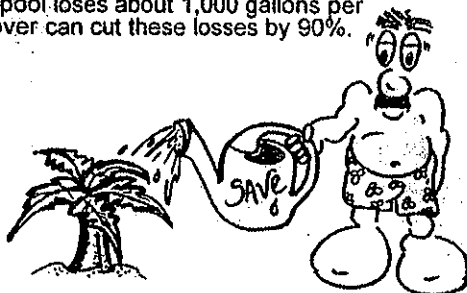
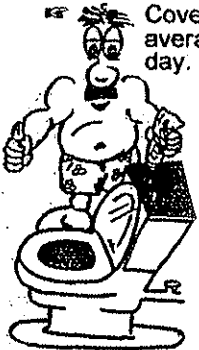
- ☞ Replace toilets with Ultra Low Flush Models, or retrofit with low flow flappers. Contact the Maui County Board of Water Supply at 243-7199 or the Wastewater Division at 243-7417 for more information.
- ☞ Retrofit faucets with aerators, or consider alternative faucet types such as self closing or, automatic sensor controlled faucets.
- ☞ Replace showerheads with low flow models. Contact the Maui County Board of Water Supply at 243-7199, or the Public Works Wastewater Division at 243-7417 to find out how you can get these!
- ☞ Check for leaks! Check for leaks! Check for leaks! Do dye tablet or food coloring tests in toilets to check for hidden leaks. Check for dripping faucets indoors and out!

COMMON LAUNDRY AREAS

- ☞ Efficient washing machines can save up to 20 gallons per load. These also save on energy. If you are replacing laundry facilities don't even consider anything but the new horizontal axis models. These not only save up to 40% of water used, but deliver even more substantial energy savings - up to 65%!
- ☞ Water boilers also require blow-down, or bleed-off, just like air conditioners. Monitor total dissolved solids, and blow down only when necessary!
- ☞ Avoid excessive filter or softener back flush. Back flush only when needed.

NON-LANDSCAPED AREAS OUTDOORS

- ☞ Never hose your sidewalks and driveways. This is a complete waste of water, and a hose can use 25 gallons in just 5 minutes. Remember: A broom is best.
- ☞ Check for leaks! Note the number of outdoor faucets on the outsides of buildings. Make a list and check every one regularly.
- ☞ Cover Pools and Jacuzzis when not in use. An average sized pool loses about 1,000 gallons per day. A pool cover can cut these losses by 90%.



EDUCATION

- ☞ Knowledge is power. Educate people about how they can help to save water at your building or facility. You may be surprised at how willing people are to chip in, once they know what to do!

LANDSCAPES

- ☞ Understand your system: Develop a schematic of all water entry points. Know where your faucets, time clocks, solenoids, booster pumps, sprinklers, bubblers, valves, pipes and etc. are located.
- ☞ Make a checklist of system elements and check each one regularly for leaks! Finding and repairing leaks can lead to big savings, especially in irrigation systems!
- ☞ Use turf only where actually necessary. Avoid turf except in picnic or active play areas.
- ☞ Choose the right plants. Native plants appropriate for your region are best. These save water, because they are adapted to survive on the natural rainfall of the area. Besides saving water, they also help to avoid the spread of invasive alien plant species which can destroy native ecosystems. And they contribute to the true Hawaiian sense of place.
- ☞ Avoid over-watering! Use soil moisture over-rides and rain-shutoffs on all automated systems. Reset controllers at least once per month to account for changing evapotranspiration.
- ☞ Zone your plants. This means that plants with similar water needs should be grouped together. This avoids wasting water, overwatering some plants and under-watering others.
- ☞ Never water during the heat of the day. The best time to water is just around sunrise. Evenings are also acceptable. Once the sun comes up, the evapotranspiration rate soars, and much of your water is wasted.
- ☞ Having your soil tested also helps you to learn what type of watering is needed. Clay soils take from ¼ to ½" of water per hour before water starts running off and being wasted. Sandy soils require somewhat more frequent, shorter watering.
- ☞ Mulch, compost or other organic material will help soils hold moisture, keep the ground from overheating and discourage weeds. Loosening the soil while you add the organic matter will also help keep your lawn healthier.
- ☞ Root feeder or water aerator probes around trees and bushes will help to direct water where it is needed. You can also build a watering basin in the soil around the base of your plants to help the water soak in deeply.

For More Information, Contact the Maui County Board of Water Supply - Water Resources & Planning Division @ 243-7199



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

MARK A. LAENDER BOY

August 27, 2007

Jeff Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai'i 96793

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Eng:

Thank you for your letter dated May 9, 2007, providing comments on the EISPN for the subject project, as well as your follow-up letter of June 18, 2007, clarifying prior comments concerning the projected daily water demand for the project based on the system per-acre standards.

On behalf of the applicant, A&B Properties, Inc., we offer the following responses to your comments:

Source Availability and Consumption

The applicant is exploring several potential source opportunities, including surface water treatment and new well sources in Central Maui. Any future source development will be coordinated with the applicable regulatory agencies. Irregardless of the alternative, the source will be developed based on redundancy factors according to Department of Water Supply (DWS) standards.

System Infrastructure

The applicant will provide water service and fire protection in accordance with system standards and will consult with the applicable DWS staff during the water system design and development process.

Conservation

During the civil design for the project, the applicant will examine the potential use of non-potable water, where available, and will consult with the relevant DWS staff, as required.

The planting brochure will be distributed to future homeowners.

Concerning over-watering by automated systems, the information provided will be given to the applicant's design consultants for implementation.

Single-pass cooling systems will not be installed in the project.

The use of low-flow fixtures and devices will be employed in conformance with Maui County Code, Subsection 16.20A.680.

The applicant will conduct a regular program of repair and maintenance to prevent leaks in fixtures.

Pollution Prevention

The applicant will include the recommended mitigation measures listed in your letter into the Best Management Practices (BMPs) for the project.

We appreciate the input we received from you. A copy of the Draft Environmental Impact Statement (EIS) 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:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission



April 16, 2007

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

Dear Mr. Ginoza,

Subject: Proposed Kihei Residential Project at
Tax Map Key (2) 3-8-004:002 (por.), 22 (por) and 030 (por.)

Thank you for allowing us to comment on the Environmental Impact Statement (EIS) Preparation Notice for the subject project, which was received on April 10, 2007.

In reviewing our records and the information received, Maui Electric Company (MECO) has no objection to the project at this time. However, the addition of this project's anticipated load demand will have a substantial impact to our system. Therefore, development of a new substation and upgrades to our transmission and distribution system may be necessary to accommodate a project of this magnitude. We highly encourage the developer's electrical consultant to submit the 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 Fred Oshiro at 872-3202.

Sincerely,

A handwritten signature in black ink, appearing to read "Neal Shinyama". The signature is fluid and cursive, written over a few lines.

Neal Shinyama
Manager, Engineering

NS/kk:lh
cc: Sage Kiyonaga – MECO DSM
Anthony Ching – SOH Land Use Commission



MICHAEL T. MUNEKIYO
GWEN ORASIE HIRAGA
MITSURU "MICK" HIRANO
KARLIS KAWAHARA

MARK ALEXANDER BOY

August 27, 2007

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

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Shinyama:

Thank you for your letter dated April 16, 2007, providing comments on the EISPN for the subject project. On behalf of the applicant, A&B Properties, Inc., we would like to provide the following information to help address your comments:

1. We acknowledge that MECO will require access and easements in order to provide service to the proposed project.
2. The project electrical consultant will submit electrical drawings and a project time schedule, as early as is practicable to facilitate the provision of service.
3. The applicant will coordinate with MECO to address the need for system upgrades which may be necessary to accommodate the anticipated load demand from the proposed project.
4. Energy conservation measures will be considered as part of the project design phase of development. Coordination with the Demand Side Management Group will be undertaken at that time.

Neal Shinyama, Engineering Manager
October 27, 2006
Page 2

We appreciate the input provided by your office. A copy of the Draft EIS will be provided to you for review and comment.

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

Very truly yours,

A handwritten signature in black ink, appearing to read "Kyle Ginoza", with a long horizontal line extending to the right from the end of the signature.

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

F:\DATA\A&B\KheiRes\EISP\NMECO.EISP\Nres.wpd

Hawaiian Telcom ●

April 17, 2007

Munekiyo & Hiraga, Inc.
305 South High Street Suite 104
Wailuku, Maui, Hawaii 96793

ATTN: Mr. Kyle Ginoza

SUBJECT: Proposed Kihei Residential Project at TMK 3-8-004:002

Dear Mr. Ginoza;

Thank you for the opportunity to comment on the Proposed Kihei Residential Project at TMK 3-8-004:002.

As stated in the "EIS" preparation notice, section II, sub-section D, item 5. Hawaiian Telcom Inc. does have aerial facilities at Piilani Hwy, but the capacities not sufficient to serve a project of this size. As we go forward with the design and planning stage of this project, please keep in mind that Hawaiian Telcom will require an easement within this parcel to place equipment which will increase line capacity to serve this project. The typical easement is 25' X 30' and is suggested to be on the highway end of the project. More details can be discussed as we get closer to the design stage.

If there are any questions, please call me at (808) 242-5107.

Sincerely,



Tom Hutchison
Engineer, IP – OSP Engineering

C: BICS; 0704-027 File
Anthony Ching, Land Use Commission



MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICK" HIRANO
KARLYN KAWAHARA
MARK ALEXANDER BEN

August 27, 2007

Thomas Hutchinson, Engineer
Network Engineering & Planning
Hawaiian Telcom
60 South Church Street
Wailuku, Hawai'i 96793

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Hutchinson:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated April 17, 2007, providing comments on the EISPN for the subject project.

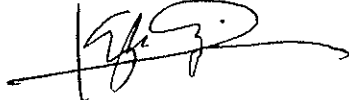
The applicant's design team will coordinate with Hawaiian Telcom during the engineering plans preparation phase of work to ensure that all telecommunication requirements for the project are addressed. The applicant acknowledges that the provision of an easement to facilitate the installation of equipment to increase line capacity will be necessary.

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

Thomas Hutchinson, Engineer
August 27, 2007
Page 2

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

Very truly yours,

A handwritten signature in black ink, appearing to read 'KG', with a long horizontal line extending to the right from the end of the signature.

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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KCA

Kihei Community Association

"Working together to shape our Community's future."

April 16, 2007

Munekiyo & Hiraga
Attn: Mr. Kyle Ginoza
305 High St. Ste. 104
Wailuku, HI.

RE: KCA PLANNING REVIEW APPLICATION

Dear Mr. Ginoza:

I want to thank you for the Draft Environmental Assessment for TMK 2-3-8-4-2 (por 22 & 30).

One of the primary functions of the KCA is to ensure Kihei and South Maui residents that all future growth and infrastructure is of a style and quality that they approve. To fulfill this function, the KCA Planning Committee spends many hours reviewing plans, participating in presentations, and preparing comments and recommendations on all projects brought before it. It is our goal to review all projects proposed for the South Maui area.

The KCA Planning Review Procedure has been adopted in an effort to ensure a thorough and timely review and response to applicant's project presentations. This Planning Review Procedure requires substantial administrative time, therefore, in order to for us to continue to provide this service a fee of \$500 will be required upon submission of the Project Review Application.

Enclosed are copies of the KCA Planning Review Procedure, KCA Planning Review Application and the KCA General Open Space and Design Guidelines. Please feel free to contact our office with any questions you may have. We look forward to working with you to bring about responsible growth in South Maui.

Mahalo,

Michael C. DiBella
Chairman
KCA Planning Committee



KCA

Kihei Community Association

P.O. Box 662 – Kihei, HI – 96753 – 808-879-5390 – info@KiheiCommunityAssociation.org

Planning Review Procedure

Purpose: To provide a forum for the review of proposed developments within the Kihei/Makena Community Plan area. To provide the Applicant with KCA and community input in written form for personal use and/or presentation to approving agencies.

KCA Review: Upon receipt of all required documents, fee, and applicant project presentation the KCA Planning Committee will review the project for conformity with KCA General Open Space and Design Guidelines and the Kihei/Makena Community Plan and make recommendations. Upon compliance with the guidelines and community plan, the KCA Planning Committee and Board of Directors will provide a letter of “conditional approval.” Conditional approval is granted to projects who meet the KCA requirements and guidelines. Conditional approval means, the KCA approves of the project only as it was presented to us and that any future changes must be presented to and approved by the KCA in order for a project to obtain final approval.

Required documents include:

All relevant documents for the proposed development including but not limited to the following, where applicable:

1. Site, grading and topographical plans with indication of water sources and runoff considerations.
2. Subdivision plan.
3. Landscaping plan including proposed public amenities.
4. Building design, elevations, sections, colors and signage.
5. All relevant government submissions including SMA application.
6. Payment of KCA review application fee of \$500.

General Requirements for each project: see attached KCA General Open Space and Design Guidelines.

Review Process:

1. Applicant submits application, review fee, and all required documents.
2. KCA Planning Committee will schedule review meeting where applicant will present project, questions will be asked and ideas exchanged. Review meetings are held weekly on Tuesday at 12:30pm at the KCA office.
3. KCA Planning Committee will provide a letter with preliminary comments and recommendations.
4. After review of recommendations, Applicant shall advise the committee in writing of changes to the project since the first meeting and the status of any government applications concerning the project.
5. Upon receipt of above the KCA Planning Committee will schedule 2nd presentation meeting.
6. Upon approval of second presentation, KCA Planning Committee will schedule Applicant for a presentation at a KCA Community Meeting. Community Meetings are held the third Tuesday of the month at 6:30pm at the Kihei Community Center. Presentations may run twenty minutes plus time for questions and answers and community participation. Applicant shall advise the committee of any changes to the project since the second meeting and the status of any government applications concerning the project.
7. Upon approval, the KCA Board of Directors will provide a letter of “conditional approval” with its comments and recommendations concerning the project to the Applicant with copies to relevant government agencies.



KCA

Kihei Community Association

"Working together to shape our Community's future"

KCA GENERAL OPEN SPACE AND DESIGN GUIDELINES

The following are major areas of concern within the Kihei community and respective guidelines. These areas will be looked at for compliance in all new development projects and SMA reviews.

Open Space Drainage Ways and Flood Control

Major natural drainage ways shall remain undeveloped with a significant buffer to provide for visual open space and connectivity of neighborhoods to beaches, parks, schools, and commercial areas for pedestrians and bikers. Drainage ways left in a natural state or with native vegetation will aid in abating the serious flood problem that Kihei faces as a result of uncontrolled development. Detention and/or retention basins that may be required for maintaining the control of on-site runoff generated from proposed developments shall be substantially completed in their construction and improved with landscape and native vegetation prior to significant clearing, grubbing, grading, and building construction on the site.

Wetlands and Low Lying Drainage Areas

Wetland areas no matter how small and low lying storm water drainage areas should not be used for development. Mitigating wetland areas and rerouting natural drainage ways is not allowed. Significant open space buffers shall be created around wetland areas and drainage ways to preserve open space and provide for a natural and adequate transition from the natural environment to a built one. This buffer will provide for visual and pedestrian access to beaches and coastlines.

Neighborhood Connectivity and Pocket Parks

New neighborhood sub-developments shall include at least one pocket park to provide open space, recreation, and refuge for residents. It is preferred that builders incorporate the park as a significant feature of the development and that sensitive environmental area and their fringes are utilized for open space in lieu of fill. The pocket park should have easy pedestrian and bikeway access to the rest of the development and connect to adjacent neighborhoods, the North/South Collector Roadway and Greenway (if practical), beaches, parks, schools, and commercial areas. Developments abutting the N/S Collector Roadway and Greenway are required to develop and maintain the portion of the greenway abutting their projects.

Shoreline Property

Shoreline property and contiguous areas suitable for open space and public parks should be preserved for that use especially as they relate to natural drainage areas and wetlands.

Beach Access/Impact

New developments shall incorporate into the overall development plan measures that will address any significant impact of their project on beach access including parking.

Pedestrian and Community Safety and De-emphasis of the Automobile

New developments shall provide measures for pedestrian and biking safety and deemphasize the automobile. Roadway standards have been developed by the KCA for use in new developments that provide for a narrowing of roadway widths thereby reducing traffic speed and creating a smaller scale and sense of place suitable for small towns and neighborhoods, (The complete Roadway Standards are available upon request). All roadways shall have street shade trees and planted separations between walkways and the street curbs. Roadways shall incorporate tree planted bulb out areas where parallel parking is included. Neighborhood roads should provide connectivity to adjacent neighborhoods. Crosswalks through roadways should be slightly elevated as a table; a change in texture and color from asphalt is preferred. Neighborhood developments should not place garage door entrances in front yards near the streetscape and should incorporate front porches and/or high visibility of streetscape from homes. Privacy walls at streetscape are discouraged.

Roundabouts and Street Design Guidelines

Roundabouts should be incorporated at the major intersections entering and leaving Kihei's four commercial neighborhood districts, Suda Store, Azeka, Kalama, and Kamaoli. Roundabouts provide for traffic calming and pedestrian safety as well as beautification and a high quality sense of place. Street design guidelines have been created by the KCA for use in all road types for the Kihei/Makena Region with the intention of providing traffic calming and beautification (these guidelines are available upon request).

Affordable Housing

Projects that contribute directly to the development of affordable housing in the form of design and construction according to Maui County guidelines are highly encouraged and supported.

Schools, Parks, and Roads

New developments should participate in an effort to assure that assessment fees for schools, parks, and roads are allocated directly to the improvement of schools, parks, and roads in Kihei. Recent consensus reports provided by the Long Range Planning division of Maui County indicate that Kihei is currently underprovided for in the area of Elementary, Intermediate, and High Schools as well as Public Park Facilities and Open Space. Unimproved parcels adjacent to beach parks should be considered for park accessory uses such as parking. Projects that contribute directly toward the development of Schools, Parks, and Roads in the form of design and/or construction are given preferential status.

Commercial and High Density Developments

Developments should orient building fronts toward the streetscape with parking in the rear or side of buildings away from the streetscape and pedestrian access ways. Wide sidewalks at streetscapes with ample canopy on buildings should be incorporated. Streetscapes and sidewalks should include benches and shade trees. Buildings should have a comfortable scale relationship with the streetscape and sidewalks. Buildings at streetscapes are preferred to be three stories maximum with a massing progression of setting back the third level from the lower two. Mixed use buildings are highly encouraged in order to integrate the residential community into commercial neighborhoods. There should be transition in scale of buildings and their appearance as commercial areas meet residential areas. Commercial zoned lots adjacent to residential shall be limited to two stories and incorporate residential style massing and detailing. Village type commercial areas encouraging pedestrian activity and walk ability within the community are given preference. Signage and building design should be geared toward the pedestrian and slow speed traffic not high speed traffic.

Green Building Guidelines

The KCA is a committed proponent of sustainable, adaptable, and energy efficient building practices. We encourage environmentally conscious building methods wherever possible to reduce the footprint of development on our communal environment. We strongly encourage all projects to seek LEED Certification, an environmentally based rating system administered by the U.S. Green Building Council, and when building a non-LEED certified project, to incorporate USGBC's green building standards.

The green building standards that are particularly applicable for South Maui are outlined below:

Water Efficiency:

- Reduce impervious coverings to increase absorption of storm water
- Use of drought tolerant plants and high efficiency drip irrigation systems to reduce use of irrigation water
- Incorporate dual flush toilets and waterless urinals to reduce water demand for sewage conveyance

Energy & Atmosphere

- Install automated lighting control systems that incorporate occupancy sensors and daylight sensors for use in daylight harvesting
- Install automated shading systems that incorporate reflective backed materials and extending roof eaves to reduce thermal transfer to within a building
- Use of non-polluting renewable energy generation such as solar water heaters and photovoltaic electrical generating panels
- Use of shade trees, reflective paving materials, and reflective or vegetative roof surface to reduce Heat Island Effect
- Use of highly efficient HVAC system that use non ozone depletion refrigerant, such as Puron, to reduce energy consumption and ozone depletion
- Incorporation of natural ventilation systems with opening windows and courtyards to reduce energy consumption and increase indoor air quality
- Use of contained outdoor lighting systems, especially in proximity to natural reserve and coastal areas, to reduce effect of "night lighting" on wildlife.

Materials & Resources

- Use of low emitting Volatile Organic Compound (VOC) adhesives, sealants, paints, coatings, and carpeting
- Incorporation of accessible recycling storage area for cardboard, newspaper, glass, and aluminum
- Use of FSC certified wood sources
- Employment of rapidly renewable building materials such as bamboo flooring and cotton based insulation



KCA

Kihei Community Association

P.O. Box 662 – Kihei, HI – 96753 – 808-879-5390 – info@KiheiCommunityAssociation.org

Planning Review Application

Project Name:

Location of Project (Closest Street Intersections):

Name of Applicant:

Applicant’s contact information, include, address, phone & fax numbers, and email address:

Contact person for applicant, include, address, phone & fax numbers, and email address:

TMK:

Zoning:

Describe project:

Purpose of review request:

List governmental agencies, include contact person, address, phone & fax numbers, and email address for each agency that is or will be involved in reviewing the proposed project:

List documents enclosed with this application (See Planning Review Procedure for required documents):

Design consultant contact: include contact person, address, phone & fax numbers, and email address for each consultant:

Applicant’s signature and title

Date:

\$500 Application fee received by:

Date:



MICHAEL T. MUNEKIYO
GWEN ORABIE HIRAGA
MITSURU "MICK" HIRANO
KARL LEE KAWANABA
MAHE AL-SALDOR BOY

August 27, 2007

Michael C. DiBella, Chairman
Kihei Community Association
Planning Committee
P. O. Box 662
Kihei, Hawai'i 96753

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. DiBella:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated April 16, 2007 on the EISPN for the subject project.

We acknowledge your role in evaluating developments as they pertain to the Kihei-Makena Community Plan. At such time when we have the required documentation and are in the process of an amendment to the community plan, we will engage your services in the form of the KCA planning review procedure.

We appreciate the input we received from your office. A copy of the Draft EIS 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,

A handwritten signature in black ink, appearing to read "Kyle Ginoza", written over a horizontal line.

Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land Use Commission

F:\DATA\A&B\KiheiRes\EISPN\KCA.EISPNres.wpd

APR 25 2007

**Chris & Marilyn Chapman
535 Kaiolohia Street
Kihei, HI 96753**

April 17, 2007

State of Hawaii
Land Use Commission
PO Box 2359
Honolulu, HI 96804

RE: A & B Sub-Division in North Kihei

Aloha:

My husband and I want to take the opportunity to express our concerns about the proposed sub-division stated above.

We own our home and have lived there for approximately twelve-years. Currently we are one house from the park and have no other homes behind us. Our home backs up to the proposed area of this sub-division. There is a beautiful view from Haleakala all the way to Kahului, Wailuku, the West Maui Mountains and Maalaea Bay. From observing other new projects, I must assume that the contractor will bring in mass quantities of dirt to build up the proposed area to the same level as our home, thereby blocking all the beautiful views we enjoy. We have been planning our retirement and purposely did not sell our home when everyone else was selling for untold profits. We added an addition to the upstairs of our home in the back with windows wrapping around to enjoy these same views. I am seriously concerned about having to look into others windows and have them able to look completely into our home because of the wrap around windows; there will be absolutely no privacy.

In addition, very few of the homes in Hale Piilani have air-conditioning, which necessitates having the windows open 24 hours a day. I do not see anyway that a construction project in the proposed area will be able to keep the flying dirt and dust down to at least the current level. Some people complain because of dust caused by a new construction project, however, in our situation, the wind blows very hard straight across the isthmus from Kahului and Wailuku into Kihei, there will not be any way to control the dirt blowing and we cannot afford the installation of air-conditioning. Perhaps someone should test the air quality at our home on windy and not so windy days and then I am sure the problem with additional dirt in this area would be well understood. In addition, every home lot will need green grass lawns, which will require plenty more water. Kihei is so arid and it does take water to keep our lawn green, however, without the grass, dirt will blow into every neighbor's home. As it is some days we cannot walk in the neighborhood for exercise because the wind is blowing dirt and it gets into our eyes.

Hopefully someone has considered how the rodents from the field will be kept from fleeing into our sub-division.

We understand that more homes are needed on Maui, however, we are not certain that this area serves the purpose. With traffic at the Kaiwahine Street and the Ohukai Street traffic lights

already backed up with existing traffic, sometimes it can take fifteen to twenty minutes simply to exit our sub-division from either street onto Piilani and with the addition of 600 homes, how does one propose everyone will get out of the area to go into Kihei, Kahului, Wailuku or Lahaina.

There has already been another sub-division approved behind the Hale Kihei Housing on Hoalike Street. The traffic will be impossible with the approval of both of these projects. The only alternative I see is adding another stoplight in between Ohukai and Kaiwahine Streets or have the new A & B proposed project enter and exit the project on Mokulele. With traffic from N. Kihei Rd, S. Kihei Rd, Mokulele Highway and Piilani Highway all converging at this area how can we assume the vehicles associated with 600 more homes will not completely undo the upgrades and improvements finally happening at this intersection (Mokulele and Piilani) and the flow of traffic.

Any information you can relay to us on these matters would be greatly appreciated.

Sincerely,



Marilyn Chapman

cc: Mr. Kyle Ginoza ✓
Munekiyo & Hiraga Inc.
205 S. High Street
Wailuku, HI 96793



MICHAEL T. MUNEKIYO
GWEN ORASHI HIRAGA
MITSURU "MICK" HIRANO
KAREEN KAWABARA

MARIE ALEXANDER BOY

August 27, 2007

Chris and Marilyn Chapman
535 Kaiolohia Street
Kihei, Hawai'i 96753

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. and Mrs. Chapman:

Thank you for your letter dated April 17, 2007, providing comments on the subject project.

On behalf of the applicant, A&B Properties, Inc., we offer the following responses to your comments.

There currently exists a grade difference between the adjacent Hale Pi'ilani residential subdivision and the project site. At this time, it is not the applicant's intent to fill the project site up to a grade consistent with the adjacent Hale Pi'ilani subdivision. However, some fill may be required to satisfy gravity flow requirements for onsite infrastructure systems and to balance overall site grading.

The applicant will employ applicable Best Management Practices (BMP's) to minimize impacts of construction activities on neighboring properties. This includes watering down the project site during construction to curtail airborne fugitive dirt and implementing rodent control measures. Moreover, the project will be properly irrigated to ensure that parcels are landscaped so as to minimize the dirt nuisance in the future.

A detailed traffic impact analysis report (TIAR) will be included as part of the documentation supplied to State and County agencies for project review. The TIAR will evaluate both present and future traffic conditions and will recommend various traffic mitigation measures to accommodate the increase in area traffic. The TIAR will account for other proposed projects in the area to evaluate its cumulative effect on traffic conditions. Please also note that direct access from Pi'ilani Highway to the proposed project is being planned, which should result in the diversion of some project traffic from Kaiwahine Street.

Chris and Marilyn Chapman
August 27, 2007
Page 2

We appreciate the input we received from you. Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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XI. CHECKLIST OF AGENCY RESPONSE LETTERS

XI. CHECKLIST OF AGENCY RESPONSE LETTERS

The EISPN comment period was from April 8, 2007 to May 8, 2007. The Draft EIS comment period was from October 8, 2007 to November 23, 2007. Where indicated, the agency, organization, or individual submitted comments.

Entity Consulted	Early Consultation (EISPN) Letter Received	Draft EIS Letter Received
FEDERAL		
Natural Resources Conservation Service		10/22/07
Department of the Army		
U.S. Fish and Wildlife Service		11/5/07
National Marine Fisheries Service		
U. S. Army Corps of Engineers		
STATE OF HAWAII		
Hawai'i Dept. of Transportation	4/16/07	11/21/07
Hawai'i State Civil Defense		11/16/07
Dept. of Accounting and General Services	5/9/07	10/12/07
Department of Agriculture		
Dept. of Business, Economic Development and Tourism, Office of Planning	5/8/07 and 3/19/07	11/23/07
Dept. of Business, Economic Development and Tourism, Energy, Resources & Technology Division		
Department of Defense		
Department of Education	5/1/07	11/6/07
Office of Environmental Quality Control	4/23/07	
Office of Hawaiian Affairs	5/8/07	11/26/07
Department of Hawaiian Home Lands		
State Land Use Commission		11/28/07
State Historic Preservation Division	3/20/08	
Department of Land and Natural Resources	4/9/07	11/16/07
Department of Health – EPO	4/5/07	11/19/07
Department of Health – Maui	4/17/07	11/9/07

The EISPN comment period was from April 8, 2007 to May 8, 2007. The Draft EIS comment period was from October 8, 2007 to November 23, 2007. Where indicated, the agency, organization, or individual submitted comments.

Entity Consulted	Early Consultation (EISPN) Letter Received	Draft EIS Letter Received
University of Hawai'i Environmental Center		11/26/07
University of Hawai'i Water Resource Research Center		
COUNTY OF MAUI		
Office of the Mayor		
Maui Civil Defense Agency		
Department of Fire and Public Safety		
Department of Housing and Human Concerns	4/10/07	
Councilmember G. Riki Hokama		
Councilmember Danny Mateo		
Councilmember Michelle Anderson		
Councilmember Gladys Baisa		
Councilmember JoAnne Johnson		
Councilmember Bill Medeiros		
Councilmember Michael Molina		
Councilmember Joseph Pontanilla	4/18/07	10/10/07
Councilmember Michael Victorino		
Department of Planning		1/11/08
Department of Parks and Recreation	4/24/07	11/6/07
Police Department	5/3/07	10/19/07
Department of Public Works	5/11/07	10/19/07
Department of Environmental Management		12/19/07
Department of Transportation		
Department of Water Supply	5/9/07 and 6/18/07	

The EISPN comment period was from April 8, 2007 to May 8, 2007. The Draft EIS comment period was from October 8, 2007 to November 23, 2007. Where indicated, the agency, organization, or individual submitted comments.

Entity Consulted	Early Consultation (EISPN) Letter Received	Draft EIS Letter Received
OTHER ORGANIZATIONS AND INDIVIDUALS		
Maui Electric Company	4/16/07	10/22/07
Maui Memorial Medical Center		
Hawaiian Telcom	4/17/07	
Oceanic Time Warner		
Kihei Community Association	4/16/07	
Zandra Souza-Amaral (resident)		
Chris and Marilyn Chapman (residents)	4/17/07	
Kihei Public Library		
Hawai'i Documents Center		
Kahului Public Library		
Department of Business, Economic Development & Tourism Library		
Hamilton Library, Hawaiian Collection		
Legislative Reference Bureau		
Maui Community College Library		
Honolulu Advertiser, Editor		
Honolulu Star Bulletin, City Editor		
Maui News, Editor		
Moloka'i Dispatch, Editor		

**XII. PARTIES
CONSULTED DURING THE
REVIEW OF THE DRAFT
ENVIRONMENTAL
IMPACT STATEMENT;
LETTERS RECEIVED AND
RESPONSES TO
SUBSTANTIVE
COMMENTS**

XII. PARTIES CONSULTED DURING THE REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during review of the Draft Environmental Impact Statement (EIS). Agency comments and responses to substantive comments are included herein.

STATE AGENCIES

- | | | | |
|----|---|-----|--|
| 1. | Anthony Ching, Executive Officer
State Land Use Commission
P. O. Box 2359
Honolulu, Hawai'i 96804 | 6. | Department of Business, Economic,
Development & Tourism
Energy, Resources & Technology
Division
235 South Beretania Street, 5th Floor
Honolulu, Hawai'i 96813 |
| 2. | Lawrence K. Lau, Interim, Director
Office Of Environmental Quality
Control
235 S. Beretania Street, Suite 702
Honolulu, Hawai'i 96813 | 7. | Mary Lou Kobayashi
Planning Program Administrator
Office of Planning
P. O. Box 2359
Honolulu, Hawai'i 96804 |
| 3. | Sandra Lee Kunimoto
Department of Agriculture
1428 South King Street
Honolulu, Hawai'i 96814-2512 | 8. | Department of Defense
3949 Diamond Head Road
Honolulu, Hawai'i 96816-4495 |
| 4. | Russ Saito, State Comptroller
Department of Accounting and
General Services
1151 Punchbowl Street, #426
Honolulu, Hawai'i 96813 | 9. | Patricia Hamamoto, Superintendent
Department of Education
P. O. Box 2360
Honolulu, Hawai'i 96804 |
| 5. | Theodore Liu, Director
Department of Business, Economic
Development and Tourism
220 South King Street
Honolulu, Hawai'i 96813 | 10. | Micah Kane, Chairman
Department of Hawai'ian Home Lands
P. O. Box 1879
Honolulu, Hawai'i 96805 |
| | | 11. | Department of Health
Environmental Planning Office
P. O. Box 3378
Honolulu, Hawai'i 96801 |

12. Laura Thielen, Acting Chairperson
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
13. Melanie Chinen, Administrator
State Historic Preservation Division
601 Kamokila Boulevard
Suite 555
Kapolei, Hawai'i 96707
14. Barry Fukunaga, Director of Transportation
Hawai'i Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097
15. Haunani Apoliona, Chairman
Office of Hawai'ian Affairs
711 Kapiolani Blvd, Suite 500
Honolulu, Hawai'i 96813
16. **University of Hawai'i Manoa Environmental Center**
2500 Dole Krauss Annex 19
Honolulu, Hawai'i 96822
17. **University of Hawai'i Manoa Water Resource Research Center**
2540 Dole Street, Room 283
Honolulu, Hawai'i 96822
18. Ed Texeira, Vice Director
Hawai'i State Civil Defense
3949 Diamond Head Road
Honolulu, Hawai'i 96816-4495
19. Bruce Anderson
Complex Area Superintendent
(Central/Upcountry Maui)
Department of Education
54 High Street, 4th Floor
Wailuku, Hawai'i 96793
20. Ron Okumura
Complex Area Superintendent
(Lanai/Molokai/Hana/Lahaina)
Department of Education
54 High Street, 4th Floor
Wailuku, Hawai'i 96793

21. Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawai'i
Department of Health
54 High Street
Wailuku, Hawai'i 96793
22. Wes Lo, CEO
Maui Memorial Medical Center
221 Mahalani Street
Wailuku, Hawai'i 96793

FEDERAL AGENCIES

23. Patrick Leonard
Field Supervisor
U. S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122, Box
50088
Honolulu, Hawai'i 96813
24. **National Marine Fisheries Service**
2570 Dole Street
Honolulu, Hawai'i 96822
25. 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
26. **U. S. Army Corps of Engineers**
Pacific Ocean Division
Building 230
Fort Shafter, Hawai'i 96858-5440
27. 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

COUNTY AGENCIES

28. Carl Kaupalolo, Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawai'i 96732
29. Vanessa Medeiros, Director
County of Maui
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawai'i 96793
30. Tamara Horcajo, Director
County of Maui
Department of Parks and Recreation
700 Hali'a Nakoia Street, Unit 2
Wailuku, Hawai'i 96793
31. Jeff Hunt, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawai'i 96793
32. Thomas Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawai'i 96793
33. Milton Arakawa, Director
County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawai'i 96793
34. Jeff Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai'i 96793
35. Jo-Ann Ridao, Housing Commissioner
Office of the Mayor
200 South High Street
Wailuku, Hawai'i 96793
36. Gen Inuma, Administrator
Maui Civil Defense Agency
200 South High Street
Wailuku, Hawai'i 96793
37. Cheryl Okuna, Director
Department of Environmental Management
200 South High Street
Wailuku, Hawai'i 96793
38. Don Medeiros, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawai'i 96793
39. **Kihei Public Library**
35 Waimahaihai Street
Kihei, Hawai'i 96793
40. **Hawai'i Documents Center**
Hawai'i State Library
478 South King Street
Honolulu, Hawai'i 96813
41. **Kahului Public Library**
90 School Street
Kahului, Hawai'i 96732
42. **Department of Business, Economic Development & Tourism Library**
P. O. Box 2359
Honolulu, Hawai'i 96804
43. **Hamilton Library, Hawaiian Collection**
University of Manoa
2550 The Mall
Honolulu, Hawai'i 96822
44. **Legislative Reference Bureau**
State Capitol, Room 004
Honolulu, Hawai'i 96813
45. **Maui Community College Library**
310 Ka'ahumanu Avenue
Kahului, Hawai'i 96732
46. **Editor, Honolulu Advertiser**
P. O. Box 31000
Honolulu, Hawai'i 96849

- 47. **City Editor, Honolulu Star Bulletin**
500 Ala Moana Boulevard, Suite 7-500
Honolulu, Hawai'i 96813
- 48. **Editor, Maui News**
P. O. Box 550
Wailuku, Hawai'i 96793
- 49. **Editor, Molokai Dispatch**
P. O. Box 440
Kaunakakai, Hawai'i 96748
- 50. G. Riki Hokama, Council Chair
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 51. Councilmember Danny Mateo
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 52. Councilmember Michelle Anderson
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 53. Councilmember Gladys Baisa
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 54. Councilmember JoAnne Johnson
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 55. Councilmember Bill Medeiros
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 56. Councilmember Michael Molina
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793
- 57. Councilmember Joseph Pontanilla
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793

- 58. Councilmember Michael Victorino
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793

OTHER CONSULTED PARTIES

- 59. **Kihei Community Association**
P. O. Box 662
Kihei, Hawai'i 96753
- 60. Neal Shinyama, Manager - Engineering
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawai'i 96732
- 61. **Hawaiian Telcom**
60 South Church Street
Wailuku, Hawai'i 96793
- 62. **Oceanic Time Warner Cable**
350 Hoohana Street
Kahului, Hawai'i 96732
- 63. Zandra Souza-Amaral
365 Hoalike Street
Kihei, Hawai'i 96753

United States Department of Agriculture



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

October 22, 2007

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

Subject: Proposed Kihei Residential Project
TMK: 3-8-004: 002 (por), 022 (por) and 030 (por)

Dear Mr. Ginoza:

We highly recommend a watershed assessment regarding the Waiakoa Gulch and its impact of runoff during storm events.

Design parking lot/driveways which will direct and capture run off to landscape areas.
Native plants should be required for groundcovers for the proposed development to reduce water usage.

Provide specific adequate design information on the proposed drainage plan or erosion control for future comments.

Thank you for the opportunity to comment.

Sincerely,

A handwritten signature in black ink, appearing to read "Ranae Ganske-Cerizo".

Ranae Ganske-Cerizo
District Conservationist

Helping People Help the Land

An Equal Opportunity Provider and Employer



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

MARK ALEXANDER ROY
KYLE GINGZA

April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Ms. Ganske-Cerizo:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated October 22, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. The applicant's civil engineer has undertaken a flood analysis along mauka portions of Waiakoa Gulch in the vicinity of the project site and is in consultation with the Federal Emergency Management Agency (FEMA) to further define applicable flood hazard areas along Waiakoa Gulch. The project's proposed drainage improvements are intended to reduce the post-development runoff volume through the creation of several detention basins. The use of drainage basins is expected to mitigate offsite drainage runoff and impacts to coastal waters.
2. Opportunities to direct runoff from parking lots and driveways to nearby landscaped areas and detention basins will be pursued. Also, native plants which require less water will be sought for the landscaped areas within the project.
3. As requested, greater design detail of the design information for the proposed drainage and erosion control plan will be provided when the project progresses to the engineering design phase of development.

Ranae Ganske-Cerizo, Soil Conservationist
April 23, 2008
Page 2

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Kyle Ginoza', with a long horizontal flourish extending to the right.

Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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NOV 06 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-FA-0007

NOV - 5 2007

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

Subject: Draft Environmental Impact Statement for Proposed Kihei Residential Project,
Wailuku District, Maui, Hawaii

Dear Mr. Ginoza:

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) October 9, 2007, receipt of your Draft Environmental Impact Statement for the Proposed Kihei Residential Project in the Wailuku District on Maui. We are concerned that activities associated with the construction and use of the proposed residential area may adversely affect threatened Newell's shearwater (*Puffinus auricularis newelli*) and endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*) (collectively referred to as seabirds). Surveys conducted by Robert Hodby, Environmental Consultant, in August 2005, did not note the presence of these listed species. However, the 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.

TAKE PRIDE®
IN AMERICA 

- 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.

In addition, we recommend that applicable measures identified in the enclosed list of Standard Best Management Practices (BMP) for fish and wildlife be incorporated into the project's BMP Plan. These measures should help prevent erosion, sedimentation, and other adverse impacts to aquatic fish and wildlife resources in Waiakoa Gulch, the Kealia Pond National Wildlife Refuge, and nearby coral reef ecosystems.

If you have questions or need further information relative to seabirds, please contact Fish and Wildlife Biologist Dawn Greenlee with our Consultation and Technical Assistance Program. For assistance related to aquatic resource conservation, please contact Fish and Wildlife Biologist Gordon Smith with our Coastal Conservation Program. The following numbers can be used to contact either individual (phone: 808-792-9400; fax: 808-792-9581).

Sincerely,

A handwritten signature in black ink, appearing to read "Patrick Leonard". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Patrick Leonard
Field Supervisor

Enclosure

Enclosure

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.



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

MARK ALEXANDER ROY
KYLE GORDON

April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Leonard:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 5, 2007 (Reference No.12200-2008-FA-0007), regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

We offer the following comments, in response to your remarks concerning potential impacts to seabirds:

1. 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.
2. There will be no night construction associated with the development of the project during the period of September 15 through December 15.
3. Information dissemination about seabird fallout will be provided to all staff working onsite prior to initiation of work. The applicant and/or its contractor will coordinate with your office to ensure that appropriate content is included in the distribution materials.
4. A cat kennel will be kept onsite to temporarily hold a downed seabird.
5. 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.

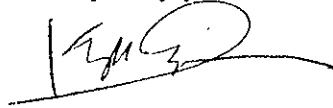


Patrick Leonard, Field Supervisor
April 23, 2008
Page 2

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

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.
R. M. Towill Corporation

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OCT 15 2007

LINDA LINGLE
GOVERNOR



RUSS K. SAITO
COMPTROLLER

BARBARA A. ANNIS
DEPUTY COMPTROLLER

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

(P)1244.7

OCT 12 2007

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

Dear Mr. Ginoza:

Subject: Draft Environmental Impact Statement
Proposed Kihei Residential Project
Island of Maui, Wailuku District
TMK (2)3-8-004:002 (por.), 022 (por.) and 030 (por.)

Thank you for the opportunity to review the Draft Environmental Impact Statement. The 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.

If you have any questions, please have your staff call Mr. Clarence Kubo of the Planning Branch at 586-0488.

Sincerely,


ERNEST X.W. LAU
Public Works Administrator

CKK:vca

cc: Mr. Laurence Lau, OEQC
Mr. Anthony Ching, State Land Use Commission
Mr. David Victor, DAGS Maui District Office



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

MARK ALEXANDER ROY
KYLE GINOZA
April 23, 2008

Ernest Y. W. Lau
Public Works Administrator
Department of Accounting and General Services
1151 Punchbowl Street, Suite 426
Honolulu, Hawai'i 96813

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.))

Dear Mr. Lau:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated October 12, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

We appreciate the input we received from your office.

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

Very truly yours,

Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

November 6, 2007

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

Dear Mr. Ginoza:

Subject: Draft Environmental Impact Statement for Kihei Residential Project
TMK: 3-8-004: por. 2, por. 22 and por. 30, Kihei, Maui

The Department of Education (DOE) has reviewed the Draft Environmental Impact Statement (DEIS) for the project noted above. The narrative of the DEIS accurately notes the impacts to primary and secondary educational facilities that will be generated by the Kihei Residential Project.

Please update the table and discussion in the DEIS to reflect the enclosed 2007 update of "Actual and Projected Enrollments at Department of Education Schools." Our enrollment numbers and future projections have changed since the data provided to you in 2006.

SUPPLEMENTAL INFORMATION

ACTUAL AND PROJECTED ENROLLMENTS
AT DEPARTMENT OF EDUCATION SCHOOLS

School	Capacity	Actual Enrollment	Projected Enrollment	
	SY 06-07	SY 07-08	SY 11-12	SY 12-13
Maui High	1,526	1,732	1,662	1,665
Lokelani Intermediate	697	651	583	561
Kamali'i Elementary	797	650	611	603
Kihei Elementary	923	799	774	781

Mr. Kyle Ginoza
Page 2
November 6, 2007

The 2007 Legislature passed a bill establishing school impact fees. The bill became Act 245 and is in the process of being implemented. Under this new law, we believe the project will be required to pay an impact fee. We currently do not know the amount of the fee per residential unit; however, we should have a better idea early in 2008. The DOE looks forward to meeting with the developers of the project to discuss an agreement to mitigate the impacts of enrollment growth generated by this and other projects.

Thank you for the opportunity to review this document. If you have any questions, please call Heidi Meeker of our Facilities Development Branch at (808) 733-4862.

Very truly yours,



Patricia Hamamoto
Superintendent

PH:jmb

c: Randolph Moore, Assistant Superintendent, OSFSS
Duane Kashiwai, Public Works Administrator, FDB
Bruce Anderson, CAS, Baldwin/King Kekaulike/Maui High Complex Areas



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

MARK ALEXANDER ROY
KYLE GINOZA

April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Ms. Hamamoto:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 6, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. Thank you for providing the updated future projections for enrollments at Department of Education schools. We will include the revised data in the applicable table and discussion in the Final EIS.
2. The applicant acknowledges that the 2007 Legislature passed a bill establishing school impact fees. The applicant will work with the Department of Education in formulating an appropriate fair-share agreement for the subject project.

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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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: **Draft Environmental Impact Statement, Proposed Kihei
Residential Project, TMK: (2) 3-8-004: 002**

Thank you for the opportunity to comment on the Draft Environmental Impact Statement. Our comments remain the same as provided in the April 17, 2007, letter from this office for the Environmental Impact Statement Preparation Notice for the proposed Kihei Residential Project.

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

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

c: Anthony Ching
OEQC
EPO



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

MARK ALEXANDER ROY
KYLE GINOZA

April 23, 2008

Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawai'i
Department of Health
54 High Street
Wailuku, Hawai'i 96793

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.))

Dear Mr. Matsubayashi:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 9, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

We appreciate the input we received from your office.

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

Very truly yours,

Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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LINDA LINGLE
GOVERNOR

MAJOR GENERAL ROBERT G. F. LEE
DIRECTOR OF CIVIL DEFENSE

EDWARD T. TEIXEIRA
VICE DIRECTOR OF CIVIL DEFENSE



PHONE (808) 733-4300
FAX (808) 733-4287

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

November 16, 2007

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

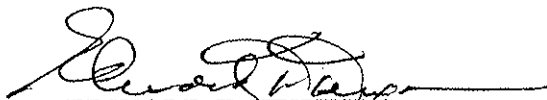
Dear Mr. Ginoza:

Draft Environmental Impact Statement
Proposed Kihei Residential Project
TMK 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Thank you for the opportunity to comment on this development. After careful review of the documents for this development, State Civil Defense (SCD) recommends that the developer not be required to install an outdoor warning siren. SCD is in the process of installing a solar-powered omni-directional sound properties siren with a minimum 121-decibel sound level rating in Hale Piilani Park adjacent to the development area. This siren will cover the entire subdivision.

If you have any questions, please call Mr. Norman Ogasawara, Assistant Telecommunications Officer, at (808) 733-4300, ext. 531.

Sincerely,


EDWARD T. TEIXEIRA
Vice Director of Civil Defense

Enc.

c: Maui Civil Defense Agency
State Civil Defense Radio Shop



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

MARK ALEXANDER ROY
KYLE GINOZA

April 23, 2008

Edward T. Teixeira
Vice Director of Civil Defense
State of Hawai'i
Department of Defense
Office of the Director of Civil Defense
3949 Diamond Head Road
Honolulu, Hawai'i 96816-4495

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Teixeira:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 16, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

We note that State Civil Defense is in the process of installing a solar-powered, omni-directional sound properties siren adjacent to the proposed project site and, as such, State Civil Defense does not recommend that the developer be required to install an outdoor warning siren.

We appreciate the input we received from your office. 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: Dan Yasui, A&B Properties, Inc.
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NOV 20 2007

LINDA LINGLE
GOVERNOR OF HAWAII



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



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 16, 2007

Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku, Hawaii 96793

Attention: Mr. Kyle Ginoza


Gentlemen:

Subject: Draft Environmental Impact Statement for Proposed Kihei Residential Project, Kihei, Maui, Tax Map Key: (2) 3-8-4:portion 2, 22, 30

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Engineering Division, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,


for Morris M. Atta
Administrator



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 8, 2007

MEMORANDUM

TO: **DLNR Agencies:**
___ Div. of Aquatic Resources
___ Div. of Boating & Ocean Recreation
x Engineering Division
___ Div. of Forestry & Wildlife
___ Div. of State Parks
x Commission on Water Resource Management
___ Office of Conservation & Coastal Lands
___ Land Division -

RECEIVED
LAND DIVISION
2007 OCT 16 A 9:59
ENGINEERING DIVISION
STATE OF HAWAII

FROM: *Russell Y. Tsuji*
SUBJECT: Draft Environmental Impact Statement
LOCATION: Kihei, Maui, Tax Map Key: (2) 3-8-4:portion 2, 22, 30
APPLICANT: Munekiyo & Hiraga, Inc. on behalf of A & B Properties, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 15, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments
07 OCT 09 AM 11:09 ENGINEERING

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *C. J. Ferriera*
Date: 10/16/07

**DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION**

LD/RYT
REF.: DEISKihieResidential
Maui.373

COMMENTS

- (X) **We confirm that the project site, according to the revised Flood Insurance Rate Map (FIRM), is located in Zone B and C. The Flood Insurance Program does not have any regulations for developments within Zone B and C.**
- () Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone.
- () Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is _____.
- () Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- () Mr. Robert Sumimoto at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
 - () Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
 - () Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
 - () Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.
- () The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
 - () The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

() Additional Comments: _____

() Other: _____

Should you have any questions, please call Ms. Suzie Agraan of the Planning Branch at 587-0258.

Signed: 
ERIC T. HIRANO, CHIEF ENGINEER

Date: 10/16/07



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

MARK ALEXANDER ROY
KYLE GINOZA
April 23, 2008

Laura Thielen, Chairperson
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.))

Dear Ms. Thielen:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 16, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

We appreciate the input we received from your office.

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

Very truly yours,

Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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NOV 21 2007

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-07-193a

November 19, 2007

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

Dear Mr. Ginoza:

SUBJECT: Draft Environmental Impact Statement for Proposed Kihei Residential Project
Kihei, Maui, Hawaii
TMK: (2) 3-8-004: 002 (por.), 022 (por.) and 030 (por.)

This letter will supercede our previous letter of EPO-07-193, dated November 8, 2007 with additional comments from the Hazard Evaluation & Emergency Response Office (HEER).

Thank you for allowing us to review and comment on the project. The document was routed to the various branches of the Department of Health (DOH) Environmental Health Administration. We have the following Clean Water Branch, Safe Drinking Water Branch, Wastewater Branch, Hazard Evaluation & Emergency Response Office, and General comments.

Clean Water Branch

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.

Mr. Ginoza
November 19, 2007
Page 2

- c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. Please call the Army Corps of Engineers at (808) 438-9258 to see if this project requires a Department of the Army (DA) permit. Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office.
 3. 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.

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>.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC 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 586-4309.

Safe Drinking Water Branch

Drinking Water

1. We understand that the applicant, A&B Properties, Inc. is proposing to develop approximately 600 residential dwelling units on 94.3 acres in the Kihei area. At this time, it is not clear if the applicant will connect to the existing Maui Department of Water Supply (DWS) water system or construct its own source, storage, and transmission network for the drinking water requirements.
2. All projects that propose the development of new sources of drinking water serving a public water system must comply with the terms of Section 11-20-29 of the Hawaii Administrative Rules, Title 11, Chapter 20, titled "Rules Relating to Potable Water Systems." This section requires that all new public water system sources be approved by the Director of Health prior to its use. Such approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29.
3. The engineering report must identify all potential sources of contamination and evaluate alternative control measures which could be implemented to reduce or eliminate the potential for contamination, including treatment of the water source. In addition, water quality analyses for all regulated contaminants, performed by a laboratory certified by the State Laboratories Division of the State of Hawaii, must be submitted as part of the report to demonstrate compliance with all drinking water standards. Additional parameters may be required by the Director of Health for this submittal or additional tests required upon his or her review of the information submitted.
4. Furthermore, all sources of public water systems must undergo a source water assessment which will delineate a source water protection area. This process is preliminary to the creation of a source water protection plan for that source and activities which will take place to protect the source of drinking water.
5. Section 11-20-30 requires that construction plans and specifications for new, proposed public water systems be approved by the Director of Health, prior to construction. However, if the water system is under the jurisdiction of the County of Maui, the Department of Water Supply will be responsible for the review and approval of the plans.
6. Section 11-20-29.5 of Chapter 20 requires that all new community public water systems demonstrate adequate technical, managerial, and financial capacity to reliably and consistently produce and deliver drinking water in compliance with all state and federal drinking water regulations, in effect or likely to be in effect when operations begin.

- Technical capacity refers to the physical infrastructure of the water system, including but not limited to the adequacy of the water source(s), treatment, storage, and distribution systems, and the ability of system personnel to adequately operate and maintain the system and to otherwise implement technical knowledge.
- Managerial capacity refers to the ability of the water system to manage itself, including clear ownership, organization, communications, accountability, adequate management, staffing, policies, training, and information management; and effective relationships with customers and regulatory agencies.
- Financial capacity refers to the financial resources of the water system, including an adequate budget, adequate fiscal controls, and credit worthiness.

It is important to note that new, proposed public water systems must demonstrate adequate technical, managerial, and financial capacity prior to construction. This requires that the Department of Health review and find acceptable the new source, engineering report, construction plans and specifications, and the pre-construction capacity application.

We are enclosing a copy of the document, "New Community and New Nontransient Noncommunity Water System Start-Up Requirements (October 2001)" to help explain capacity, how and when it must be demonstrated, and the approval process.

7. Hawaii Administrative Rules, Title 11, Chapter 25, Rules Relating to Certification of Public Water System Operators, requires all community public water systems to be operated by certified water distribution system operators.
8. The document mentions that the applicant will explore the availability of non-potable (brackish and/or reclaimed) water sources in the Kihei region for irrigation purposes. If the applicant proposes the use of dual water systems or the use of a non-potable water system in proximity to an existing potable water system to meet irrigation or other needs, he or she must be careful in the design and operation of these systems to prevent the cross-connection of these systems and prevent the possibility of backflow of water from the non-potable system to the potable system. The two systems must be clearly labeled and physically separated by air gaps or reduced pressure principle backflow prevention devices to avoid contaminating the potable water supply. In addition, backflow devices must be tested periodically to assure their proper operation. Further, all non-potable

spigots and irrigated areas should be clearly labeled with warning signs to prevent inadvertent consumption of non-potable water. Compliance with Hawaii Administrative Rules, Title 11, Chapter 11-21 titled "Cross Connection and Backflow Control" is required.

Mr. Ginoza
November 19, 2007
Page 5

Should you have any questions regarding the potable water system, please contact Mr. Kumar Bhagavan of the SDWB Compliance Section at 586-4258 in Honolulu.

Underground Injection Control

Injection wells used for the subsurface disposal of wastewater, sewage effluent, or surface runoff are subject to environmental regulation and permitting under Hawaii Administrative Rules, Title 11, Chapter 23, titled "Underground Injection Control" (UIC). The Department of Health's approval must be first obtained before any injection well construction commences. A UIC permit must be issued before any injection well operation occurs.

Authorization to use an injection well is granted when a UIC permit is issued to the injection well facility. The UIC permit contains discharge and operating limitations, monitoring and reporting requirements, and other facility management and operational conditions. A completed UIC permit-application form is needed to apply for a UIC permit.

A UIC permit can have a valid duration of up to five years. Permit renewal is needed to keep an expiring permit valid for another term.

Questions about UIC may be directed to Mr. Chauncey Hew at 586-4258.

Wastewater Branch

The document proposes to develop approximately 600 residential dwelling units on approximately 94.3 acres in the Kihei Residential Project. The project will include single-family and multi-family housing types and will include affordable units. A small neighborhood commercial area, as well as park and open space areas with trails and bike paths, are also proposed at the project.

We have no objections to the proposal and concur with the method of wastewater disposal – connection to the County's sewer system. We also strongly encourage the developer to work with the County and utilize recycled water for irrigation and other non-potable water purposes.

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.

Hazard Evaluation & Emergency Response Office

Residual pesticides in the former agricultural lands could pose potential risks to human health and the environment under urban land uses. As part of the pre-development process, the Department of Health recommends that soils be tested for residual pesticide contamination and that the presence of potential hazards be evaluated.

Mr. Ginoza
November 19, 2007
Page 6

Detailed guidance for the investigation of former agricultural lands is currently under preparation. Interim guidance is presented in the HEER office documents referenced below. The HEER office recommends that the developer initiate an environmental investigation of the former agricultural lands as early in the process as possible. Preparation of investigation work plans should be coordinated with the HEER office to ensure that the study is carried out in the most efficient and effective manner possible.

References:

HDOH, 2005, *Screening For Environmental Concerns at Sites With Contaminated Soils and Groundwater* (May 2005): Hawaii Department of Health, Office of Hazard Evaluation & Emergency Response, <http://www.hawaii.gov/health/environmental/hazard/eal2005.html>

HDOH, 2006, *Soil Action Levels and Categories for Bioaccessible Arsenic* (August 2006): Hawaii Department of Health, Office of Hazard Evaluation & Emergency Response, <http://www.hawaii.gov/health/environmental/hazard/eal2005.html>

HDOH, 2006, *Proposed Dioxin Action Levels for East Kapolei Brownfield Site* (March 2006): Hawaii Department of Health, Office of Hazard Evaluation & Emergency Response, <http://www.hawaii.gov/health/environmental/hazard/eal2005.html>

HDOH, 2007, *Use of Laboratory Batch Tests to Evaluate Potential Leaching of Contaminants from Soil* (April 2007): Hawaii Department of Health, Office of Hazard Evaluation & Emergency Response, <http://www.hawaii.gov/health/environmental/hazard/eal2005.html>

HDOH, 2007, *Pesticides in the Former Agricultural Lands and Related Areas – Updates on Investigation and Assessment* (August 2007): Hawaii Department of Health, Office of Hazard Evaluation & Emergency Response, <http://www.hawaii.gov/health/environmental/hazard/eal2005.html>

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.

Mr. Ginoza
November 19, 2007
Page 7

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

Sincerely,

A handwritten signature in black ink, appearing to read "Kelvin H. Sunada", with a long horizontal line extending to the right.

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
HEER
EH-Maui



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

MARK ALEXANDER ROY
KYLE GINDOZA

April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Sunada:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 19, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

Clean Water Branch

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 provided by the branch, 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 the relevant State Water Quality Standards. Discharges will be kept at a minimum through the application of engineering Best Management Practices (BMPs).
2. The applicant has consulted with the Army Corps of Engineers to determine whether or not a Department of the Army (DA) permit is required. A discussion of the applicability of a DA permit will be included in the Final EIS. We note that projects which require a DA permit will also require a Section 401 Water Quality Certification (WQC) from the Clean Water Branch.



3. 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. The NPDES permit application or NOI will also be submitted for review by the State Historic Preservation Division of the Department of Land and Natural Resources.
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.

Safe Drinking Water Branch

Drinking Water

1. At this time, the applicant remains in discussions with the Department of Water Supply regarding the provision of drinking water source and storage facilities to serve the project. As mentioned in the Draft EIS, the applicant is exploring several potential source opportunities, including surface water treatment and new well sources in Central Maui. It is likely that the applicant will develop source, storage, and transmission facilities which will connect to the Maui Department of Water Supply system. A more detailed discussion of these components will be included in the Final EIS.
2. The applicant will review and apply, as appropriate, Hawai'i Administrative Rules (HAR), Title 11, Chapter 20, titled "Rules Relating to Potable Water Systems" during the development of the project's water system. The applicant will develop an engineering report for the Department's review, which addresses the specific potable water requirements as set forth in HAR, Title 11, Chapter 20. We note that the Director of Health will need to approve the new public water system source prior to its use.
3. The project's domestic water system will be developed in accordance with County standards so that, upon completion of construction, the system may be dedicated to the County.
4. Should non-potable water become available to serve the project, the applicant will ensure that both the drinking and non-drinking water system designs are in compliance with HAR, Title 11, Chapter 11-21, titled "Cross Connection and Backflow Control". In addition, further consultation with the Safe Drinking Water

Branch may be necessary to ensure that appropriate devices are installed to avoid cross contamination.

Underground Injection Control

The applicant does not intend on utilizing injection wells for the subsurface disposal of wastewater, sewage effluent, or surface runoff. Wastewater and sewage effluent will be handled through the County wastewater collection and treatment system, while surface runoff will primarily be accommodated by several onsite detention basins and within landscaped areas. Should the use of injection wells be considered at a later stage of project development, HAR, Title 11, Chapter 23 will be reviewed and applied. We note that the Department of Health's approval is required before any injection well construction commences and an Underground Injection Control permit must be issued before any injection well operation occurs.

Wastewater Branch

The project will connect to the County sewer 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.

Hazard Evaluation and Emergency Response (HEER) Office

The applicant acknowledges the HEER comment regarding potential residual pesticides in former agricultural lands that are proposed for urban use and has contacted the HEER regarding an appropriate soil testing program. We note your comment that detailed guidance for the investigation of former agricultural lands is currently under preparation. The applicant will continue to work with the HEER to develop a mutually acceptable soils testing program for this site.

Kelvin H. Sunada, Manager
April 23, 2008
Page 4

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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LINDA LINGLE
GOVERNOR



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BARRY FUKUNAGA
DIRECTOR

Deputy Directors
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BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

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

IN REPLY REFER TO:

STP 8.2685

November 21, 2007

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

Dear Mr. Ginoza:

Subject: A & B Properties, Inc.
Proposed Kihei Residential Project
TMK: 3-8-004: portions of 002, 022 & 030, Maui

We have the following comments on the subject project:

1. Certain general aviation aircraft flights may occur over the project, but the flights will be at an altitude whereby no noise attenuation conditions or aviation easement requirements are expected to be imposed. However, occupants of the project should be made aware that overflights may occur.
2. Agreement on the mitigation measures and highway intersection improvements to be implemented by the applicant/developer as presented in the Draft EIS, including the TIAR (Appendix E), will need to be concluded with our Highways Division. The applicant/developer should contact our Highways Planning Branch. Other Highway Division offices may need to be consulted should any improvements, changes, or alterations affect a highway right-of-way.

We appreciate the opportunity to provide our comments.

Very truly yours,

A handwritten signature in black ink, appearing to read "Barry Fukunaga", written over the typed name and title.

BARRY FUKUNAGA
Director of Transportation

c: Genevieve Salmonson, Office of Environmental Quality Control
Mary-Lou Kobayashi, Office of Planning
Anthony Ching, Land Use Commission



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

MARK ALEXANDER ROY
KYLE SINDZA

April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Morioka:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your office's letter dated November 21, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. We acknowledge that certain general aviation aircraft flights may occur over the project, but the flights will be at an altitude whereby no noise attenuation conditions or avigation easement requirements are expected to be imposed. Nonetheless, potential occupants of the project will be made aware prior to purchase that overflight may occur.
2. The applicant's traffic engineer will be coordinating with the Highways Division and the Highways Planning Branch to reach agreement on the mitigation measures and highway intersection improvements. Other Highways Division offices will be consulted, as required, should the proposed improvements affect a State highway right-of-way.

Brennon Morioka, Interim Director
April 23, 2008
Page 2

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

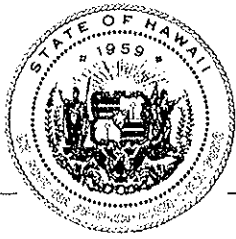
A handwritten signature in black ink, appearing to read 'K. Ginoza', with a long horizontal line extending to the right.

Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.
Keith Niiya, Austin, Tsutsumi & Associates, Inc.

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DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING

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NOV 26 2007
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Ref. No. P-11975

November 23, 2007

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

Dear Mr. Ginoza:

Subject: Proposed Kihei Residential Project
Draft Environmental Impact Statement (DEIS)
TMK: (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)
Wailuku District, Maui
(State Land Use Commission Docket No. A07-772/A&B Properties, Inc.)

Thank you for the opportunity to submit comments on the DEIS for the above referenced proposal to reclassify approximately 94.3 acres of land in north Kihei, Maui, Hawaii, from the State Agricultural District to the State Urban District. The subject project proposes the development of approximately 600 residential units, including affordable housing units, configured with approximately 25.0 acres of land for R-1 residential zoning, 67.9 acres for A-1 and A-2 residential zoning, 1.4 acres for neighborhood commercial uses, and the remainder for road networks, park, and open space.

The following comments are offered to ensure that the final EIS provides a clear account for the user and decision-maker of site conditions, impacts of the proposed development as identified through studies and comments received in response to the preparation notice, development alternatives, and mitigation measures available. The comments include general observations as well as specific comments related to topic areas of interest to the State.

1. **Inclusion of information from comment letters and studies in the body of the final EIS; increased specificity of mitigation measures.** The DEIS needs to be reviewed to determine where information included in the appended comment letters and reference materials should be incorporated in the body of the final EIS. This will enable the reader to have a more complete assessment of potential

impacts, alternatives, and mitigation measures required without having to cross-reference and extract information contained in the appended materials. The sections on *Potential Impacts and Proposed Mitigation Measures* in the final EIS should include the identification of key measures and techniques that can be used to mitigate impacts. For example, in the *Streams, Wetlands, and Reservoirs* section, it would help the reader to identify some of the best management practices that should be considered in site design to “maintain the natural and functional integrity of the Waiakoa Gulch.” In the comments that follow, the Office has highlighted specific instances where revisions to the final EIS should be made to strengthen the document.

2. **Proposed project configuration.** The DEIS narrative and figures do not provide a clear and consistent picture of the proposed project configuration. The final EIS needs a more detailed description of the project components in its project overview, including the number of units and anticipated population associated with individual project components, as well as total population associated with the project. Attachment A, Wastewater System Calculations, of the appended Preliminary Engineering Report, provides such a breakdown. This information communicates clearly to the reader the proposed project mix of residential unit types and other uses that is the basis for the various analyses. It is not clear whether the market study used the same proportion of single-family vs. multi-family units, and what, if any, impact this would have on the conclusions of the market and economic analysis. The project mix of single-family and multi-family units is particularly important for calculating project water demand, since the average daily demand rate used for single-family units is almost twice the average daily demand rate of multi-family units.

Reference is also made in the Preliminary Engineering Report to a Concept Land Plan (July 24, 2006). If Figure 5 is the concept land plan, it should be dated and similarly titled so it is clear to the reader which figure is being referenced. The project mix as described in the Preliminary Engineering Report and Figure 5 are not consistent; the labeling and legend of Figure 5 should be revised to reflect single-family rather than multi-family use in the eastern portion of the site.

3. **Cumulative regional impact.** The final EIS would be significantly strengthened with the inclusion of information on projected dwelling units and residents and visitors to be added to the Kihei region by projects approved for development but not yet built, and the demand of these approved projects with respect to existing and planned regional public infrastructure capacity. Water system capacity is already an issue for this project, and the wastewater system requirements

assessment does not account for applications for future connections by other projects in the area. It would be extremely useful for the reader to be able to put the proposed project in the context of the other projects coming on line in the region. The County is likely to have information available that can be used to provide the reader with a comparison of projected regional build-out to regional capacity for key infrastructure and services.

While the County's general plan update is still in progress, it would be extremely helpful to highlight in the final EIS the key urban growth policies and land use patterns being contemplated for the Kihei area, as well as proposed infrastructure improvements being discussed. This will allow for a brief discussion of how the proposed project relates to these components and the larger regional planning effort underway.

4. **Characterization as infill location/development.** The proposed project and site is characterized in the Executive Summary, Findings and Conclusions, and other sections of the DEIS as an infill location or infill development. This characterization is inaccurate and inappropriate in an EIS. The Office recommends this language be removed in all instances from the final EIS. Infill development is typically defined as the development or redevelopment of vacant or underutilized lots within existing built-up or developed areas, where infrastructure and services to the site—water, sewer, streets, schools, fire protection, etc.—have already been developed or are provided. The project area is wholly contained within parcels designated for agricultural use at the State and County levels. This project is better characterized as urban growth or expansion contiguous to an existing urban area.
5. **Water Supply.** The final EIS should note that the project is located within a water management area, administered by the State Commission on Water Resource Management (CWRM). It should also note CWRM's request that the project be incorporated in the County's Water Use and Development Plan. As this is a hot and arid region and water is a key constraining factor on Maui, the section on mitigation measures that should be considered to reduce project water demand is notably weak. Consideration should be given to investigating whether substituting multi-family units for A-1 single-family units could have a positive impact on reducing water demand for the project as a whole.
6. **Agricultural Lands.** The final EIS should include reference to the loss of the truck farm in *V. Summary of Unavoidable Impacts*. The discussion under Criteria

1 and 2 in *VIII. Findings and Conclusions* should include the loss of agricultural land resources and the loss of agricultural use of the land in these sections.

7. **Affordable Housing.** The final EIS should be expanded to provide information on the number of single-family and multi-family units to be built, the income groups to be targeted and the number of different housing types to be offered to the different target groups, and the estimated price ranges for both affordable and market-priced units. The section should also discuss the County's Residential Workforce Housing Policy, which establishes specific requirements for the provision of affordable housing when new residential projects are developed, and plans to meet the County's affordable housing requirements. This section should also include a discussion of what measures are being considered to promote continued affordability of the affordable housing units.

The final EIS should consider and discuss alternative configurations that might increase the affordable housing component such as: (a) mixed use zoning with commercial/business and residential uses in the proposed commercial area to enhance affordable housing opportunities, including affordable rental housing, and potentially expand commercial space potential; and (b) configuring the proposed A-1 zoning for multi-family units rather than detached single-family units.

8. **Transportation.** The final EIS should include a map showing the project with respect to roadway improvements and the proposed alignment of other regional improvements being discussed, so the reader can understand the relationship of this project to the larger regional transportation network. This section should also include reference to overflight of aircraft using Kahului Airport, as cited in the State Department of Transportation's comment letter. This section should include information on alternative modes of transportation that could serve the project and project residents, including the public bus system, bike paths incorporated in regional transportation plans, and any identified trail networks. It would also appear that the proposed access to the project's commercial area near Waiakoa Gulch Bridge could create traffic conflicts due to the crossing of vehicles using the northbound acceleration lane from the Piilani Highway-Kaiwahine Street intersection and the right turn only deceleration lane from Piilani Highway into the project. Can this be avoided? Please address this in the final EIS.
9. **Flood and Tsunami Hazards.** The final EIS should include in this section a summary of the detailed flood analysis conducted by the project applicant and any findings and recommendations. A copy of the Letter of Map Revision for the

FIRM map approved by the Federal Emergency Management Agency (FEMA) in 2004, should be included in the appendices. This additional information should be reflected or referenced in other sections of the final EIS pertaining to drainage. The text should note that the mauka portion of the project site abuts lands designated Zone AO/A2 on the revised FIRM. These zones are defined by FEMA as special flood hazard areas having special flood, mudflow, or flood-related erosion hazards.

10. **Public Health.** The final EIS should include information as to whether agricultural chemicals were stored or mixed on the portions of the project site being used for agricultural purposes and whether there is potential soil contamination from chemical use. If this information is unavailable, the project applicant should discuss with the Department of Health (DOH) the inclusion of an assessment of potential agricultural chemical contamination in conjunction with the soil arsenic levels investigation. The final EIS should also address the DOH Clean Air Branch's comment that the project will have an impact on the Branch's air monitoring station.
11. **Education and school facilities.** The local intermediate school and complex high school are operating at capacity. As the project applicant will need to work with the Hawaii Department of Education toward a fair-share contribution to expand capacity, we recommend that school facilities be included in the section on unresolved issues.
12. **Drainage.** The final EIS should include a discussion of low impact development techniques that can be incorporated into the building and site design to improve stormwater management. The Hawaii Coastal Zone Management Program's publication, *Low Impact Development: A Practitioner's Guide* (2006), provides examples of design techniques that offer alternatives to conventional drainage plans.
13. **IV. Alternatives to the Proposed Action.** The DEIS does not consider alternative designs or details of the project, as contemplated in Section 11-200-17 of the Office of Environmental Quality Control (OEQC) rules, that could reduce environmental and development impacts of the proposed project. We encourage the final EIS to consider alternative design configurations, including the development of multi-family units in lieu of A-1 detached single-family units, the relocation of higher density A-1 zoning from the eastern elevated portion of the site to the area currently proposed for R-1 single-family dwellings, and the use of a mixed-use zoning in lieu of the B-2 and A-2 zoning currently proposed. These

alternatives could potentially reduce the land alteration and drainage system requirements, increase affordable housing opportunities, reduce water demand, etc., of the proposed project.

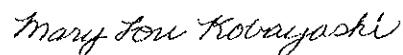
14. **V. Summary of Unavoidable Impacts.** The following should be included in this section: increase in impervious surface area and increase in stormwater runoff, alteration of existing hydrology, increased demand for water resources for domestic, commercial, and irrigation purposes, and increase school enrollment in schools where current enrollment exceeds capacity.
15. **Other comments.**
 - a. Pages 12-13, b. under *Climate*: We recommend restating the conclusion. Once built out, the project will contribute to a heat island effect typically associated with urban development, which would drastically change the local micro-climate of the site.
 - b. Page 15, b. under *Topography and Soils*: The conclusion doesn't adequately reflect the erodibility and erosion hazard associated with the Waiakoa Extremely Stony Silty Clay Loam soils found on the approximately 50 mauka acres of the project site.
 - c. Page 22, *Flora and Fauna*: The final EIS should indicate the approximate location of the native plant species found on the site and the extent of these populations, which would better inform whether these native plant populations should be taken into account in site design.
 - d. Page 25, b. *Archaeological and Historical Resources*: We suggest substituting the language used in the Office of Hawaiian Affairs' May 8, 2007 letter regarding action to be taken should discovery occur during site work. Their language is more specific about stopping work upon discovery.
 - e. Page 26, *Cultural Resources*: We recommend this section include statements from the cultural survey report's Section 8.1, related to concerns raised about flooding of Waiakoa Gulch and the potential for increased run-off from the project and its potential negative affect on coastal and nearshore fishing grounds. This would better reflect the range of concerns and place-based values shared by the informants.
 - f. Page 32, *Population and Demography*: Section b. should include the number of residents and commercial users likely to be added by the project.
 - g. Page 39, *Solid Waste Disposal*: This section could be strengthened by including an estimate of the amount of solid waste anticipated to be generated by the project.

- h. Page 49, *Electrical, Telephone, and Cable Television Services*: The final EIS should incorporate in this section the statements made in the Maui Electric Company (MECO) comment letter of April 2007, which state that the development of a new substation and upgrades to their transmission and distribution system may be necessary to accommodate the project. This section should also include MECO's request to explore demand side management measures to reduce energy demand generated by the project. This section should identify some of the demand side management measures that should be considered in building and site design.
- i. Page 50, *Cumulative and Secondary Impacts*: Inclusion of data on approved projects in the region would help to set the context for this discussion.
- j. Page 92, *List of Permits and Approvals*: The list does not appear to be complete, and the timeframes requested in the EIS guidelines are not provided.

The Office recommends using the final EIS process as a means to incorporate and use sustainable design and development practices in the proposed project. OEQC's, *Guidelines for Sustainable Building Design in Hawai'i*, and the US Green Building Council's Leadership in Energy and Environmental Design (LEED) programs for new construction and its pilot program for neighborhood development offer guidelines and checklists for this purpose. The adoption of sustainable building and development practices has long-term environmental, social, and economic benefits to Hawaii's residents and communities.

Thank you again for the opportunity to review the DEIS and offer comments. The Office of Planning looks forward to receiving the Petitioner's final EIS. If you have any questions, please call Ruby Edwards in the Land Use Division at (808) 587-2817.

Sincerely,



Mary Lou Kobayashi
Planning Program Administrator

c: Mr. Benjamin Matsubara, Matsubara, Lee & Kotake
Anthony Ching, State Land Use Commission
Laurence K. Lau, OEQC



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

MARK ALEXANDER ROY
KYLE GINDEA

April 23, 2008

Ms. Mary Lou Kobayashi
Planning Program Administrator
State of Hawai'i
**Department of Business, Economic
Development & Tourism**
P. O. Box 2359
Honolulu, Hawai'i 96804

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Ms. Kobayashi:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 23, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. Supplemental information provided in the responses to comment letters and identification of key measures and techniques to mitigate impacts will be clearly noted in the body of the Final EIS, as shown in **Attachment 1**.
2. The following information will be included in Section I.B. Proposed Action in the Final EIS.

A&B Properties, Inc. proposes to develop a master-planned residential community on approximately 94.3 acres of land situated in Kihei, Maui, Hawai'i. See **Figure 5**. The project proposes a total of 600 residential units in addition to a small 1.4 acre neighborhood commercial site at its western (makai) end. Approximately 200 multi-family attached units are proposed at the western portion of the site and is labeled "Multi-Family Residential" on Figure 5. The central portion of the site is planned for approximately 100 single-family detached units on subdivided lots of approximately 6,000 square feet. This area is labeled "Single-Family Residential" on Figure 5. The eastern (mauka) portion of the project is planned for approximately 300 single-family detached residential units. These proposed single-family detached units would not be on individual subdivided lots, but clustered and offered under condominium

ownership. This concept is intended to allow for a higher residential density (versus a typical subdivision) at a lower per unit cost, while still providing desired single-family detached units. This area is labeled "Multi-Family Residential" on Figure 5. Note that the land use designations shown on Table 5 refer to the respective community plan land use designations which would be requested for the project.

Note that the market study (Appendix A), was based on the above referenced proportion of single-family detached and multi-family units (see page 10 of Appendix A).

The overall estimated population of the project at full build out is 1,800 persons, based on the average household size in the County of Maui (2006). Section II.B.2. Population and Demography will include the following in the Final EIS.

Based on the 2006 County average of three (3) persons per household (Maui County Data Book, 2006), approximately 1,800 people are anticipated to occupy the 600 proposed units at full project buildout.

With respect to Figure 5 and the reference to the Concept Land Plan in the Preliminary Engineering Report (PER), we note that the development parameters reflected in the July 24, 2006 plan and those set forth in Figure 5 are essentially the same in terms of acreage and use allocations. Figure 5, dated January 18, 2007, represents a subsequent iteration of the plan with minor adjustments which maintain, in general, the preliminary engineering outcomes reported in the PER. As further clarification, although Figure 5 reflects a single-family spatial configuration, the community plan land use designation which will be requested reflects a multi-family designation to provide flexibility in implementing the horizontal property regime concept intended for this area of the project site.

3. The urban growth policies applicable to the Kihei region have not yet been determined as part of the General Plan Update process. The draft Maui Island Plan, wherein future growth areas would be identified, was anticipated to be issued in 2007, but has been delayed. Further, the County of Maui has not yet released information regarding the long-term infrastructure improvement projects that are being contemplated. Section II.E. Cumulative and Secondary Impacts, which will be included in the Final EIS, was expanded and currently includes a list of the existing and proposed developments in the region. See **Attachment 2**.
4. As noted, references to "infill location" or "infill development" will be amended in the Final EIS with "urban growth area" or "expansion contiguous to an existing urban area".

5. The following information will be included in the Section II.D.2. Water System of the Final EIS as follows.

The project site is situated over the Paia aquifer (State Aquifer No. 60302) which has an estimated sustainable yield of 8 million gallons per day (mgd). The Paia aquifer extends from Paia to north Kihei, within Central Maui, just east of the Kahului aquifer. The subject site is located in the southern portion of the aquifer, in an area of underlying brackish water (chlorides in excess of 250 parts per million). Wells in this portion of the aquifer are generally used for irrigation purposes. Based on available well information from the Commission on Water Resources Management (CWRM) there are approximately 30 registered wells (excluding wells not in use or for observation) within the Paia aquifer. The majority of the wells are used for irrigation purposes, including those in the vicinity of the project site. The underlying brackish water extends well beyond the project site (mauka/east). Fresh drinking water begins to occur in the basalt lava flows at approximately elevation 1,200 feet above mean sea level (amsl), far beyond the site's maximum elevation of approximately 230 feet amsl. The only listed domestic wells in the Paia aquifer are on the northern end of the aquifer, in the vicinity of Spreckelsville and Maliko Gulch. Due to the project's relative proximity to the ocean, it is not situated upgradient of any known drinking water wells. Based on these factors, the project is not anticipated to have significant adverse impact upon drinking water resources. Specific information concerning the current withdrawal rate from the aquifer was not available, however, the area is not designated a ground water management area by the CWRM.

Regarding potential adverse impacts upon groundwater resources resulting from project implementation, the project will connect to the County wastewater system and household refuse will be collected by County personnel on a regular basis as part of the residential refuse collection service. Further, impacts to groundwater resources attributable to hazardous materials usage are not anticipated since uses typically associated with such materials (e.g. industrial use) are not planned at the project. As a result, the project is not anticipated to have a significant adverse impact upon groundwater resources as a result of project development.

As mentioned in the Draft EIS, the applicant is exploring several potential drinking water source opportunities, including surface water treatment and new well sources in Central Maui. A primary focus has been the development of a surface water treatment plant utilizing water from the West Maui ditch system. Engineering design of the plant is well underway, as well as the

preparation of other needed regulatory documents. Over the past three (3) years, in excess of \$850,000.00 has been spent on the engineering design and preparation of regulatory documents needed for the plant to proceed. The plant is now about 80 percent designed and other environmental and engineering documents are also nearing completion. The applicant is also pursuing other potential sources, including a new drinking water well in the Kahului aquifer. Potential well sites have been identified and a test well was drilled. The results of the well's pump test indicate a sustainable capacity of approximately 0.648 million gallons per day.

The timing of completion of the source development projects will, in large part, determine the particular water source for the project. The applicant acknowledges that both source alternatives will require further discussion, review, and approval by applicable governmental agencies and expects to continue discussions as the planning and design for the project proceeds. Nonetheless, the applicant is committed to develop source, storage, and transmission facilities to serve this project. The applicant will coordinate with the DWS to incorporate this project into the County's Water Use and Development Plan.

Further, regarding measures to reduce drinking water consumption, the applicant will explore the availability of non-drinking water sources in the region. The applicant would like to be able to utilize R-1 recycled water, where appropriate. The applicant will examine partnership opportunities for the potential use of non-drinking water and will consult with the Department of Environmental Management staff concerning the extension of the R-1 water line from the Kihei Wastewater Reclamation Facility.

Additionally, the applicant will explore the availability of other non-drinking water sources for landscape irrigation purposes, which will be pursued further during the civil design phase of the project. The information on "Maui County Planting Plan – Plant Zone 3" from the Department of Water Supply, will be utilized, as applicable, to place plants in landscaping, which will help to conserve water and protect the watershed from degradation. Rain sensors will be provided on all automated irrigation controllers in common landscaping areas. The applicant will initiate a regular maintenance program to check and reset the automated irrigation controllers.

Plumbing fixtures will be installed in accordance with Maui County Code Section 16.20A.680, which requires the utilization of low-flow fixtures and devices in an effort to conserve water. The applicant will advise owners to maintain fixtures and devices to minimize leakage.

It is acknowledged that the substitution of additional multi-family units for a portion of the single-family units would result in less overall water demand for the project. This is due to the lower average daily water demand factor for multi-family units (560 gallons per day) versus that for single-family units (1,000 gallons per day). However, various other factors were also considered in developing the project master plan and unit mix. By offering a range of housing types it was felt that the project would attract and serve a wider range of the housing market. The unit mix does reflect the general market preference for single-family detached units. It was also felt that single family-residential use was compatible and consistent with the adjacent portions of the Hale Pi'ilani subdivision. Also, the higher density multi family use was deemed more appropriate closer to the primary vehicular access points on the western (makai) portion of the site.

The CWRM requested that the project be included in the County's Water Use and Development Plan. The applicant will coordinate with the DWS, as applicable, to address the CWRM request.

6. The displacement of truck farming will be included in Section V. Summary of Unavoidable Impacts of the Final EIS as follows.

The project will commit approximately 94.3 acres of agricultural land formerly used for sugar cane cultivation to an urban use. The production of sugar cane ceased in the 1980's and a portion of the parcel is now being utilized for seed corn cultivation. In anticipation of the project, and the potential removal of 38 acres from seed corn cultivation, replacement lands have been provided in the near vicinity. **Approximately 12 acres currently farmed (truck crops) in the central portion of the site will be impacted by the project. The applicant will work with the farmer to explore potential locations for relocation.** The mauka portion of the property is vacant and has been fallow since the termination of sugar cultivation.

In addition, Section VIII. Findings and Conclusions will be amended as follows in the Final EIS to include the loss of agricultural land resources and the loss of agricultural use of the land.

As mentioned in Chapter II of this document, the cultural impact assessment of the project area concluded that no significant impacts to cultural practices were anticipated, while the archaeological inventory survey concluded that no historic properties would be affected. The archaeological inventory survey report was submitted to the State Historic Preservation Division (SHPD) for review. The SHPD concurred with the report's findings and recommendations and accepted the report in a letter dated June 7, 2006. Refer to **Appendix "D"** and **Appendix "D-1"**. Flora

and fauna surveys of the property found the site generally limited to non-native, abundant species, and the proposed project is not anticipated to have significant adverse impact on the biological resources in the area. **The proposed project will result in the conversion of agricultural lands to urban use and the termination of seed corn and truck crop cultivation at the site.**

7. The following will be included in Section II.B.4. Housing of the Final EIS.

Regarding affordability of housing units, the project will be in compliance with the Maui Residential Workforce Housing Policy (MRWHP), Maui County Code Section 2.96. The MRWHP sets forth requirements for the provision of housing units for a defined set of household income brackets, including individuals and families earning between 80% and 160% of median household income.

As required under the MRWHP, a minimum of 40 percent of the project's units, or approximately 240 units (based on the project's planned 600 units), must be priced for households within this income range. The MRWHP specifies the proportionate allocation of the affordable units among the various income groups, which include: 30% (72 units) priced for below-moderate income households (earning between 80% and 100% of median income), 30% (72 units) priced for moderate income households (earning between 100% and 120% of median income), 20% (48 units) priced for above-moderate income households (earning between 120% and 140% of median income), and 20% (48 units) priced for gap income households (earning between 140% and 160% of median income).

While subject to agreement with the County, it is anticipated that the affordable units will comprise a mix of both multi-family and single-family units and that the affordable units will be developed concurrently with the market units. See Table 6 below.

Table 6. Affordable Housing Price Ranges

Income Group	Income Range	Affordable Unit Allocation		Single-Family		Multi-Family	
	(% of Median Income)	%	Unit Count	Price Range		Price Range	
Below Moderate Income	80-100	30%	72	\$211,200.00	\$267,900.00	\$206,900.00	\$263,600.00
Moderate Income	100-120	30%	72	\$267,900.00	\$329,600.00	\$263,600.00	\$325,400.00
Above Moderate Income	120-140	20%	48	\$329,600.00	\$391,400.00	\$325,400.00	\$387,100.00
Gap Income Group	140-160	20%	48	\$391,400.00	\$469,300.00	\$387,100.00	\$464,800.00

The potential for some residential use at the planned neighborhood commercial site is acknowledged and will continue to be evaluated as the project progresses. A primary consideration is the market's acceptance of a mixed use concept at this location. As indicated in items nos. 2 and 5 above, the overall housing mix is premised upon the market's preference for single-family detached units. The substitution of higher density multi-family units at the eastern (mauka) portion of the site would also entail more vehicular trips traversing the entire project site.

8. A map detailing existing and proposed regional roadways in relation to the project site will be included in the Final EIS. **See Attachment 3.** The reference to the overflight of aircraft using Kahului Airport will be included in Section II.A.10. Air and Noise Quality of the Final EIS as follows.

The Department of Transportation noted the occurrence of general aviation aircraft flights over the project. Although the flights will be at an altitude whereby no noise attenuation conditions or avigation easement requirements are expected, potential occupants of the project will be made aware prior to purchase that overflight may occur.

Section II.D.1. Roadways of the Final EIS will be revised as follows to include transportation demand management measures for the project.

The applicant will ensure that all proposed roadway development and improvements are in accordance with the Hawai'i Revised Statutes, Maui

County Code, and other applicable rules and regulations. This includes the Hawai'i Standard Specifications for Road and Bridge Construction dated 2005, the Standard Details for Public Works Construction, 1984, as amended, and the Manual on Uniform Traffic Control Devices for Streets and Highways, 2003.

The TIAR recommends mitigation measures and improvements to be implemented for the project. These are outlined above and on page 56 of the TIAR. As noted in the State Department of Transportation's (DOT) letter of November 21, 2007, agreement on the mitigation measures and improvements to be implemented by the applicant will be determined with the DOT Highways Division. This would occur as part of the applicant's engineering design process and the preparation of specific onsite and offsite roadway and intersection improvement plans. DOT approval will be required prior to finalizing plans and undertaking these roadway and intersection improvements.

The Department of Public Works and the DOT Highways Division will be given the opportunity to review and approve roadway construction plans to ensure that applicable regulations are satisfied.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The Kihei Residential Project may be subject to the provisions of Chapter 14.62. Although the specific traffic impact fee schedule for the South Maui region has not yet been adopted by ordinance, the final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

Lastly, the project presents an opportunity to promote non-automobile travel for recreational and household pursuits. In order to minimize vehicle trips particularly outside the project, a limited commercial area within the project limits is planned to serve the needs of the adjacent community. Accommodations to support public bus transportation services may be provided in the commercial area to facilitate an alternative travel mode. Also, recreational needs will be served by the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths and walking trails will connect these areas and promote recreational activity and also serve to reduce residents' reliance on automobiles.

The Kihei Residential Project was designed to provide the greatest mobility to the community while maintaining the best possible operations at adjacent intersections. The access from Pi'ilani Highway is intended to lessen the traffic burden and

potential queues at the Pi'ilani Highway/Kaiwahine/Uwapo Road intersection. The potential traffic conflicts noted between Kaiwahine Street and the project's access from Pi'ilani Highway is not anticipated to be significant due to the presence of signalization at the Kaiwahine Street and Pi'ilani Highway intersection. Also the frequency of this occurrence is not anticipated to be significant to warrant specific mitigation. The acceleration/deceleration lane will be designed to ensure that there is adequate sight distance to minimize the potential for hazardous situations along this stretch of Pi'ilani Highway. The shared acceleration/deceleration lane was designed within the existing geographic constraints.

9. Section II.A.5. Flood and Tsunami Hazards of the Final EIS will be revised as follows.

The Flood Insurance Rate Map (FIRM) for this area of Maui was amended by a Letter of Map Revision (LOMR Case No. 03-09-0438P) that was approved by **the Federal Emergency Management Agency (FEMA)** and effective as of July 1, 2004. The revised FIRM for this area of Maui designates the project site as being located within Zones B and C, areas of minimal flooding. The revised FIRM is shown in **Figure 10**.

This LOMR covered the western (makai) portion of the project site and is included as Appendix "B". The makai portions of the project site abut lands designated Zone AO/A2 which are special flood hazard areas by FEMA.

As noted above, the project site is currently designated within Zones B and C, areas of minimal flooding. Additionally, the applicant has undertaken a more detailed flood analysis along mauka portions of Waiakoa Gulch in the vicinity of the project site. **The purpose of this analysis is to define potential flood hazard areas along the mauka portions of the site.** As a result of this analysis the applicant has filed a Letter of Map Revision (LOMR) with the FEMA to update the FIRM for the area.

10. Section II.A.12. Hazardous Materials and Fertilizer Usage of the Final EIS will be revised as follows to include a discussion on arsenic or other agricultural chemicals.

There are no indications that appreciable levels of arsenic or other agricultural chemicals are present at the subject property. Nonetheless, the applicant acknowledges that the HEER Office noted the potential for residual pesticides in former agricultural lands that are proposed for urban use and the applicant has contacted the HEER Office regarding an appropriate soil testing program. The HEER Office stated in its letter of November 19, 2007 that detailed guidance for the investigation of former agricultural lands is

currently under preparation. The applicant will continue to work with the HEER Office to develop a mutually acceptable soils testing program for this site with the understanding that corrective actions may be necessary.

In addition, Section II.A.10. Air and Noise Quality of the Final EIS will be revised as follows to include a discussion on the air monitoring station.

Concerning potential impact on the Department of Health's air monitoring station, the applicant has had discussions with the department regarding minimizing impacts. The Department of Health (DOH) noted that an air quality monitoring station is situated adjacent to the project site in the Hale Pi'ilani neighborhood park. The primary purpose of the air monitoring station is to monitor particulates resulting from cane burning. The DOH makes every attempt to prevent dust from construction activities from affecting the particulate readings.

Through consultation with the DOH, the DOH recommended adherence to Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control. The DOH further noted that, while there are no specific requirements for projects in the vicinity of an air monitoring station, the DOH will coordinate with the contractor to minimize impacts to the air monitoring station. Should air quality readings at the station be affected, the DOH will assist the contractor in the development of a dust mitigation action plan.

11. The section dealing with unresolved issues of the project will be revised to include the additional unresolved issue mentioned. **Attachment 4** contains the revisions, which will be included in the Final EIS.
12. The following will be added in Section V. Summary of Unavoidable Impacts and Commitment of Resources in the Final EIS.

To minimize potential adverse impacts to natural resources in building design, the Office of Environmental Quality Control's publication entitled "Guidelines for Sustainable Building Design in Hawai'i" has been reviewed. As a result, the following measures to conserve natural resources and to promote energy efficiency will be undertaken in the planning, design, construction, and operation of the project.

- Site buildings to take advantage of natural features and maximize their beneficial effects by providing for solar access, daylighting, and natural cooling.

- Design south, east, and west shading devices to minimize solar heat gain.
- Locate buildings to encourage bicycle and pedestrian access and pedestrian oriented uses.
- Consolidate utility and infrastructure in common corridors to minimize site degradation and cost, improve efficiency, and reduce impermeable surfaces.
- Provide tenant sub-metering to encourage utility use accountability.
- Design space for recycling and waste diversion opportunities during occupancy.

13. The following information will be included in Section IV. Alternatives to the Proposed Action in the Final EIS.

D. ALTERNATIVE SITE LAYOUTS

Other potential project designs and site layouts were considered in the development of the project master plan. These included alternatives with greater single-family detached dwellings similar to the adjacent Hale Pi'ilani subdivision and alternatives with a greater proportion of multi-family attached dwellings. One of the factors considered in the preparation of the master plan was to provide a mix of housing types. By offering a range of housing types, it was felt that the project would attract and serve a wider range of the housing market.

The unit mix does reflect an assumed market preference for single-family detached units. As proposed, the plan includes multi-family attached units on the makai portion of the site and single-family detached units on the central and mauka portions of the site. The mauka portion of the site is planned for higher density single-family detached residential use which is aimed to meet buyers' preference for single-family detached units, but at a lower price point. Compatibility and consistency with adjacent residential use was also considered in the master plan. It was felt that single-family residential use consistent with the adjacent Hale Pi'ilani subdivision would be appropriate for that central portion of the site.

The project's single-family area is planned to be consistent with the adjacent Hale Pi'ilani subdivision (single-family dwellings on subdivided lots of approximately 6,000 square feet). Higher density multi-family use was deemed more appropriate closer to the primary

vehicular access points on the makai portion of the site. The potential for some residential use at the planned neighborhood commercial site is acknowledged and will continue to be evaluated as the project progresses. A primary consideration is the market's acceptance of a mixed use concept at this location. The master plan seeks to address these factors without significant alteration to the existing land form.

It is acknowledged that the substitution of additional multi-family units for a portion of the single-family units would result in less overall water demand for the project. This is due to the lower average daily water demand factor for multi-family units (560 gallons per day) versus that for single-family units (1,000 gallons per day). However, the substitution of higher density multi-family units at the eastern (mauka) portion of the site would entail more vehicular trips traversing the entire project site. As currently proposed, affordable housing opportunities will be provided through a mix of multi-family attached and single-family detached units. This will provide greater diversity of affordable housing units.

14. The contents of **Attachment 5** will be added to Section V. Summary of Unavoidable Impacts and Commitment of Resources of the Final EIS.
15. Regarding the other comments, see below.
 - a. The following information referencing the heat island effect will be included in Section II.A.2. Climate of the Final EIS.

~~The proposed action is not anticipated to alter local micro-climates:~~ According to the United States Environmental Protection Agency, the development of cities and suburban areas has a tendency to increase temperatures slightly (up to 10 degrees Fahrenheit, in dense cities) as compared to surrounding natural land cover. This "heat island" effect, as it is often denoted, refers to urban air and surface temperatures that may be higher than nearby rural or undeveloped areas.

In order to minimize the potential of an elevated heat island profile, the applicant will implement a number of landscaping measures. For example, the applicant will provide shade trees and landscape vegetation throughout the subdivision to take advantage of the natural cooling effects of shading and the evaporative effects of water from the soil and leaves.

Further, the buildings will be architecturally designed and built with a low profile to minimize trapped heat and to maximize natural air flow. It is anticipated that these mitigation measures will serve to offset the potential heat island effect of the residences, businesses, and pavement in the subdivision. As a result, the proposed action is not anticipated to significantly alter local micro-climates.

- b. The following information will be included in Section II.A.3. Topography and Soils of the Final EIS.

Although three (3) of the four (4) specific soil types underlying the project site generally exhibit slow runoff and low erosion hazard, there is one soil type, namely Waiakoa Extremely Stony Silty Clay Loam, which commonly exhibits medium runoff and severe erosion hazard. To minimize runoff and erosion associated with this soil type, several Best Management Practices (BMPs) will be implemented. These include the following: constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site, protecting of natural vegetation, using wind erosion control, intercepting runoff above disturbed slopes, and using seeding and fertilizing or other soil erosion control.

- c. The following information will be included in Section II.A.6. Flora and Fauna of the Final EIS.

Three (3) native plants, `ilima, `uhaloa, and koali awahia were found on the upper (mauka) 40 or so acres of the property. However, all are common indigenous plants that are widespread on Maui. The vegetation throughout the property was dominated by non-native species. No endangered or threatened plant species were identified on the property.

- d. The text regarding inadvertent discoveries will be revised in the Final EIS to reflect the specific language used by the Office of Hawaiian Affairs. Specifically, the following language will be included in Section II.A.8. Archaeological and Historical Resources of the Final EIS.

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 during construction activities, work will stop in the immediate vicinity and the applicant will contact the SHPD. Pursuant to their specific request, the Office of Hawaiian Affairs (OHA), will also be notified.

- e. Information garnered from the informant interviews will be included in the body of the Final EIS. The informants did not note specific cultural practices in the area, outside of use of coastal area for fishing grounds and canoe paddling. Specifically, the following discussion will be included in Section II.A.9. Cultural Resources of the Final EIS.

As part of the cultural assessment, two (2) informant (kama`aina) interviews were conducted to gain an understanding of likely cultural practices which occurred in the vicinity. Mr. Leonard Kimokeo Kapahulehua explained that he was not aware of cultural practices in the present day or of the existence of heiau (temples) or ahu (shrines) in the area. As a result, Mr. Kapahulehua did not feel that there would be any cultural impacts associated with residential development.

Mrs. Paula Kalanikau was also interviewed and, like Mr. Kapahulehua, did not recall significant cultural practices in the area, outside of use of the coastal fishing grounds. Mrs. Kalanikau noted canoe club related activities in the last few decades which occur to the west of the project site along the shoreline. However, in the direction of the project site from the shoreline area, Mrs. Kalanikau recalled only a multitude of kiawe trees and no significant cultural practices. Mrs. Kalanikau mentioned concern over the periodic flooding of Waiakoa Gulch and potential runoff impacting coastal and nearshore fishing grounds.

To address Mrs. Kalanikau's concern of runoff impacts to coastal areas, the erosion and soil control measures listed in Section II.A.7. Streams, Wetlands, and Reservoirs will be implemented.

- f. In Section II.B.2. Population and Demography of the Final EIS, the projected number of residents of the project will be included as follows.

Based on the 2006 County average of three (3) persons per household (Maui County Data Book, 2006), approximately 1,800 persons are anticipated to occupy the 600 proposed units at full project build out. The specific commercial tenants are unknown at this time; however, based on the size and nature of the commercial site, the amount of resulting employees is anticipated to be minimal.

- g. **An estimate of the amount of solid waste attributable to the project at full project build out is 5.67 tons per day, which is based on a factor of approximately 6.3 lbs/person/day for 1,800 persons. This discussion will be included in Section II.C.5. Solid Waste Disposal of the Final EIS.**

- h. Comments provided by Maui Electric Company will be included in Section II.D.5. Electrical, Telephone, and Cable Television Services of the Final EIS as follows.

As noted, Maui Electric Company will require an electrical line extension, access, and easements in order to provide service to the project. In addition, energy conservation measures will be considered as part of the project design phase of development and further coordination with Maui Electric Company will occur at that time. As a result, the applicant will consider implementation of the following demand side management measures to conserve natural resources and to promote energy efficiency.

- **Site buildings to take advantage of natural features and maximize their beneficial effects by providing for solar access, daylighting, and natural cooling.**
 - **Design south, east, and west shading devices to minimize solar heat gain.**
 - **Consolidate utility and infrastructure in common corridors to minimize site degradation and cost, improve efficiency, and reduce impermeable surfaces.**
 - **Provide tenant sub-metering to encourage utility use accountability.**
- i. Existing and future developments in the Kihei-Makena region were utilized for analyzing potential cumulative and secondary impacts related to development of the Kihei Residential Project. Section II.E. Cumulative and Secondary Impacts, which will be included in the Final EIS, was expanded and currently includes a list of the existing and proposed developments in the region. Refer to **Attachment 2**.
- j. The list of permits and approvals will be reviewed. If additional permits and approvals are identified as being required, these will be included in Section IX. List of Permits and Approvals of the Final EIS. The following table will be included in the Final EIS.

Permit or Approval	Anticipated Submission Date	Anticipated Approval Date
District Boundary Amendment	2007	2008
Community Plan Amendment	2008	2010
Change in Zoning	2008	2010
Subdivision Approval	2010	2010
NPDES Permits, as applicable	2010	2011
Construction Permits	2011-2016	2011-2016

16. The applicant intends to utilize OEQC's Guidelines for Sustainable Building Design in Hawai'i and the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) programs for new construction and neighborhood development to incorporate and implement sustainable design and development practices. The following will be added in Section V. Summary of Unavoidable Impacts and Commitment of Resources of the Final EIS.

To minimize potential adverse impacts to natural resources in building design, the Office of Environmental Quality Control's publication entitled "Guidelines for Sustainable Building Design in Hawai'i" has been reviewed. As a result, the following measures to conserve natural resources and to promote energy efficiency will be undertaken in the planning, design, construction, and operation of the project.

- Site buildings to take advantage of natural features and maximize their beneficial effects by providing for solar access, daylighting, and natural cooling.
- Design south, east, and west shading devices to minimize solar heat gain.
- Locate buildings to encourage bicycle and pedestrian access and pedestrian oriented uses.
- Consolidate utility and infrastructure in common corridors to minimize site degradation and cost, improve efficiency, and reduce impermeable surfaces.
- Provide tenant sub-metering to encourage utility use accountability.
- Design space for recycling and waste diversion opportunities during occupancy.

Ms. Mary Lou Kobayashi
April 23, 2008
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We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Kyle Ginoza', with a long horizontal flourish extending to the right.

Kyle Ginoza
Project Manager

KG:lh

cc: Dan Yasui, A&B Properties, Inc.

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ATTACHMENT 1

FLORA AND FAUNA

The following will be added to Section II.A.6. Flora and Fauna of the Final EIS.

The United States Fish and Wildlife Service (USF&WLS) noted potential impacts to seabirds in the area as a result of construction activities. To mitigate potential impacts, several Best Management Practices, as recommended by the USF&WLS, will be implemented by the applicant during construction. For instance, lights will be shielded so the bulb is not visible at or above bulb height, information will be disseminated regarding seabird fallout, and provisions for handling a downed seabird will be implemented during construction activities.

In addition, a list of standard BMPs for fish and wildlife, provided by the USF&WLS, will be incorporated by the applicant in project construction documents during the construction phase of development to prevent erosion, sedimentation, and other potential adverse impacts to aquatic fish and wildlife resources in the vicinity of the project site.

STREAMS, WETLANDS, AND RESERVOIRS

The following revision will be added to Section II.A.7. Streams, Wetlands, and Reservoirs of the Final EIS.

~~The land plan for the project provides an open space buffer along the gulch to ensure adequate protection against gulch runoff during storm events. Mitigation measures, such as Best Management Practices (BMPs) for erosion and sedimentation control, will be implemented to maintain the natural and functional integrity of the Waiakoa Gulch. The proposed action will not impact the Kealia Pond National Wildlife Refuge.~~

During construction, the following Best Management Practices (BMPs) will be implemented by the project contractors for erosion and sediment control to maintain the natural and functional integrity of Waiakoa Gulch.

- **Constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site**
- **Staging construction**
- **Protecting of natural vegetation**
- **Stockpiling topsoil, and covering or stabilizing of the soil stockpiles**
- **Using wind erosion control**
- **Intercepting runoff above disturbed slopes**

- Constructing of benches, terraces, or ditches at regular intervals to intercept runoff on long or man-made slopes
- Providing linings or other method to prevent erosion of storm channels
- Using seeding and fertilizing or other soil erosion control
- Providing vehicle wheel wash-down facilities
- Using stabilized construction entrances
- Using vegetated filter strips

Greater detail of the design information for the proposed drainage and erosion control plan will be provided when the project progresses to the engineering design phase of development.

ARCHAEOLOGICAL AND HISTORICAL RESOURCES

The following revision will be added to Section II.A.8. Archaeological and Historic Resources of the Final EIS.

~~Finally, should any significant archaeological resources be uncovered during work on the site, the SHPD will be contacted immediately and all applicable inadvertent discovery procedures will be followed.~~ 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 during construction activities, work will stop in the immediate vicinity and the applicant will contact the SHPD. Pursuant to their specific request, the Office of Hawaiian Affairs (OHA), will also be notified.

AIR AND NOISE QUALITY

The following will be added to Section II.A.10. Air and Noise Quality of the Final EIS.

The major potential short-term air quality impact of the project will occur from the emission of fugitive dust during construction. In addition to regular watering and sprinkling, the following measures will be implemented by the applicant's contractor during construction activities to minimize the proliferation of fugitive dust, in accordance with Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control.

Use of wind screens and/or limiting the area that is disturbed at any given time will help to contain fugitive dust emissions. Wind erosion of inactive areas of the site that have been disturbed could be controlled by mulching. Trucks hauling soil material would be covered to mitigate dust. A routine road cleaning and tire washing program would help reduce fugitive dust emissions from trucks/vehicles tracking dirt onto nearby paved roadways. Installation of landscaping early in the construction schedule will also help to control dust.

During the construction phase, emissions from engine exhaust will occur from onsite construction equipment and other construction related vehicles. Increased vehicular emissions due to traffic disruptions by construction equipment or vehicles entering/exiting the site can be mitigated by moving equipment during off-peak hours. Construction related emissions would be limited to the construction period of the project. After the project is completed, carbon monoxide concentrations at the site are anticipated to remain within acceptable air quality standards. The project site is situated adjacent to Waiakoa Gulch, which will serve as a buffer between the project and ongoing agricultural activities situated further to the north. Related noise and dust emissions from such agricultural activities are anticipated to be buffered by Waiakoa Gulch.

Concerning potential impact on the Department of Health's air monitoring station, the applicant has had discussions with the department regarding minimizing impacts. The Department of Health (DOH) noted that an air quality monitoring station is situated adjacent to the project site in the Hale Pi'ilani neighborhood park. The primary purpose of the air monitoring station is to monitor particulates resulting from cane burning. The DOH makes every attempt to prevent dust from construction activities from affecting the particulate readings.

Through consultation with the DOH, the DOH recommended adherence to Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control. The DOH further noted that, while there are no specific requirements for projects in the vicinity of an air monitoring station, the DOH will coordinate with the contractor to minimize impacts to the air monitoring station. Should air quality readings at the station be affected, the DOH will assist the contractor in the development of a dust mitigation action plan.

Development of the project will entail typical construction activities including excavation, grading, and the use of construction equipment (e.g. bulldozers, front-end loaders, and diesel-powered trucks). Existing residences to the south may be impacted by construction noise due to their close proximity to the project site. Noise from such construction activities would be short term and must comply with the State DOH noise regulations. Should noise during the construction phase of the project exceed the maximum allowable levels, a noise permit may be required. This has been noted by the State DOH Maui District Health Office in their comment letter of April 17, 2007 to the EISPN.

After the completion of construction, noise generated by stationary mechanical equipment (e.g. compressors and HVAC equipment) at the site must meet applicable noise standards. The planning and design of the project will take into account means to attenuate noise from such facilities through proper placement and design. Given the limited commercial use planned at the project, the potential for such adverse impacts is anticipated to be minimal. A landscaped buffer is planned within the project site between the existing residences in the Hale Pi'ilani Subdivision and

the planned new collector road. This should serve to mitigate potential noise associated with the planned road and the project.

The State Department of Transportation (DOT) is currently in the process of constructing the Mokulele Highway Widening project, west of the project site. Future traffic related noise resulting from the completed roadway may impact the western most (makai) portion of the project. The planning and design of this portion of the project will need to take into account applicable noise standards. The Federal Highway Administration utilizes a noise standard of 67 decibels (dBA) for residential communities. It should be noted that the predominant trade winds of the region place the highway downwind of the project site.

A review of relevant noise studies revealed that, for residential exterior environmental noise, a day-night average sound level should not exceed 65 dBA, according to the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency. According to data from the Kapalua Mauka Final Environmental Impact Statement, prepared by PBR Hawaii in November 2002, based on this acoustical standard, traffic noise from Honoapiʻilani Highway may impact residential properties located within 75 feet of the highway. The distance between the Piʻilani Highway centerline and the project's property line is approximately 140 feet. Along Piʻilani Highway in particular, according to data reported in the Final Environmental Impact Statement for the New Kihei Elementary School, prepared by Comprehensive Consulting Services of Hawaiʻi in April 1992, heavy traffic volumes along Piʻilani Highway traveling at 50 miles per hour generate a noise level of 62 dBA at the edge of pavement. Therefore, based on the sizable distance between the highway and the project site, it is anticipated that traffic noise attributed to Piʻilani Highway will not adversely impact the proposed project.

Noise measurements, after completion of the highway, should determine the extent of the noise impact and applicable mitigation measures. Potential noise mitigation measures may include construction of landscaped earthen berms, use of sound barriers, setbacks, and air conditioning. The applicant will work with the State DOT, the DOH, and other agencies in complying with all applicable noise standards.

ROADWAYS

The following will be added to Section II.D.1. Roadways of the Final EIS.

The applicant will ensure that all proposed roadway development and improvements are in accordance with the Hawaiʻi Revised Statutes, Maui County Code, and other applicable rules and regulations. This includes the Hawaiʻi Standard Specifications for Road and Bridge Construction dated 2005, the Standard Details for Public Works Construction, 1984, as amended, and the Manual on Uniform Traffic Control Devices for Streets and Highways, 2003.

The TIAR recommends mitigation measures and improvements to be implemented for the project. These are outlined above and on page 56 of the TIAR. As noted in the State Department of Transportation's (DOT) letter of November 21, 2007, agreement on the mitigation measures and improvements to be implemented by the applicant will be determined with the DOT Highways Division. This would occur as part of the applicant's engineering design process and the preparation of specific onsite and offsite roadway and intersection improvement plans. DOT approval will be required prior to finalizing plans and undertaking these roadway and intersection improvements.

The Department of Public Works and the DOT Highways Division will be given the opportunity to review and approve roadway construction plans to ensure that applicable regulations are satisfied.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The Kihei Residential Project may be subject to the provisions of Chapter 14.62. Although the specific traffic impact fee schedule for the South Maui region has not yet been adopted by ordinance, the final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

Lastly, the project presents an opportunity to promote non-automobile travel for recreational and household pursuits. In order to minimize vehicle trips particularly outside the project, a limited commercial area within the project limits is planned to serve the needs of the adjacent community. Accommodations to support public bus transportation services may be provided in the commercial area to facilitate an alternative travel mode. Also, recreational needs will be served by the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths and walking trails will connect these areas and promote recreational activity and also serve to reduce residents' reliance on automobiles.

DRAINAGE SYSTEM

The following will be added to Section II.D.4. Drainage System of the Final EIS.

The applicant will ensure that runoff from parking lots and driveways will be directed to nearby landscaped areas and detention basins to minimize drainage-related impacts resulting from project implementation. Also, native plants which require less water will be sought for the landscaped areas within the project.

Further, appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the design process. During construction, the contractor will implement the following recommended Best Management Practices (BMPs) for erosion and sedimentation control.

- **Constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site**
- **Staging construction**
- **Protecting of natural vegetation**
- **Stockpiling topsoil, and covering or stabilizing of the soil stockpiles**
- **Using wind erosion control**
- **Intercepting runoff above disturbed slopes**
- **Constructing of benches, terraces, or ditches at regular intervals to intercept runoff on long or man-made slopes**
- **Providing linings or other method to prevent erosion of storm channels**
- **Using seeding and fertilizing or other soil erosion control**
- **Providing vehicle wheel wash-down facilities**
- **Using stabilized construction entrances**
- **Using vegetated filter strips**

Greater detail of the design information for the proposed drainage and erosion control plan will be provided when the project progresses to the engineering design phase of development.

ATTACHMENT 2

Existing and future developments in the Kihei-Makena region were the basis for analyzing potential cumulative and secondary impacts related to development of the Kihei Residential Project. It is noted that some of these projects are in the planning and entitlement phase and may not necessarily be constructed. See Table 12.

Table 12. Proposed Development in the Region

Development	Land Use	Number of Units/Area
Kaonoulu Industrial Park	Light Industrial	88 acres
Honua Ula (Wailea 670)	Single-Family Residential	475 dwelling units
	Single-Family Resort	475 dwelling units
	Multi-Family Residential	225 dwelling units
	Multi-Family Resort	225 dwelling units
	Shopping Center	80,000 square feet (gross leasable area)
	Golf Course	200 acres
Wailea Resort	Single-Family Residential	85 dwelling units
	Single-Family Resort	85 dwelling units
	Multi-Family Residential	285 dwelling units
	Multi-Family Resort	285 dwelling units
	Shopping Center	20,000 square feet (gross leasable area)
	Office	60,000 square feet (gross leasable area)
	Warehouse	40,000 square feet (gross leasable area)
Makena Resort	Single-Family Residential	53 dwelling units
	Single-Family Resort	53 dwelling units
	Multi-Family Residential	536 dwelling units
	Multi-Family Resort	536 dwelling units
	Shopping Center	100,000 square feet (gross leasable area)
Kaonoulu Estates	Multi-Family Residential	191 dwelling units
Maui Lu Redevelopment	Resort Hotel	788 rooms
	Resort Hotel (existing to be demolished)	174 rooms
Silverswords Golf Estates	Single-Family Residential	182 dwelling units

Source: Austin, Tsutsumi & Associates, Inc.

The TIAR prepared for the project has examined and evaluated traffic impacts of the project, as well as the other potential projects identified on Table 12. The projected peak hour traffic impact of these projects is presented on Table 1 of the TIAR. Based on the analysis the TIAR has recommended the implementation of applicable traffic mitigation measures and improvements. As noted in the TIAR, while these projects have been included in the traffic impact analysis, some are still in the planning and entitlement stage and for various reasons may be subject to delay or may not materialize at all within the time horizon of this project.

With regard to the availability of drinking water for the project, the applicant is pursuing several options, including surface water treatment and new well sources in central Maui. Maui County Ordinance No. 3502 requires that a long-term reliable supply of water be verified at the time of subdivision approval. The ordinance requires each applicant to provide a long-term reliable supply of water, which is defined as “the total water supplies from a private, non-County source that will meet the projected demand associated with a proposed development, in addition to existing and planned future demand”. In light of this requirement cumulative impacts will be addressed as new water sources are brought online as a condition of development. Other proposed projects will be required to similarly meet the requirements of this ordinance as their projects progress through the development process. Additionally, specific improvements to the water transmission and storage systems will be determined with the County for each project.

Sewage generated by the project will be treated at the KWRF. As indicated by the County Department of Environmental Management, wastewater system capacity is currently available for the project. The applicant will be required to make needed system improvements at the time of service. Also, applicable assessment fees for treatment plant expansion will be required. These system improvements and fees will also be applicable to other planned projects to mitigate impacts to the County sewer system and to maintain adequate system service.

The agricultural impact of this project is near negligible when taken in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands. In fact, much of the lands of these former plantations are

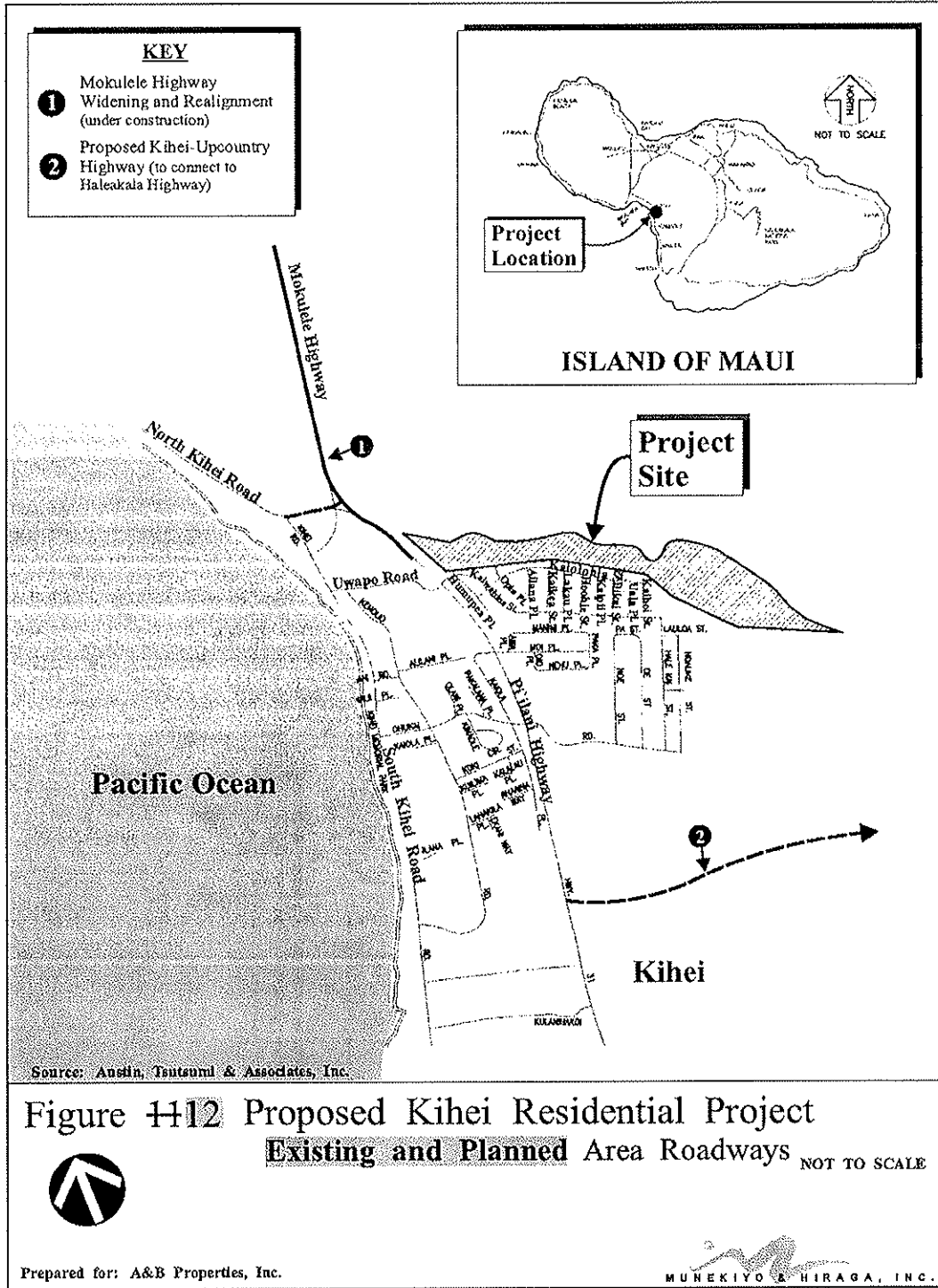
still fallow. The proposed project will ultimately involve the use of approximately 94.3 acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui. Further, rather than the available land supply, more salient factors facing the agricultural industry include the market demand for products (access to markets and local purchasing patterns) and the overall profitability of crops grown in Hawai`i.

The mitigation of other potential adverse cumulative impacts resulting from infrastructure use will be resolved during the course of development either through the provision of additional facilities onsite and offsite (drainage, water, and park facilities) or through fair-share contributions (wastewater, school, and traffic facilities). Other planned projects will similarly be required to mitigate the impacts of their respective projects as they progress through the development process.

In general, processes and mechanisms for coordinating mitigation measures attributable to cumulative impacts are in place. An example of a process which addresses cumulative impacts is the scoping of infrastructure studies (including traffic impact) to include those projects which are anticipated to be implemented within a timeframe similar to that of the proposed action. Similarly, as noted, mechanisms for addressing impacts from more than a single project include impact fees or assessments which require fair-share contribution from the respective applicants.

The projects listed in Table 12 represent potential future developments identified in the Kihei-Makena Community Plan region. The implementation timeframes for these projects are dependent on their respective regulatory and market parameters which are not linked to the proposed Kihei Residential Project. It is in this context that the processes and mechanisms (noted above) for assuring cumulative evaluation have evolved. The proposed action is being planned and will be implemented within this framework.

ATTACHMENT 3



ATTACHMENT 4

The following information will be added to Section VII. Unresolved Issues in the Final EIS.

Other unresolved issues for the project, which will be decided prior to project implementation, include a fair-share educational contribution, parks and playgrounds contribution, traffic impact fees, participation in Kihei wastewater system improvements, the potential presence of arsenic at the property, and an affordable housing agreement.

The 2007 Legislature passed a bill establishing school impact fees. Under this new law, the project may be required to pay an impact fee. The State Department of Education noted that they do not know the fee amount per residential unit at this time, but may have a better idea of the fee amount in early 2008. The applicant will work with the Department of Education in formulating an appropriate fair-share agreement for the subject project.

The applicant has been in coordination with the County of Maui, Department of Parks and Recreation to ensure satisfactory compliance with parks and playgrounds assessment requirements. Preliminarily, it is estimated that the park assessment would amount to just under seven (7) acres for a 600-unit residential subdivision in South Maui. The applicant is currently exploring the possibility of creating a new park adjacent and north of the existing Hale Pi'ilani neighborhood park to satisfy its parks and playgrounds assessment requirements.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The Kihei Residential Project may be subject to the provisions of Chapter 14.62. Although the specific traffic impact fee schedule for the South Maui region has not yet been adopted by ordinance, the final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

The project site is located within the Wastewater Reclamation Division's Kihei Assessment Area No. 3 and, as such, the applicant will be required to pay assessment fees for treatment plant expansion costs. The applicant remains in coordination with the Wastewater Reclamation Division regarding assessment fees for the treatment plant expansion, as well as any necessary off-site improvements to the collection system and wastewater pump stations. The applicant will consult with the Wastewater Reclamation Division staff concerning the extension of the R-1 water line for non-drinking water usage. The applicant will also explore the availability of other non-drinking water sources.

The applicant acknowledges that the State Department of Health, Hazard Evaluation, and Emergency Response (HEER) Office noted the potential for arsenic and other residual pesticides in former agricultural lands that are proposed for urban use and the applicant has contacted the HEER Office regarding an appropriate soil testing program. It should be noted that there is no specific evidence of hazardous materials at the property. In its letter of November 19, 2007, the HEER Office stated that detailed guidance for the investigation of former agricultural lands is currently under preparation. The applicant will continue to work with the HEER Office to develop and implement a mutually acceptable soils testing program for this site prior to development with the understanding that corrective actions may be necessary.

The applicant has been in discussion with the County of Maui, Department of Housing and Human Concerns to develop an appropriate affordable housing program pursuant to the provisions of the Maui Residential Workforce Housing Policy (MRWHP). As provided under the MRWHP, the sales prices for affordable units will be established at the time of development, and based on Maui's median family income at that time. The applicant must formulate and execute an affordable housing agreement with the Department of Housing and Human Concerns prior to project implementation.

ATTACHMENT 5

From an infrastructure use perspective, project implementation will result in alteration of existing hydrology (drainage), largely due to the increase in impervious surface area, and other impacts related to wastewater, water, park, school, and roadway usage. However, these impacts will be mitigated either through the provision of additional resources onsite and offsite (drainage, water, and park) or through the payment of fair-share contributions (wastewater, school, and traffic).

The proposed drainage improvements are intended to reduce the post-development peak runoff through the creation of several detention basins. These detention basins will accommodate the increased, post-development runoff volume, thereby limiting the peak rate of runoff. Opportunities to further reduce post-development flows below existing drainage conditions will be evaluated during the design phase of the proposed development. The use of drainage basins is expected to mitigate offsite drainage runoff and impacts to coastal waters. Opportunities to direct runoff from parking lots and driveways to nearby landscaped areas and detention basins will be pursued. Also, native plants which require less water will be sought for the landscaped areas within the project.

As mentioned, the applicant is exploring several potential drinking water source opportunities, including surface water treatment and new well sources in Central Maui. The timing of completion of the source development projects will, in large part, determine the particular water source for the project. The applicant acknowledges that both source alternatives will require further discussion, review, and approval by applicable governmental agencies and expects to continue discussions as the planning and design for the project proceeds. Nonetheless, the applicant is committed to develop source, storage, and transmission facilities to serve this project.

The applicant has been in coordination with the County of Maui, Department of Parks and Recreation to ensure satisfactory compliance with parks and playgrounds assessment requirements. Preliminarily, it is estimated that the park assessment would amount to just under seven (7) acres for a 600-unit residential subdivision in South Maui. The applicant is currently exploring the possibility of creating a new park adjacent and north of the existing Hale Pi'ilani neighborhood park to satisfy its park assessment requirements.

The project site is located within the Wastewater Reclamation Division's Kihei Assessment Area No. 3 and, as such, the applicant will be required to pay assessment fees. The assessment fees will be used for the treatment plant expansion as well as any necessary off-site improvements to the collection system and wastewater pump stations.

The 2007 Legislature passed a bill establishing school impact fees. Under this new law, the project may be required to pay a fair-share fee, which will be used to mitigate the educational demands stemming from the project. The applicant will work with the Department of Education in formulating an appropriate fair-share agreement for the subject project.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The traffic impact fees will be used to provide a method of sharing the growth-related costs incurred by the county for road and traffic infrastructure improvements made necessary by expanded population levels. The final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

To minimize potential adverse impacts to natural resources in building design, the Office of Environmental Quality Control's publication entitled "Guidelines for Sustainable Building Design in Hawai'i" has been reviewed. As a result, the following measures to conserve natural resources and to promote energy efficiency will be undertaken in the planning, design, construction, and operation of the project.

- Site buildings to take advantage of natural features and maximize their beneficial effects by providing for solar access, daylighting, and natural cooling.
- Design south, east, and west shading devices to minimize solar heat gain.
- Locate buildings to encourage bicycle and pedestrian access and pedestrian oriented uses.
- Consolidate utility and infrastructure in common corridors to minimize site degradation and cost, improve efficiency, and reduce impermeable surfaces.
- Provide tenant sub-metering to encourage utility use accountability.
- Design space for recycling and waste diversion opportunities during occupancy.

NOV 29 2007

PHONE (808) 594-1888

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

HRD07/2946C

November 26, 2007

Kyle Ginoza
Munekio & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

RE: Draft Environmental Impact Statement, Proposed Kihei Residential Project, TMK (2) 3-8-004: 002 (por.), 022 (por.), and 030 (por.), Kihei, Kula, Maui.

Dear Kyle Ginoza,

The Office of Hawaiian Affairs (OHA) is in receipt of your October 4, 2007 request for comments concerning the Draft Environmental Impact Statement (DEIS) for the Proposed Residential Project and offers the following comments:

Our office previously offered comments in response to a request for comments on the Environmental Impact Statement Preparation Notice for this project. Our initial response voiced concern about the net benefit of this proposed project for current residents of Maui. Although the project is following the guidelines set forth by the Maui Residential Workforce Housing Policy (MRWHP), our concerns rest with the current Maui residents being able to secure these housing options as a long term option. The South Shore of Maui has turned into an up-scale playground consisting of transient vacation homes and second homes for many part-time residents. Although the homes do meet the current MRWHP, the impacts on the local community do not appear too beneficial.

The loss of agricultural lands continues to be a concern on the island of Maui and throughout the State of Hawai'i. This concern primarily rests with the reality that former agricultural lands are being and have been developed into urban land uses. The uncontrolled development of former agricultural land becomes a major issue that has impacts on infrastructure, traffic, quality of life, cost of living, and impacts on natural and cultural resources.

Urban growth on Maui, especially in the Kihei area is alarming. This situation begs the questions: When will the growth stop? Is this sustainable for the future of Central Maui? These are some of the questions that everyone should ask each other when proposing residential

Kyle Ginoza
Munekiyo & Hiraga, Inc.
November 26, 2007
Page 2

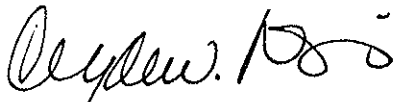
development of former agricultural lands. Concepts such as an urban growth boundary and smart growth policies should be put in place to carefully limit the growth of development. Without such planning tools, urban sprawl and uncontrolled development will continue on the island of Maui.

Our office previously voiced our concerns with the natural and cultural landscapes in South Maui. These landscapes have completely and irrevocably been transformed by the numerous developments in the area. OHA has continually voiced our concerns over the uncontrolled development of the Kīhei-Mākena coast. The impacts of the continued development place a constant burden on the local residents of Maui. As more and more resort-based tourism development and correlating workforce residential housing development is proposed in South Maui, the residents will continue to be forced to participate in non-sustainable economic development. This places an added burden on the land and the natural and cultural resources which are being destroyed and altered at the expense of urban development.

Along with the concerns over the loss of agricultural lands, uncontrolled urban growth, and Native Hawaiian cultural landscapes, our office always has particular concerns over the potential to disturb sub-surface cultural resources. OHA asks that, in accordance with Section 6E-46.6, Hawaii Revised Statutes 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. OHA would also like to be contacted at that time.

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
Kahalui, HI 96732



MICHAEL T. MUNEKIYO
GWEN DHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GIROZA

April 23, 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 Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Namu`o:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 26, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai`i.

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

1. We acknowledge your office's concerns regarding the Maui Residential Workforce Housing Policy (MRWHP), Maui County Code Section 2.96. Regarding affordability of housing units, the MRWHP sets forth requirements for the provision of housing units for a defined set of income brackets, including individuals and families earning between 80 percent and 160 percent of median household income. As required under the MRWHP, a minimum of 40 percent of the project's units must be priced for households within this income range. The MRWHP also includes provisions for the screening and selection of qualified households, and measures to insure the long term affordability of the housing units, including deed and resale restrictions, and County buyback provisions. A more thorough discussion of the specific number of housing units for each income bracket will be included in the Final Environmental Impact Statement (EIS).
2. We note your office's concerns regarding the loss of agricultural lands, urban growth resort-based tourism developments, and Native Hawaiian cultural landscapes. As the foregoing concerns relate to urban growth considerations, we note that the County of Maui's General Plan Advisory Committee (GPAC) will be reviewing and recommending urban growth boundaries for the updated Maui County General Plan. We understand that the criteria for defining urban growth boundaries will address in part, infrastructure availability, land use compatibility, housing needs by region, and relationship to surrounding natural resources. The proposed Kihei Residential

Clyde Namu'o, Administrator
April 23, 2008
Page 2

Project has been submitted to the Planning Department for consideration by the GPAC in the urban growth boundary deliberation and delineation process. The project is expected to serve the housing needs of the region at a logical location for future residential growth, which is in close proximity to existing infrastructure and other residential uses.

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) will be contacted. This language will be included in the Final EIS. As requested in your letter, OHA will be notified

We appreciate the input we received from your office. 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: Dan Yasui, A&B Properties, Inc.

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UNIVERSITY OF HAWAII AT MANOA
Environmental Center

November 26, 2007

Mr. Dan Yasui
A&B Properties
822 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Yasui:

We have made some changes to our review of the Proposed Kihei Residential Project Draft Environmental Impact Statement based on further discussion among the authors. We ask that you disregard the review that we sent to you on November 21, 2007 and substitute the attached comments in its place. We realize that these revised comments are being submitted after the deadline but we hope you will accept them because they raise several issues that we failed to point out in our earlier review.

Please let me know if you will accept the revised review. Please call me at 956-3976 if you have any questions.

Thank you very much for your consideration.

Sincerely,


Peter Rappa
Environmental Review Coordinator

cc: Kyle Ginoza, Munekiyo & Hiraga
Anthony Ching, Land Use Commission
OEQC
Catherine Davenport
Ann Coopersmith
James Moncur

UNIVERSITY OF HAWAII AT MANOA
Environmental Center

November 26, 2007
RE:0767

Mr. Dan Yasui
A&B Properties
822 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Yasui:

Draft Environmental Impact Statement
Kihei Residential Project
Kihei, Maui

A&B Properties proposes to develop a master-planned residential community with approximately 600 dwelling units on approximately 94.3 acres situated Kihei, Maui. The parcels are owned by Alexander and Baldwin, Inc. The project includes a mix of single-family detached and multi-family residential units, as well as a small neighborhood commercial area. The project will meet the requirements of the Maui Residential Workforce Housing Policy (MRWHP). The proposed project will provided needed housing in close proximity to existing urban development and infrastructure. The applicant will coordinate with the County Department of Housing and Human Concerns to develop an appropriate affordable housing program pursuant to the provisions of the MRWHP.

This review was conducted with the assistance of Catherine Davenport, Ethnobotany; and Ann Coopersmith, Biological Science, Maui Community College.

General Comments

The supply of potable water on the island of Maui is one of the major concerns facing all proposed development. The insufficient supply of potable water for this proposed development is highlighted on page 45 of the DEIS. This section states that the Department of Water Supply is likely to "require the applicant to develop a potable water source and storage facilities to service the project." The DEIS states that the applicant is exploring several possible source opportunities, but fails to elaborate what they are and where they might be. The availability of potable water is of such importance that the County of Maui is considering passage of a "Show Me the Water" ordinance. In effect, the County Council will not approve any developments unless a sustainable water source is clearly available. This DEIS does not address the water source for 600 units it proposes to develop. The water for the Kihei area

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November 26, 2007
Page 2 of 5

comes from the Iao Aquifer on West Maui and that source of potable water is reaching its maximum sustainable yield. The Department of Water Supply has recently said that new water source development is needed to meet cumulative demand.

The island has been experiencing drought conditions for several months with requests for 10% cut back in usage. The Maui Department of Water Supply (DWS) in their response to the Preparation Notice suggests a number of conservation measures and other ways to help conserve water. None of these suggestions are discussed in the DEIS.

We believe that a more robust discussion of portable drinking water is required both in the section on water systems and in the cumulative impacts and this discussion should include the suggestions made by the DWS. If sources of portable water are not found, will the project be withdrawn? Should it be permitted by the Land Use Commission?

We also have some concerns about who will purchase these units. For whom are these homes being built? Will these units be affordable for police officers, fire fighters, teachers, construction workers, office workers, etc? Can these people afford a home for "approximately \$580,000 (2007 dollars)"? How long would it take a person in these occupations to save enough for the down payment? We would like see a more robust discussion in the Final EIS on potential buyers.

The DEIS states that the proposed development is in a highly desirable location. However, we note that this area is hot, dry, windy, dusty, noisy, and crowded with no access to public transportation. What makes it an obvious location for the land owner to develop is that it is cut off from the main agricultural sections to the north by a gulch and having a higher value as an urban rather than an agricultural development.

In addition to our general comments we have some specific comments.

Maps (various pages)

The maps used in the DEIS needs to be updated. They do not show the highway intersection currently under construction. The improvements to the highway were proposed and decided upon years ago. The lack of up to date maps make it difficult for those reviewing the DEIS to get a true understanding of the proposed project.

Project Need (p. 7)

A 1.4 acre commercial area is planned for this proposed development. We believe there should be a fuller description of what type(s) of facilities that the applicant hopes to attract to this area? What do they see as the area that the commercial center will serve?

November 26, 2007

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Agriculture (p. 17)

The proposed development will take 45 acres of prime agricultural land out of agricultural and put it into urban use. The proposed new use of this land decreases the ability of the islands to achieve sustainability in food production. With increasing fuel prices it may become necessary to grow more food locally and therefore increase the security of our island communities. Diversified agriculture secures an economic base and food sources in difficult times.

In the last paragraph on page 17, the DEIS states that the project site is located on land designated "E77" by the Land Study Bureau (LSB). These lands have the lowest productivity rating according to the LSB. There is no map showing where the "E77" lands are located. The use of the LSB rating system is confusing the issue of agricultural lands. Does the "E77" designation apply to lands that are considered "Prime" under the stat ALISH rating? Are the prime agricultural lands suitable for agriculture or do they have low productivity. We suggest a clarification of the use of the rating systems and the inclusion of a map showing what lands are considered "E77".

Hazardous Materials and Fertilizers Usage (p. 31)

The first paragraph on Potential Impacts and Proposed Mitigation Measures discusses the potential for the presence of arsenic in the soil. The DEIS states that the applicant will work with the hazard Evaluation and Emergency Response Office to develop a mutually acceptable soil testing program to address these concerns. Shouldn't the soil have been tested as part of the environmental impact assessment with the result reported in the DEIS? The presence or absence of arsenic is an important point of interest for both the developers and regulators. We believe that the public would find the result of that testing to be interesting.

Economy and Labor Force (p. 33)

In the first paragraph in the Potential Impacts and Proposed Mitigation Measures section the project short-term benefit for the provision of construction jobs is touted. Hawaii's employment rate as the DEIS points out is the lowest in the country. Under these conditions adding more jobs to the economy drives up the cost of labor making projects more costly than if there was a real need for employment or it creates a situation where more workers move to Maui requiring more housing for them. The provision of more jobs when the county is at full employment is hardly a benefit.

Educational Facilities (pp. 36-38)

The proposed new residential development will increase the enrollment in the local public schools. In the case of Lokelani Intermediate School and Maui High the increase in enrollment will add to the overcrowded conditions that already exist. The DEIS states in the

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final paragraph of discussion of the problem that the applicant will continue discussions with the DOE concerning a fair-share educational contribution for the project. This discussion should have been included in the DEIS since it is important information on which the Land Use Commission needs to make an informed decision. How will the proposed development contribute to the solution of overcrowding at the intermediate and high schools?

Roadways (pp. 40-44)

The discussion of roadways and traffic should contain about the proposed development's impact on level of services on existing road. We feel that a table showing the current level of service for each of the main roads with and without the project will be helpful in understanding the impact of the proposed development on existing roads. We note that Appendix E – Traffic Impact Analysis Report has a discussion of level of service with and without the project on page 47 with an accompanying table on the next page. A synopsis of the Appendix E discussion on level of service would have been very informative in the DEIS portion of the document.

We also suggest that there should be an alternative entry to Mokolele Highway on the Kahului side of the intersection that would bring traffic going to Kahului from the proposed development onto the highway past the main Kihei-Lahaina-Kahului intersection.

Drainage System (p 48)

While the average rainfall for Kihei is only 11.25 inches, periodically rain comes in torrential downpours over short periods of time causing flash flooding. There is a huge drainage ditch next to the proposed development which is about 3000 meters from the ocean. This ditch will carry major amounts of silt into the ocean when these downpours come. The heavy rains common in this area carry a lot of surface flow to the ocean quickly as it does not have time to percolate into the soil.

Cumulative and Secondary Impacts (pp. 50-51)

We find this section seriously lacking in specifics. We particularly find the discussion on cumulative impacts to be rather brief. Though the proposed project is not part of a larger action nor does it occur within the context of such action, it does occur in a part of Maui that has seen much change in the past two decades. For example, the new Wailea 670 development at the south end of Kihei area may soon be built and will add 1400 units to an area already congested with traffic. The Wailea 670 development proposal has passed the County Council Planning Committee with stipulations and may soon be approved by the Council

Though the proposed project is not responsible for all the development that has occurred in Kihei, there have been large scale changes that have taken place. These changes should be cited and the proposed project's part should be acknowledged. As we pointed out in our general

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comments above, the cumulative results of all the development on Maui is a dwindling supply of portable water. These are the types of issues that should be addressed in this section.

Sincerely,



Peter Rappa
Environmental Review Coordinator

cc: Kyle Ginoza, Munekiyo & Hiraga
Anthony Ching, Land Use Commission
OEQC
Catherine Davenport
Ann Coopersmith
James Moncur



MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
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MARK ALEXANDER ROY
KYLE BRINZA
April 23, 2008

Mr. Peter Rappa
Environmental Review Coordinator
University of Hawai'i at Manoa
Environmental Center
2500 Dole Street
Krauss Annex 19
Honolulu, Hawai'i 96822-2313

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Rappa:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 26, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

General Comments

As mentioned in the Draft EIS, the applicant is exploring several potential drinking water source opportunities, including surface water treatment and new well sources in Central Maui. A primary focus has been the development of a surface water treatment plant utilizing water from the West Maui ditch system. Engineering design of the plant is well underway, as well as the preparation of other needed regulatory documents. Over the past three (3) years, in excess of \$850,000.00 has been spent on the engineering design and preparation of regulatory documents needed for the plant to proceed. The plant is now about 80 percent designed and other environmental and engineering documents are also nearing completion. The applicant is also pursuing other potential sources, including a new drinking water well in the Kahului aquifer. Potential well sites have been identified and a test well was drilled. The results of the well's pump test indicate a sustainable capacity of approximately 0.648 million gallons per day.

The timing of completion of the source development projects will, in large part, determine the particular water source for the project. The applicant acknowledges that both source alternatives will require further discussion, review, and approval by applicable governmental agencies and expects to continue discussions as the planning and design for the project

proceeds. Nonetheless, the applicant is committed to develop source, storage, and transmission facilities to serve this project. The applicant will coordinate with the DWS to incorporate this project into the County's Water Use and Development Plan.

As referenced in your letter, the County of Maui recently approved Ordinance No. 3502, relating to water availability. This ordinance requires that a long-term reliable supply of water be verified at the time of subdivision approval. The ordinance provides that "No subdivision shall be approved, unless prior to submittal of subdivision construction plans..., the director shall provide written verification of a long-term reliable supply of water." As such, it will be the applicant's responsibility during the course of the future planning and design of the project to satisfy the requirements of Ordinance No. 3502 and to establish an adequate and viable water source for the project.

Further, regarding measures to reduce drinking water consumption, the applicant will explore the availability of non-drinking water sources in the region. The applicant would like to be able to utilize R-1 recycled water, where appropriate. The applicant will examine partnership opportunities for the potential use of non-drinking water and will consult with the Department of Environmental Management staff concerning the extension of the R-1 water line from the Kihei Wastewater Reclamation Facility.

Additionally, the applicant will explore the availability of other non-drinking water sources for landscape irrigation purposes, which will be pursued further during the civil design phase of the project. The information on "Maui County Planting Plan – Plant Zone 3" from the Department of Water Supply, will be utilized, as applicable, to place plants in landscaping, which will help to conserve water and protect the watershed from degradation. Rain sensors will be provided on all automated irrigation controllers in common landscaping areas. The applicant will initiate a regular maintenance program to check and reset the automated irrigation controllers.

Plumbing fixtures will be installed in accordance with Maui County Code Section 16.20A.680, which requires the utilization of low-flow fixtures and devices in an effort to conserve water. The applicant will advise owners to maintain fixtures and devices to minimize leakage.

It is acknowledged that the substitution of additional multi-family units for a portion of the single-family units would result in less overall water demand for the project. This is due to the lower average daily water demand factor for multi-family units (560 gallons per day) versus that for single-family units (1,000 gallons per day). However, various other factors were also considered in developing the project master plan and unit mix. By offering a range of housing types it was felt that the project would attract and serve a wider range of the housing market. The unit mix does reflect the general market preference for single-family detached units. It was also felt that single family-residential use was compatible and consistent with the adjacent portions of the Hale Pi'ilani subdivision. Also, the higher

density multi family use was deemed more appropriate closer to the primary vehicular access points on the western (makai) portion of the site.

The CWRM requested that the project be included in the County's Water Use and Development Plan. The applicant will coordinate with the DWS, as applicable, to address the CWRM request.

Regarding affordability of housing units, the project will be in compliance with the Maui Residential Workforce Housing Policy (MRWHP), Maui County Code Section 2.96. The MRWHP sets forth requirements for the provision of housing units for a defined set of household income brackets, including individuals and families earning between 80% and 160% of median household income.

As required under the MRWHP, a minimum of 40 percent of the project's units, or approximately 240 units (based on the project's planned 600 units) must be priced for households within this income range. The MRWHP specifies the proportionate allocation of the affordable units among the various income groups, which include: 30% (72 units) priced for below-moderate income households (earning between 80% and 100% of median income), 30% (72 units) priced for moderate income households (earning between 100% and 120% of median income), 20% (48 units) priced for above-moderate income households (earning between 120% and 140% of median income), and 20% (48 units) priced for gap income households (earning between 140% and 160% of median income).

While subject to agreement with the County, it is anticipated that the affordable units will comprise a mix of both multi-family and single-family units and that the affordable units will be developed concurrently with the market units. See Table 4 below.

Table 4. Affordable Housing Price Ranges

Income Group	Income Range	Affordable Unit Allocation		Single-Family		Multi-Family	
	(% of Median Income)	%	Unit Count	Price Range		Price Range	
Below Moderate Income	80-100	30%	72	\$211,200	\$267,900	\$206,900	\$263,600
Moderate Income	100-120	30%	72	\$267,900	\$329,600	\$263,600	\$325,400
Above Moderate Income	120-140	20%	48	\$329,600	\$391,400	\$325,400	\$387,100
Gap Income Group	140-160	20%	48	\$391,400	469,300	\$387,100	\$464,800

The projected home sales price cited in your letter (approximately \$580,000) is for the proposed market homes at the project. It should be noted that this is less than the median home price in Kihei of \$695,000 (year-to-date through October 31, 2007, as published by the Realtors Association of Maui). Both the affordable and the market homes are intended to ease the high demand for housing for residents of Maui.

The project is situated in North Kihei, a region in South Maui approximately equidistant between the resort area of Wailea and the business/commercial area of Kahului and Wailuku. While the Kihei region is predominantly dry and at times windy, it is a desirable place to reside, particularly in the context of proximity to recreational, employment, and commercial areas.

The information above will be included in the body of the Final EIS.

Maps

As suggested, a figure depicting the proposed realignment of the Mokulele Highway/Pi'ilani Highway connection will be included in the body of the Final EIS.

Project Need

The 1.4-acre commercial area is intended to serve the household needs of the surrounding neighborhood. The composition of businesses occupying the commercial area will generally be limited to those serving the neighborhood clientele. The applicant envisions a small neighborhood commercial center linked to bike and pedestrian paths, where nearby residents would not have to leave the neighborhood to satisfy their needs for household goods and services, thereby potentially reducing vehicular trips. The commercial

component is not intended to be a destination area for residents and visitors whose origin or destination is not in the immediate vicinity of the project.

Agriculture

Regarding the local inventory of Agricultural Lands of Importance to the State of Hawai'i (ALISH), there are large acreages of "Prime" agricultural land north of the project which are owned and being farmed by an affiliate of the applicant. Replacement lands for the seed corn farmer have been provided to mitigate the potential loss of these lands. It is therefore anticipated that the conversion of 45 acres of "Prime" agricultural lands for residential use will not have a significant adverse impact on the agricultural resources of the region.

The agricultural impact of this project is near negligible when taken in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands. In fact, much of the lands of these former plantations are still fallow. The proposed project will ultimately involve the use of approximately 94.3 acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui. Further, rather than the available land supply, more salient factors facing the agricultural industry include the market demand for products (access to markets and local purchasing patterns) and the overall profitability of crops grown in Hawai'i.

Generally speaking, the Land Study Bureau "E77" designated lands are designated "Unclassified" under the ALISH classification system. Similarly, Land Study Bureau-designated "B72i" lands occupy a similar area to the "Prime" ALISH lands. A more thorough discussion detailing the differences in the agricultural land rating systems used, in addition to the Land Study Bureau map, will be included in the Final EIS.

Hazardous Materials and Fertilizer Usage

There are no indications that appreciable levels of arsenic or other agricultural chemicals are present at the subject property. Nonetheless, the applicant acknowledges that the HEER Office noted the potential for residual pesticides in former agricultural lands that are proposed for urban use and the applicant has contacted the HEER Office regarding an appropriate soil testing program. The HEER Office stated in its letter of November 19, 2007 that detailed guidance for the investigation of former agricultural lands is currently under preparation. The applicant will continue to work with the HEER Office to develop a mutually acceptable soils testing program for this site with the understanding that corrective actions may be necessary.

Economy and Labor Force

The benefits of adding jobs to the local economy were reviewed in the context of the local economy and construction-related employment being cyclical in nature. While Hawai'i's unemployment rate remains low at the present time, past experience shows that this condition may not remain true a few years from now, when the construction phase of the project is slated to commence. Recent statistics indicate an upward trend in the rate of unemployment on Maui, rising from about 2.0 percent in January 2007 to 3.3 percent by December 2007. It is noted that the project's build-out duration is estimated to be five (5) years.

Educational Facilities

The applicant acknowledges that the 2007 Legislature passed a bill establishing school impact fees and will update the Final EIS to note this information. In the Department of Education's Draft EIS response letter, they noted that they "currently do not know the amount of the fee per residential unit; however, [they] should have a better idea early in 2008". The applicant will work with the Department of Education in formulating an appropriate fair-share agreement for the subject project to mitigate impacts upon school facilities.

Roadways

The discussion of the level of service for each major roadway both with and without the project will be included in the body of the Final EIS, as requested. Further, regarding the suggested alternative access to Mokulele Highway, there have been discussions regarding the concept of a future north/south collector road, parallel to and mauka of Pi'ilani Highway. However, at this time there are neither plans of the proposed alignment nor any timeframe for the development of such a roadway. Such a roadway would likely cross over existing agricultural land and require access approval to Mokulele Highway from the State DOT. This mauka roadway was discussed in the Draft EIS under the section entitled "Unresolved Issues". However, since this mauka roadway is not anticipated to be completed prior to the project build-out year, the roadway was not factored into the project's traffic analysis.

Drainage System

With the implementation of Best Management Practices (BMPs), the proposed project is not anticipated to have adverse long-term effects on the nearby coastal ecosystems. Appropriate BMPs and erosion-control measures will be implemented to ensure that coastal ecosystems are not adversely impacted by construction activities. Project-related drainage system improvements will be designed in accordance with applicable regulatory standards to mitigate potential adverse impact to surrounding properties.

Proposed drainage improvements include the creation of several onsite detention basins and the installation of box culverts. The detention basins and box culverts will accommodate the increased, post-development runoff volume, thereby limiting runoff to levels at or below existing drainage conditions.

Regarding possible runoff discharge to the ocean, 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, Water Quality Standards, are applicable. Nonetheless, all discharges related to project construction or operation activities will comply with the relevant sections of HAR, Chapter 11-54. Discharges will be kept at a minimum through the application of BMPs.

Cumulative and Secondary Impacts

To the extent that specific information on other major projects can be identified, these projects will be addressed in the Final EIS. We note that issues regarding the dwindling water supply and opportunities to develop new source, and roadway congestion and remedial opportunities were discussed based on information currently available. Specific assumptive information and detailed analyses used in the discussion may be found in the technical reports located in the appendices of the Draft EIS and Final EIS.

Regarding the Wailea 670 project specifically, the most salient community impact as it relates to the Kihei Residential Project would likely be roadway congestion. Wailea 670 and other probable, proposed projects were factored into the traffic impact analysis. As a result, a discussion of a potential mauka roadway to alleviate cumulative impacts to the region was included. This discussion will be incorporated in the cumulative impact section of the Final EIS.

We appreciate the input we received from your office. 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: Dan Yasui, A&B Properties, Inc.

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STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

LAND USE COMMISSION

P.O. Box 2359
Honolulu, Hawaii 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

November 28, 2007

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

Dear Mr. Ginoza:

Subject: Docket No. A07-772
Draft Environmental Impact Statement (DEIS)
Proposed Kihei Residential Project
Kihei, Maui, Hawaii
Tax Map Key: 3-8-04: por. 2, por. 22, and por. 30

We have reviewed the subject DEIS for the proposed development and have the following comments to offer:

- 1) In accordance with section 11-200-17(b), Hawaii Administrative Rules (HAR), a summary sheet should be provided that summarizes (i) the proposed action; (ii) the significant beneficial and adverse impacts (including cumulative impacts and secondary impacts); (iii) the proposed mitigation measures; (iv) the alternatives considered; (v) the unresolved issues; (vi) the compatibility of the proposed action with land use plans and policies; and (vii) the permits or approvals required for the proposed action.
- 2) In accordance with section 11-200-17(f), HAR, alternatives to the proposed action should be described in a separate and distinct section. We note that the alternatives that are presented are solely discussed in a negative context relative to the proposed development. Please also include a discussion as to the potential benefits of the alternatives, including the extent to which the alternatives could avoid some or all of the short and long-term adverse environmental effects. In addition, please include under this section a discussion of alternative site layouts to the conceptual master plan presented in Figure 5 of the DEIS.

- 3) In accordance with section 11-200-17(g), HAR, a description of the environmental setting should be provided. Accordingly, we request that information on the existing groundwater resources (i.e., hydrogeology, aquifers, sustainable yields, recharge, wells, etc.) underlying the subject property be provided, including the potential impacts and mitigation measures from the proposed development. Although we acknowledge that adverse effects on groundwater resources are not anticipated from fertilizer use, we believe that this discussion should be expanded to address all potential impacts from uses typically associated with residential development.
- 4) In accordance with section 11-200-17(h), HAR, the status of each identified approval should be described. Therefore, we request that to the extent possible the projected submittal dates (i.e., by month/year) of the applications and plans for approval to the various agencies be provided.
- 5) In accordance with section 11-200-17(i), HAR, the probable impact of the proposed action on the environment should be discussed. We note that the DEIS contains statements that affirm the proposed development's negligible long-term impacts upon the air quality and ambient noise levels of the area. We further note that there are no studies in the DEIS on which these conclusions are based. Given the technical and scientific nature of these issues, it has been customary to assess existing conditions and potential impacts and mitigation measures based on studies conducted by experts in the respective fields. In fact, the location, size, and configuration of the development would appear to require that such studies be done. As such, we request that the statements be affirmed by acknowledged experts in the fields in question. In the alternative, we request that the statements be comprehensively supported by published studies that have addressed the impacts upon air quality and ambient noise levels from projects on Maui that are similar to the proposed development.

Pursuant to section 11-200-17(i), HAR, the interrelationships and cumulative environmental impacts (both direct and indirect) of the proposed action and other related projects should also be discussed, including the potential secondary effects. We note that the *Cumulative and Secondary Impacts* section within the DEIS points to the ongoing General Plan update process to ultimately delineate urban and rural growth boundaries for *future* development in the North Kihei region. As such, the discussion on cumulative and secondary impacts lacks specificity. We request that the section identify *existing* developments in the region to ensure that the interrelationships of all projects are considered. We also

request an assessment of the cumulative and secondary impacts of the proposed development and other projects upon Maui's supply of agricultural land that is similarly rated as the subject property.

- 6) In accordance with section 11-200-17(m), HAR, mitigation measures proposed to avoid, minimize, rectify, or reduce impact should be considered. Included in this discussion should be the timing of each step proposed to be taken in the mitigation process and other provisions to assure that the mitigation measures will in fact be taken. We note that the proposed development is projected to contribute impacts upon roadway facilities sufficient to warrant the need for specific traffic improvements. However, there is no discussion as to (i) the party who will be responsible for the improvements; (ii) the timeframe for implementing such improvements in the process; or (iii) the necessary assurances that will ensure that the improvements will be undertaken as represented.
- 7) In accordance with section 11-200-17(n), HAR, unresolved issues associated with the proposed action should be discussed. To the extent that the petitioner's fair-share educational contribution, park assessment requirements, affordable housing requirements, and participation in wastewater improvements remain under discussion/coordination with the applicable agencies and have yet to be resolved, they should be included in the *Unresolved Issues* section within the DEIS. The potential presence of arsenic on the subject property should likewise be treated as an unresolved issue at this time and be included. These matters should be discussed in terms of how they will be resolved prior to the commencement of the development. In the alternative, the overriding reasons for proceeding without resolving the problems should be addressed.
- 8) In accordance with section 11-200-17(o), HAR, the identity of the persons and firms preparing the document, by contract or other authorization, should be disclosed.
- 9) In accordance with section 11-200-17(p), HAR, reproductions of all substantive comments and responses made during the consultation process should be provided. Review of the DEIS (Section X) indicates that the response to Chris and Marilyn Chapman's April 17, 2007, letter has not been included. In addition, we suggest that the comment letter and corresponding response letter be consistently organized by party throughout the section to facilitate easier review.

- 10) There should be discussion as to how the proposed development will address the housing needs of the low income, low-moderate income, and gap groups. We acknowledge that an affordable housing program ultimately will be developed with actual sale prices for the affordable units established at the time of development and based on Maui's median family income at that time. However, we believe that in the interest of full disclosure, information on the number of affordable units and the range of affordable prices that are projected for the development should be provided. We also request that information be provided on the projected distribution of the affordable housing between the proposed multi-family and single-family units and the timeframe as to when the affordable units are projected to be constructed in the development relative to the market units.
- 11) We acknowledge that the proposed development will generate revenues to the State and County of Maui via increased general excise taxes and real property taxes, respectively. However, we request that an analysis of the projected expenses that would be incurred by the State and County governments to support the proposed development. The analysis of governmental operating expenditures should include, but not be limited to, the following areas: roadways (improvements and maintenance), higher/lower education, public safety, health and sanitation, human services, recreation, debt service, and government employee benefits.
- 12) We request that a description be included of the specific efforts that will be undertaken to design and construct structures within the proposed development that conserve natural resources and are energy efficient.
- 13) In the DEIS, there are numerous references to the term *potable water*. We request that it be replaced by the term *drinking water*. We have been advised that although potable water has generally been used to mean drinking water, the Department of Health (DOH) uses the latter term specifically to indicate water for human consumption that is derived from surface water and/or groundwater and is regulated by the DOH pursuant to chapter 11-20, HAR.
- 14) The legend in Figure 12 of the DEIS should be revised to include the State Land Use Rural District. Lands within this district are indicated on the figure by a hatched pattern.

Mr. Kyle Ginoza
November 28, 2007
Page 5

- 15) We suggest that a list of acronyms and abbreviations be included for ease of reference.

We have no further comments to offer at this time. Thank you for the opportunity to comment on the subject DEIS.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,



ANTHONY J. H. CHING
Executive Officer

c: Office of Environmental Quality Control



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

MARK ALEXANDER ROY
KYLE GINGZA

April 23, 2008

Rodney Maile, Interim Executive Director
State of Hawai'i
Land Use Commission
P. O. Box 2359
Honolulu, Hawai'i 96804

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Maile:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your office's letter dated November 28, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. The Executive Summary contained within the Draft EIS will be revised in the Final EIS to satisfy Hawai'i Administrative Rules (HAR), Section 11-200-17(b). Specifically, the contents of **Attachment 1** will be included in the Executive Summary of the Final EIS.
2. Section IV. Alternatives to the Proposed Action will be revised in the Final EIS to include potential benefits of the alternatives, including the extent to which the alternatives could avoid short- and long-term adverse environmental effects. **Attachment 2** contains the revisions with alternative site layouts addressed, which will be included in the Final EIS.
3. The information below to address existing groundwater resources will be included in Section II.D.2. Water System of the Final EIS.

The project site is situated over the Paia aquifer (State Aquifer #60302) which has an estimated sustainable yield of 8 million gallons per day (mgd). The Paia aquifer extends from Paia to north Kihei, within Central Maui, just east of the Kahului aquifer. The subject site is located in the southern portion of the aquifer, in an area of underlying brackish water (chlorides in excess of 250 parts per million). Wells in this portion of the aquifer are generally used for

irrigation purposes. Based on available well information from the Commission on Water Resources Management (CWRM) there are approximately 30 registered wells (excluding wells not in use or for observation) within the Paia aquifer. The majority of the wells are used for irrigation purposes, including those in the vicinity of the project site. The underlying brackish water extends well beyond the project site (mauka/east). Fresh drinking water begins to occur in the basalt lava flows at approximately elevation 1,200 feet above mean sea level (amsl), far beyond the site's maximum elevation of approximately 230 feet amsl. The only listed domestic wells in the Paia aquifer are on the northern end of the aquifer, in the vicinity of Spreckelsville and Maliko Gulch. Due to the project's relative proximity to the ocean, it is not situated upgradient of any known drinking water wells. Based on these factors, the project is not anticipated to have significant adverse impact upon drinking water resources. Specific information concerning the current withdrawal rate from the aquifer was not available, however, the area is not designated a ground water management area by the CWRM.

Regarding potential adverse impacts upon groundwater resources resulting from project implementation, the project will connect to the County wastewater system and household refuse will be collected by County personnel on a regular basis as part of the residential refuse collection service. Further, impacts to groundwater resources attributable to hazardous materials usage are not anticipated since uses typically associated with such materials (e.g. industrial use) are not planned at the project. As a result, the project is not anticipated to have a significant adverse impact upon groundwater resources as a result of project development.

As mentioned in the Draft EIS, the applicant is exploring several potential drinking water source opportunities, including surface water treatment and new well sources in Central Maui. A primary focus has been the development of a surface water treatment plant utilizing water from the West Maui ditch system. Engineering design of the plant is well underway, as well as the preparation of other needed regulatory documents. Over the past three (3) years, in excess of \$850,000.00 has been spent on the engineering design and preparation of regulatory documents needed for the plant to proceed. The plant is now about 80 percent designed and other environmental and engineering documents are also nearing completion. The applicant is also pursuing other potential sources, including a new drinking water well in the Kahului aquifer. Potential well sites have been identified and a test well was

drilled. The results of the well's pump test indicate a sustainable capacity of approximately 0.648 million gallons per day.

The timing of completion of the source development projects will, in large part, determine the particular water source for the project. The applicant acknowledges that both source alternatives will require further discussion, review, and approval by applicable governmental agencies and expects to continue discussions as the planning and design for the project proceeds. Nonetheless, the applicant is committed to develop source, storage, and transmission facilities to serve this project. The applicant will coordinate with the DWS to incorporate this project into the County's Water Use and Development Plan.

4. **Table 1** below containing the projected submittal and approval dates for each identified approval will be inserted in Section IX. List of Permits and Approvals of the Final EIS.

Table 1. Projected Submittal and Approval Dates

<i>Permit or Approval</i>	<i>Anticipated Submission Date</i>	<i>Anticipated Approval Date</i>
District Boundary Amendment	2007	2008
Community Plan Amendment	2008	2010
Change in Zoning	2008	2010
Subdivision Approval	2010	2010
NPDES Permits, as applicable	2010	2011
Construction Permits	2011-2016	2011-2016

5. The statements made in the Draft EIS regarding negligible long-term impacts to air quality and ambient noise quality were based on potential impacts to similar projects and existing proximate uses to the south and Waiakoa Gulch and agricultural uses to the north of the project site.

The following will be included in Section II.A.10. Air and Noise Quality of the Final EIS.

The major potential short-term air quality impact of the project will occur from the emission of fugitive dust during construction. In addition to regular

watering and sprinkling, the following measures will be implemented by the applicant's contractor during construction activities to minimize the proliferation of fugitive dust, in accordance with Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control.

Use of wind screens and/or limiting the area that is disturbed at any given time will help to contain fugitive dust emissions. Wind erosion of inactive areas of the site that have been disturbed could be controlled by mulching. Trucks hauling soil material would be covered to mitigate dust. A routine road cleaning and tire washing program would help reduce fugitive dust emissions from trucks/vehicles tracking dirt onto nearby paved roadways. Installation of landscaping early in the construction schedule will also help to control dust.

During the construction phase, emissions from engine exhaust will occur from onsite construction equipment and other construction related vehicles. Increased vehicular emissions due to traffic disruptions by construction equipment or vehicles entering/exiting the site can be mitigated by moving equipment during off-peak hours. Construction related emissions would be limited to the construction period of the project. After the project is completed, carbon monoxide concentrations at the site are anticipated to remain within acceptable air quality standards. The project site is situated adjacent to Waiakoa Gulch, which will serve as a buffer between the project and ongoing agricultural activities situated further to the north. Related noise and dust emissions from such agricultural activities are anticipated to be buffered by Waiakoa Gulch.

Concerning potential impact on the Department of Health's air monitoring station, the applicant has had discussions with the department regarding minimizing impacts. The Department of Health (DOH) noted that an air quality monitoring station is situated adjacent to the project site in the Hale Pi'ilani neighborhood park. The primary purpose of the air monitoring station is to monitor particulates resulting from cane burning. The DOH makes every attempt to prevent dust from construction activities from affecting the particulate readings.

Through consultation with the DOH, the DOH recommended adherence to Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control. The DOH further noted that, while there are no specific requirements for projects in the vicinity of an air monitoring station, the DOH will coordinate with the

contractor to minimize impacts to the air monitoring station. Should air quality readings at the station be affected, the DOH will assist the contractor in the development of a dust mitigation action plan.

Development of the project will entail typical construction activities including excavation, grading, and the use of construction equipment (e.g. bulldozers, front-end loaders, and diesel-powered trucks). Existing residences to the south may be impacted by construction noise due to their close proximity to the project site. Noise from such construction activities would be short term and must comply with the State DOH noise regulations. Should noise during the construction phase of the project exceed the maximum allowable levels, a noise permit may be required. This has been noted by the State DOH Maui District Health Office in their comment letter of April 17, 2007 to the EISPN.

After the completion of construction, noise generated by stationary mechanical equipment (e.g. compressors and HVAC equipment) at the site must meet applicable noise standards. The planning and design of the project will take into account means to attenuate noise from such facilities through proper placement and design. Given the limited commercial use planned at the project, the potential for such adverse impacts is anticipated to be minimal. A landscaped buffer is planned within the project site between the existing residences in the Hale Pi'ilani Subdivision and the planned new collector road. This should serve to mitigate potential noise associated with the planned road and the project.

The State Department of Transportation (DOT) is currently in the process of constructing the Mokulele Highway Widening project, west of the project site. Future traffic related noise resulting from the completed roadway may impact the western most (makai) portion of the project. The planning and design of this portion of the project will need to take into account applicable noise standards. The Federal Highway Administration utilizes a noise standard of 67 decibels (dBA) for residential communities. It should be noted that the predominant trade winds of the region place the highway downwind of the project site.

A review of relevant noise studies revealed that, for residential exterior environmental noise, a day-night average sound level should not exceed 65 dBA, according to the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency. According to data from the Kapalua Mauka Final Environmental Impact Statement, prepared by PBR

Hawaii in November 2002, based on this acoustical standard, traffic noise from Honoapi`ilani Highway may impact residential properties located within 75 feet of the highway. The distance between the Pi`ilani Highway centerline and the project's property line is approximately 140 feet. Along Pi`ilani Highway in particular, according to data reported in the Final Environmental Impact Statement for the New Kihei Elementary School, prepared by Comprehensive Consulting Services of Hawai`i in April 1992, heavy traffic volumes along Pi`ilani Highway traveling at 50 miles per hour generate a noise level of 62 dBA at the edge of pavement. Therefore, based on the sizable distance between the highway and the project site, it is anticipated that traffic noise attributed to Pi`ilani Highway will not adversely impact the proposed project.

Noise measurements, after completion of the highway, should determine the extent of the noise impact and applicable mitigation measures. Potential noise mitigation measures may include construction of landscaped earthen berms, use of sound barriers, setbacks, and air conditioning. The applicant will work with the State DOT, the DOH, and other agencies in complying with all applicable noise standards.

Cumulative and Secondary Analysis

The urban growth policies applicable to the Kihei region have not yet been determined as part of the General Plan update process. The draft Maui Island Plan, wherein future growth areas would be identified, was anticipated to be issued in 2007, but has been delayed. Section II.E. Cumulative and Secondary Impacts, which will be included in the Final EIS, was expanded and currently includes a list of the existing developments in the region. See **Attachment 3**.

6. The specific mitigation measures which will be employed, including the responsible party for implementation, projected timing of implementation, and assurances of such measures, will be included in the Final EIS. **Attachment 4** contains the specific text by section that will be added to the Final EIS.
7. The section dealing with unresolved issues of the project will be revised to include the additional unresolved issues mentioned. **Attachment 5** contains the revisions, which will be included in the Final EIS.
8. A listing of firms which participated in the preparation of the EIS will be included in the Final EIS. See **Attachment 6**.

9. In the publication of the Final EIS, the comment letter and corresponding response letter will be consistently organized by party throughout the section to facilitate easier review. Additionally, the response to the Chris and Marilyn Chapman's comment letter will be included in the Final EIS. A checklist of agency responses will be included in the Final EIS as shown in **Attachment 7**.
10. The following will be included in Section II.B.4. Housing of the Final EIS.

Regarding affordability of housing units, the project will be in compliance with the Maui Residential Workforce Housing Policy (MRWHP), Maui County Code Section 2.96. The MRWHP sets forth requirements for the provision of housing units for a defined set of household income brackets, including individuals and families earning between 80 percent and 160 percent of median household income.

As required under the MRWHP, a minimum of 40 percent of the project's units, or approximately 240 units (based on the project's planned 600 units) must be priced for households within this income range. The MRWHP specifies the proportionate allocation of the affordable units among the various income groups, which include: 30 percent (72 units) priced for below-moderate income households (earning between 80 percent and 100 percent of median income), 30 percent (72 units) priced for moderate income households (earning between 100 percent and 120 percent of median income), 20 percent (48 units) priced for above-moderate income households (earning between 120 percent and 140 percent of median income), and 20 percent (48 units) priced for gap income households (earning between 140 percent and 160 percent of median income).

While subject to agreement with the County, it is anticipated that the affordable units will comprise a mix of both multi-family and single-family units and that the affordable units will be developed concurrently with the market units. See Table 6 below.

Table 6. Affordable Housing Price Ranges

<i>Income Group</i>	<i>Income Range</i>	<i>Affordable Unit Allocation</i>		<i>Single Family</i>		<i>Multi Family</i>	
	<i>(% of Median Income)</i>	<i>%</i>	<i>Unit Count</i>	<i>Price Range</i>		<i>Price Range</i>	
Below Moderate Income	80-100	30%	72	\$211,200.00	\$267,900.00	\$206,900.00	\$263,600.00
Moderate Income	100-120	30%	72	\$267,900.00	\$329,600.00	\$263,600.00	\$325,400.00
Above Moderate Income	120-140	20%	48	\$329,600.00	\$391,400.00	\$325,400.00	\$387,100.00
Gap Income Group	140-160	20%	48	\$391,400.00	\$469,300.00	\$387,100.00	\$464,800.00

11. In response to your request for an analysis of the projected governmental expenses to be incurred by the State and County governments to support the proposed development (operating expenditures including roadways, education, public safety, health and sanitation, human services, recreation, debt service, and government employee benefits), the following information will be included in Section II.B.3. Economy and Labor Force of the Final EIS.

Based on State operating expenditures at an estimated \$6.2 billion in 2006, and a de facto State population estimated at 1.5 million persons, the per capita expenditure is estimated at approximately \$4,700.00 per person. Similarly, the per capita estimate for County operating expenditures is estimated at approximately \$1,800.00 per person, based on total County operating expenditures of approximately \$317 million and an estimated de facto population of 181,000 persons.

Table 4 below contains the estimated operating expenditures per capita by functional area for the State of Hawai'i.

Table 4. State Operating Expenditures per Capita

	2006 Operating Expenditures (\$thousands)	Population ^a	Expenditures, per:	
			Resident	Visitor
Governmental Activities:				
General Government	\$455,008	1,464,300	\$311	\$311
Public Safety	\$336,362	1,464,300	\$230	\$230
Highways	\$646,336	1,464,300	\$441	\$441
Conservation and Natural Resources	\$76,490	1,464,300	\$52	\$52
Health	\$690,265	1,464,300	\$471	\$471
Welfare	\$1,709,526	1,279,400	\$1,336	\$0
Lower Education	\$2,151,891	1,279,400	\$1,682	\$0
Higher Education	\$678,338	1,279,400	\$530	\$0
Other Education	\$19,183	1,279,400	\$15	\$0
Culture and Recreation	\$98,121	1,464,300	\$67	\$67
Urban Redevelopment and Housing	\$87,789	1,279,400	\$69	\$0
Economic Development and Assistance	\$215,578	1,279,400	\$168	\$0
Interest Expense	\$172,673	1,464,300	\$118	\$118
Business-type Activities:				
Airports	\$292,086	1,464,300	\$199	\$199
Harbors	\$61,408	1,464,300	\$42	\$42
Unemployment Compensation	\$105,786	1,279,400	\$83	\$0
Nonmajor Proprietary Fund	\$2,587	1,464,300	\$2	\$2
Subtotal	\$7,799,427	1,464,300	\$5,817	\$1,934
Less: Intergovernmental Revenues	(\$1,601,005)	1,464,300	(\$1,093)	(\$1,093)
Total	\$6,198,422		\$4,723	\$840
^a Population is based on resident and defacto (resident + visitor) numbers from the U.S. Census and the Department of Business, Economic Development & Tourism. Sources: State of Hawai'i, Department of Accounting and General Services, "State of Hawai'i: Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2006", 2007 and Mikiko Corporation, "Economic and Fiscal Impact Assessment for Ho'opili", August 2007.				

Table 5 below contains the operating budget per capita by functional area for the County of Maui.

Table 5. County Operating Budget per Capita

	2006 Operating Expenditures (\$thousands)	Population ^a	Expenditures, per:	
			Resident	Visitor
Governmental Activities:				
Legislative	\$5,196	139,995	\$37	\$0
Management	\$88,821	181,534	\$489	\$489
Fire and Public Safety	\$20,561	181,534	\$113	\$113
Housing	\$13,128	181,534	\$72	\$72
Liquor	\$2,371	181,534	\$13	\$13
Administration	\$13,528	181,534	\$75	\$75
Recreation	\$22,872	181,534	\$126	\$126
Planning	\$3,579	139,995	\$26	\$0
Police	\$31,800	181,534	\$175	\$175
Legal	\$5,651	139,995	\$40	\$0
Infrastructure (exc. Water)	\$73,167	181,534	\$403	\$403
Water	\$36,191	181,534	\$199	\$199
Total	\$316,865		\$1,768	\$1,665
^a Population is based on resident and defacto (resident + visitor) numbers from the Maui County Data Book 2006. Source: County of Maui, "Operating Budget for the County of Maui for the Fiscal Year July 1, 2005 to June 30, 2006".				

The proportion of residents at the project anticipated to be new in-migrants to Maui is expected to be modest, given the pent up demand for housing on Maui and that the MRWHP requires residency within the County as a qualification criterion. Accordingly, an in-migrant population of between 5 percent and 10 percent was assumed for estimation purposes. Based on this assumption, between approximately 90 persons (30 households at an average of 3 persons per household) and 180 persons (60 households at an average of 3 persons per household) would be new residents to Maui County. The

total estimated cost of providing State and County services for these new residents is estimated at between \$585,000 and \$1,170,000.

12. The contents of **Attachment 8** will be included in the Final EIS to address specific efforts regarding conservation of natural resources and energy efficiency.
13. As recommended, all references to "potable" water will be changed to "drinking" water in the Final EIS.
14. The legend in Figure 12 will be revised to include the State Land Use Rural District.
15. A list of acronyms and abbreviations will be included in the Final EIS for ease of reference. See **Attachment 9**.
16. Regarding impacts to nearby civil defense warning sirens, the State Civil Defense provided comment that they are in the process of installing a solar-powered, omnidirectional sound properties siren adjacent to the proposed project site and, as such, the State Civil Defense does not recommend that the developer be required to install an outdoor warning siren. The State Civil Defense comment letter, which contains this information, in addition to the corresponding response letter, will be included in the Final EIS.

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:tn

Attachments

cc: Dan Yasui, A&B Properties, Inc.

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ATTACHMENT 1

PROJECT SUMMARY

PROJECT DESCRIPTION:

The applicant proposes to develop approximately 600 residential dwelling units on approximately 94.3 acres in the Kihei Residential Project. The project will include single-family and multi-family housing types and will include affordable units. A small neighborhood commercial area, as well as park and open space areas with trails and bike paths, are also proposed at the project.

SIGNIFICANT BENEFICIAL AND ADVERSE IMPACTS:

The project is anticipated to provide much needed new housing supply for Maui's residents. Necessary infrastructure systems and services can be reasonably provided to serve the project. In addition, the project is anticipated to have a beneficial impact on the local economy both during construction and in the long term. Real property taxes generated by the project residents will contribute to the County's revenue tax base to support increases in regional public service demands over time.

From an infrastructure use perspective, project implementation will result in impacts to existing hydrology (drainage), largely due to the increase in impervious surface area, and other impacts related to wastewater, water, park, school, and roadway usage.

PROPOSED MITIGATION MEASURES:

Impacts resulting from infrastructure use will be mitigated either through the provision of additional resources onsite and offsite (drainage, water, and park) or through the payment of fair-share contributions (wastewater, school, and traffic). Additionally, in the long-term, real property taxes generated by project residents will help to offset costs of increased regional public service demands.

ALTERNATIVES CONSIDERED:

The applicant has evaluated the no action alternative, alternative uses of the site, and alternative site locations. However, these options will not address the pervasive need for the timely provision of affordable housing in the area. Further, alternative site layouts were considered, though the proposed master plan was selected based on compatibility with adjacent residential land uses and its mix of housing types based on market preferences.

UNRESOLVED ISSUES:

Two (2) unresolved issues regarding project development are discussed. As noted in the Traffic Impact Analysis Report, intersections along Pi'ilani Highway in the vicinity of the project are anticipated to experience increasing traffic congestion in the future, even without the proposed project. The TIAR recommends applicable mitigation measures to address these future conditions. Included among these is the concept of a mauka roadway parallel to and mauka of the existing Pi'ilani Highway. The project's roadway system, including any connection to existing and future roadways, will be developed in consultation with the State Department of Transportation and the County Department of Public Works. Applicable traffic mitigation measures will be developed and implemented in consultation with the State Department of Transportation and the County Department of Public Works.

The applicant will participate in the funding and construction of adequate drinking water source, storage, and transmission facilities and improvements to accommodate water use generated by the project. The applicant is exploring several potential source opportunities, including surface water treatment and new well sources in Central Maui. To meet the water storage needs of the project, the applicant is in discussions with neighboring landowners concerning the location of such a tank, as well as potential joint development opportunities. All water system improvements will be developed with the cooperation and consent of the Department of Water Supply. Regarding potential non-drinking water supply, the applicant will examine partnership opportunities and will consult with the Department of Environmental Management staff concerning the extension of the R-1 water line.

Additionally, the applicant remains in discussions with various governmental agencies regarding assessment fees for infrastructure and public services, including fair-share educational contribution, park and playground assessment fees, traffic impact fees, and participation in Kihei wastewater system improvements, as well as the potential presence of arsenic and other pesticides at the property. While not specifically determined at this time, these matters will be resolved as the project progresses through the entitlement process and prior to development. Similarly, while affordable housing requirements are set forth in the Maui Residential Workforce Housing Policy, the applicant will coordinate with the Department of Housing and Human Concerns regarding the formulation and execution of an affordable housing agreement prior to development of the project.

LAND USE COMPATIBILITY:

The proposed project will require several land use entitlement approvals to proceed. A summary of the current land use parameters and the entitlement designations being sought for land use consistency with residential and commercial use is presented below.

Land Use Parameter	Existing Designation	Proposed Designation
State Land Use District	Agricultural (94.3 acres)	Urban (94.3 acres)
Kihei-Makena Community Plan	Agriculture (94.3 acres)	Multi-Family (67.9 acres)
		Single-Family (25.0 acres)
		Commercial (1.4 acres)
County Zoning	Agricultural (94.3 acres)	A-1, Apartment District (52.8 acres)
		A-2, Apartment District (15.1 acres)
		R-1, Residential District (25.0 acres)
		B-2, Community Business District (1.4 acres)

List of Permits and Approvals:

A summary of the required permits and approvals and an estimated time schedule for application and approval for project implementation is presented below.

Permit or Approval	Anticipated Submission Date	Anticipated Approval Date
District Boundary Amendment	2007	2008
Community Plan Amendment	2008	2010
Change in Zoning	2008	2010
Subdivision Approval	2010	2010
NPDES Permits, as applicable	2010	2011
Construction Permits	2011-2016	2011-2016

ATTACHMENT 2

The following potential alternatives to the proposed action have been examined.

A. NO ACTION ALTERNATIVE

Under the “no action” alternative, the site would not be developed for residential and commercial use, and portions of the site would continue in either limited agricultural use or remain vacant for the time being. **The “no action” alternative would involve neither a commitment of resources nor short- and long-term adverse environmental effects related to residential and commercial development. Under this alternative, there would be no additional demands on infrastructure (e.g. sewer, water, roadways, and educational facilities and resources) or public services (e.g. police and fire protection) associated with project implementation.**

~~However, t~~The “no action” alternative would not take advantage of the site’s high suitability for residential use. The site is situated adjacent to an existing residential neighborhood, with available infrastructure systems in close proximity. The development of the project as proposed will not necessitate an unreasonable investment in public infrastructure or support systems. Waiakoa Gulch would serve as a natural buffer between agricultural lands farther to the north and the proposed project and existing residential development to the south. As noted previously, the geometry of the subject property, with its relatively narrow north/south configuration defined by Waiakoa Gulch to the north and the Hale Pi’ilani residential subdivision to the south, poses logistical and compatibility challenges to long-term productive agricultural use. ~~With the proposed project, Waiakoa Gulch would become the natural buffer between agricultural lands farther to the north and the proposed project and existing residential development to the south.~~

The “no action” alternative would not address the urgent need for additional housing units for Maui residents. Over the past five (5) years, the demand for housing on Maui has intensified due to steady population growth, high employment and historically low interest rates. This strong demand, coupled with limited supply, has led to rising housing prices. The Hawai’i Housing Policy Study Update 2003 estimated a deficit of approximately 3,755 needed resident housing units as of 2006. This deficit was projected to further increase to approximately 4,156 units by 2024. The long-term projection of housing conditions in South Maui indicates that the increase in households over the next five (5) years will outnumber the existing supply of new homes. A significant increase in housing supply will be needed to accommodate the region’s anticipated growth. In light of the current and projected housing market conditions, the proposed residential use of the site could provide a significant community benefit by offering residents new opportunities to secure

needed housing. The “no action” alternative will not address the urgent need for housing on Maui.

B. OTHER USES OF THE SITE

The “other uses of the site” alternative considers uses of the project site other than the proposed use.

Similar to the “no action” alternative, agricultural use would involve neither a commitment of resources nor short- and long-term adverse environmental effects related to residential and commercial development. As a result, aside from potential water use impacts, the agricultural use alternative would not involve an increase of infrastructure or public service demands associated with project implementation. Agricultural use at the project site would increase the potential for locally grown food crops.

However, as discussed in other sections of this document, the site is not deemed conducive to long-term agricultural use. The geometry of the subject property, with its relatively narrow north/south configuration defined by Waiakoa Gulch to the north and the Hale Pi'ilani residential subdivision to the south, poses logistical and compatibility challenges to long-term productive agricultural use. The narrow configuration of the site limits agricultural activities and requires a buffer from the neighboring residential subdivision to the south. As proposed, Waiakoa Gulch would become the natural buffer between agricultural lands farther to the north and the proposed project and existing residential development to the south. Due to the presence of the Waiakoa Gulch to the north, Pi'ilani Highway to the west, and the Hale Pi'ilani subdivision to the south, agricultural activities would be confined, with no allowance for expansion and limited access. The mauka portion of the site has remained vacant and fallow since the termination of sugar cultivation.

The agricultural impact of this action is near negligible when viewed in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands and much of these former plantations lands remain fallow. The proposed project will ultimately involve the use of approximately 94.3 acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui. **Further, rather than the available land supply, more salient factors facing the agricultural industry include the market demand for products (access to markets and local purchasing patterns) and the overall profitability of crops grown in Hawai'i.**

Use of the site for commercial/industrial purposes was also examined, **which would result in economic benefit to the community in terms of the creation of**

jobs and increased commerce. Commercial and industrial uses of the site would likely result in similar short and long-term environmental effects as the proposed action. ~~however, again~~ Due to the site's configuration and proximity to existing residences, these **alternatives** were not deemed to be compatible with the existing environment. The geometry of the parcel offers little highway frontage and its proximity to adjacent residences poses issues of compatibility. Also, existing commercial areas at Ohukai Road and Pi'ilani Highway, at Pi'ikea Street and Pi'ilani Highway, and along South Kihei Road, are available to serve the region. A small, limited commercial area, to provide convenience goods and services, was deemed appropriate for the needs of the proposed development and immediate neighborhood. The small commercial site would serve to mitigate residents' need for vehicular travel from the site for such convenience goods and services.

Potential use of the site for government services and/or office buildings has not been expressed and would pose some of the same compatibility issues as commercial/industrial uses. Many civic uses would not be compatible with the residential and agricultural uses bordering the subject property. The County of Maui's government seat is located in Wailuku and many of the County's satellite offices in Kihei are located closer to the town's center, such as the Kihei Community Center on Lipoa Street. The County has expressed interest in expanding its presence in areas farther to the south in Kihei. The planned Kihei Regional Park is such an example. There has been no interest expressed by the Federal, State, or County governments concerning any lease or purchase of the property.

C. ALTERNATIVE PROJECT LOCATION

This alternative considers other locations for the planned project.

Over the past five (5) years, the demand for housing on Maui has intensified due to steady population growth, high employment and historically low interest rates. This strong demand, coupled with limited supply, has led to rising housing prices. The Hawai'i Housing Policy Study Update 2003 estimated a deficit of approximately 3,755 needed resident housing units as of 2006. This deficit was projected to further increase to approximately 4,156 units by 2024. The long-term projection of housing conditions in South Maui indicates that the increase in households over the next five (5) years will outnumber the existing supply of new homes. A significant increase in housing supply will be needed to accommodate the region's anticipated growth.

In view of the strong demand for housing, a significant increase in housing supply to accommodate the region's anticipated growth will be required. This demand will require housing from the planned project, as well as others within the region. In evaluating potential housing sites the Applicant considered the following factors, which support development of the project at this location.

- The site is situated at an attractive and central location in North Kihei, in close proximity to employment centers in South and Central Maui.
- The site is a logical infill location **urban growth area**, situated between an existing residential area and natural feature (Waiakoa Gulch). Waiakoa Gulch forms a natural buffer between the site and agricultural lands to the north.
- Necessary infrastructure systems and services are within near proximity, or can be reasonably provided to serve the project.
- Residential development at the site is not anticipated to have a significant adverse impact on the physical environment.
- The site is suitable for the development of a range of housing types to meet the housing needs of the region.

D. ALTERNATIVE SITE LAYOUTS

Other potential project designs and site layouts were considered in the development of the project master plan. These included alternatives with greater single-family detached dwellings similar to the adjacent Hale Pi`ilani subdivision and alternatives with a greater proportion of multi-family attached dwellings. One of the factors considered in the preparation of the master plan was to provide a mix of housing types. By offering a range of housing types, it was felt that the project would attract and serve a wider range of the housing market.

The unit mix does reflect an assumed market preference for single-family detached units. As proposed, the plan includes multi-family attached units on the makai portion of the site and single-family detached units on the central and mauka portions of the site. The mauka portion of the site is planned for higher density single-family detached residential use which is aimed to meet buyers' preference for single-family detached units, but at a lower price point. Compatibility and consistency with adjacent residential use was also considered in the master plan. It was felt that single-family residential use consistent with the adjacent Hale Pi`ilani subdivision would be appropriate for that central portion of the site.

The project's single-family area is planned to be consistent with the adjacent Hale Pi`ilani subdivision (single-family dwellings on subdivided lots of approximately 6,000 square feet). Higher density multi-family use was deemed more appropriate closer to the primary vehicular access points on the makai portion of the site. The potential for some residential use at the planned neighborhood commercial site is acknowledged and will continue to be evaluated as the project progresses. A primary consideration is the market's acceptance of a mixed use concept at this location. The master plan

seeks to address these factors without significant alteration to the existing land form.

It is acknowledged that the substitution of additional multi-family units for a portion of the single-family units would result in less overall water demand for the project. This is due to the lower average daily water demand factor for multi-family units (560 gallons per day) versus that for single-family units (1,000 gallons per day). However, the substitution of higher density multi-family units at the eastern (mauka) portion of the site would entail more vehicular trips traversing the entire project site. As currently proposed, affordable housing opportunities will be provided through a mix of multi-family attached and single-family detached units. This will provide greater diversity of affordable housing units.

ATTACHMENT 3

Existing and future developments in the Kihei-Makena region were the basis for analyzing potential cumulative and secondary impacts related to development of the Kihei Residential Project. It is noted that some of these projects are in the planning and entitlement phase and may not necessarily be constructed. See Table 12.

Table 12. Proposed Development in the Region

Development	Land Use	Number of Units/Area
Kaonoulu Industrial Park	Light Industrial	88 acres
Honua Ula (Wailea 670)	Single-Family Residential	475 dwelling units
	Single-Family Resort	475 dwelling units
	Multi-Family Residential	225 dwelling units
	Multi-Family Resort	225 dwelling units
	Shopping Center	80,000 square feet (gross leasable area)
	Golf Course	200 acres
Wailea Resort	Single-Family Residential	85 dwelling units
	Single-Family Resort	85 dwelling units
	Multi-Family Residential	285 dwelling units
	Multi-Family Resort	285 dwelling units
	Shopping Center	20,000 square feet (gross leasable area)
	Office	60,000 square feet (gross leasable area)
	Warehouse	40,000 square feet (gross leasable area)
Makena Resort	Single-Family Residential	53 dwelling units
	Single-Family Resort	53 dwelling units
	Multi-Family Residential	536 dwelling units
	Multi-Family Resort	536 dwelling units
	Shopping Center	100,000 square feet (gross leasable area)
Kaonoulu Estates	Multi-Family Residential	191 dwelling units
Maui Lu Redevelopment	Resort Hotel	788 rooms
	Resort Hotel (existing to be demolished)	174 rooms
Silverswords Golf Estates	Single-Family Residential	182 dwelling units

Source: Austin, Tsutsumi & Associates, Inc.

The TIAR prepared for the project has examined and evaluated traffic impacts of the project, as well as the other potential projects identified on Table 12. The projected peak hour traffic impact of these projects is presented on Table 1 of the TIAR. Based on the analysis the TIAR has recommended the implementation of applicable traffic mitigation measures and improvements. As noted in the TIAR, while these projects have been included in the traffic impact analysis, some are still in the planning and entitlement stage and for various reasons may be subject to delay or may not materialize at all within the time horizon of this project.

With regard to the availability of drinking water for the project, the applicant is pursuing several options, including surface water treatment and new well sources in central Maui. Maui County Ordinance No. 3502 requires that a long-term reliable supply of water be verified at the time of subdivision approval. The ordinance requires each applicant to provide a long-term reliable supply of water, which is defined as “the total water supplies from a private, non-County source that will meet the projected demand associated with a proposed development, in addition to existing and planned future demand”. In light of this requirement cumulative impacts will be addressed as new water sources are brought online as a condition of development. Other proposed projects will be required to similarly meet the requirements of this ordinance as their projects progress through the development process. Additionally, specific improvements to the water transmission and storage systems will be determined with the County for each project.

Sewage generated by the project will be treated at the KWRF. As indicated by the County Department of Environmental Management, wastewater system capacity is currently available for the project. The applicant will be required to make needed system improvements at the time of service. Also, applicable assessment fees for treatment plant expansion will be required. These system improvements and fees will also be applicable to other planned projects to mitigate impacts to the County sewer system and to maintain adequate system service.

The agricultural impact of this project is near negligible when taken in the context of the recent trends occurring on Maui. In the last 30 years, the closures of Wailuku Sugar and Pioneer Mill on Maui have taken significant acreages out of active sugar cane cultivation. These actions have greatly increased the supply of non-sugar based agricultural lands. In fact, much of the lands of these former plantations are still fallow. The proposed project will ultimately involve the use of approximately 94.3 acres of land, which represents 0.03 percent of the roughly 246,000 acres of State Agricultural district lands on the island of Maui. Further, rather than the available land supply, more salient factors facing the agricultural industry include the market demand for products (access to markets and local purchasing patterns) and the overall profitability of crops grown in Hawai'i.

The mitigation of other potential adverse cumulative impacts resulting from infrastructure use will be resolved during the course of development either through the provision of additional facilities onsite and offsite (drainage, water, and park facilities) or through fair-share contributions (wastewater, school, and traffic facilities). Other planned projects will similarly be required to mitigate the impacts of their respective projects as they progress through the development process.

In general, processes and mechanisms for coordinating mitigation measures attributable to cumulative impacts are in place. An example of a process which addresses cumulative impacts is the scoping of infrastructure studies (including traffic impact) to include those projects which are anticipated to be implemented within a timeframe similar to that of the proposed action. Similarly, as noted, mechanisms for addressing impacts from more than a single project include impact fees or assessments which require fair-share contribution from the respective applicants.

The projects listed in Table 12 represent potential future developments identified in the Kihei-Makena Community Plan region. The implementation timeframes for these projects are dependent on their respective regulatory and market parameters which are not linked to the proposed Kihei Residential Project. It is in this context that the processes and mechanisms (noted above) for assuring cumulative evaluation have evolved. The proposed action is being planned and will be implemented within this framework.

ATTACHMENT 4

SPECIFIC MITIGATION MEASURES

FLORA AND FAUNA

The following will be added to Section II.A.6. Flora and Fauna of the Final EIS.

The United States Fish and Wildlife Service (USF&WLS) noted potential impacts to seabirds in the area as a result of construction activities. To mitigate potential impacts, several Best Management Practices, as recommended by the USF&WLS, will be implemented by the applicant during construction. For instance, lights will be shielded so the bulb is not visible at or above bulb height, information will be disseminated regarding seabird fallout, and provisions for handling a downed seabird will be implemented during construction activities.

In addition, a list of standard BMPs for fish and wildlife, provided by the USF&WLS, will be incorporated by the applicant in project construction documents during the construction phase of development to prevent erosion, sedimentation, and other potential adverse impacts to aquatic fish and wildlife resources in the vicinity of the project site.

STREAMS, WETLANDS, AND RESERVOIRS

The following revision will be added to Section II.A.7. Streams, Wetlands, and Reservoirs of the Final EIS.

~~The land plan for the project provides an open space buffer along the gulch to ensure adequate protection against gulch runoff during storm events. Mitigation measures, such as Best Management Practices (BMPs) for erosion and sedimentation control, will be implemented to maintain the natural and functional integrity of the Waiakoa Gulch. The proposed action will not impact the Kealia Pond National Wildlife Refuge.~~

During construction, the following Best Management Practices (BMPs) will be implemented by the project contractors for erosion and sediment control to maintain the natural and functional integrity of Waiakoa Gulch.

- **Constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site**
- **Staging construction**
- **Protecting of natural vegetation**
- **Stockpiling topsoil, and covering or stabilizing of the soil stockpiles**
- **Using wind erosion control**
- **Intercepting runoff above disturbed slopes**

- Constructing of benches, terraces, or ditches at regular intervals to intercept runoff on long or man-made slopes
- Providing linings or other method to prevent erosion of storm channels
- Using seeding and fertilizing or other soil erosion control
- Providing vehicle wheel wash-down facilities
- Using stabilized construction entrances
- Using vegetated filter strips

Greater detail of the design information for the proposed drainage and erosion control plan will be provided when the project progresses to the engineering design phase of development.

ARCHAEOLOGICAL AND HISTORICAL RESOURCES

The following revision will be added to Section II.A.8. Archaeological and Historic Resources of the Final EIS.

~~Finally, should any significant archaeological resources be uncovered during work on the site, the SHPD will be contacted immediately and all applicable inadvertent discovery procedures will be followed.~~ 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 during construction activities, work will stop in the immediate vicinity and the applicant will contact the SHPD. Pursuant to their specific request, the Office of Hawaiian Affairs (OHA), will also be notified.

AIR AND NOISE QUALITY

The following will be added to Section II.A.10. Air and Noise Quality of the Final EIS.

The major potential short-term air quality impact of the project will occur from the emission of fugitive dust during construction. In addition to regular watering and sprinkling, the following measures will be implemented by the applicant's contractor during construction activities to minimize the proliferation of fugitive dust, in accordance with Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control.

Use of wind screens and/or limiting the area that is disturbed at any given time will help to contain fugitive dust emissions. Wind erosion of inactive areas of the site that have been disturbed could be controlled by mulching. Trucks hauling soil material would be covered to mitigate dust. A routine road cleaning and tire washing program would help reduce fugitive dust emissions from trucks/vehicles tracking dirt onto nearby paved roadways. Installation of landscaping early in the construction schedule will also help to control dust.

During the construction phase, emissions from engine exhaust will occur from onsite construction equipment and other construction related vehicles. Increased vehicular emissions due to traffic disruptions by construction equipment or vehicles entering/exiting the site can be mitigated by moving equipment during off-peak hours. Construction related emissions would be limited to the construction period of the project. After the project is completed, carbon monoxide concentrations at the site are anticipated to remain within acceptable air quality standards. The project site is situated adjacent to Waiakoa Gulch, which will serve as a buffer between the project and ongoing agricultural activities situated further to the north. Related noise and dust emissions from such agricultural activities are anticipated to be buffered by Waiakoa Gulch.

Concerning potential impact on the Department of Health's air monitoring station, the applicant has had discussions with the department regarding minimizing impacts. The Department of Health (DOH) noted that an air quality monitoring station is situated adjacent to the project site in the Hale Pi'ilani neighborhood park. The primary purpose of the air monitoring station is to monitor particulates resulting from cane burning. The DOH makes every attempt to prevent dust from construction activities from affecting the particulate readings.

Through consultation with the DOH, the DOH recommended adherence to Hawai'i Administrative Rules, Chapter 11-60.1, Air Pollution Control. The DOH further noted that, while there are no specific requirements for projects in the vicinity of an air monitoring station, the DOH will coordinate with the contractor to minimize impacts to the air monitoring station. Should air quality readings at the station be affected, the DOH will assist the contractor in the development of a dust mitigation action plan.

Development of the project will entail typical construction activities including excavation, grading, and the use of construction equipment (e.g. bulldozers, front-end loaders, and diesel-powered trucks). Existing residences to the south may be impacted by construction noise due to their close proximity to the project site. Noise from such construction activities would be short term and must comply with the State DOH noise regulations. Should noise during the construction phase of the project exceed the maximum allowable levels, a noise permit may be required. This has been noted by the State DOH Maui District Health Office in their comment letter of April 17, 2007 to the EISPN.

After the completion of construction, noise generated by stationary mechanical equipment (e.g. compressors and HVAC equipment) at the site must meet applicable noise standards. The planning and design of the project will take into account means to attenuate noise from such facilities through proper placement and design. Given the limited commercial use planned at the project, the potential for such adverse impacts is anticipated to be minimal. A landscaped buffer is planned within the project site between the existing residences in the Hale Pi'ilani Subdivision and

the planned new collector road. This should serve to mitigate potential noise associated with the planned road and the project.

The State Department of Transportation (DOT) is currently in the process of constructing the Mokulele Highway Widening project, west of the project site. Future traffic related noise resulting from the completed roadway may impact the western most (makai) portion of the project. The planning and design of this portion of the project will need to take into account applicable noise standards. The Federal Highway Administration utilizes a noise standard of 67 decibels (dBA) for residential communities. It should be noted that the predominant trade winds of the region place the highway downwind of the project site.

A review of relevant noise studies revealed that, for residential exterior environmental noise, a day-night average sound level should not exceed 65 dBA, according to the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency. According to data from the Kapalua Mauka Final Environmental Impact Statement, prepared by PBR Hawaii in November 2002, based on this acoustical standard, traffic noise from Honoapiʻilani Highway may impact residential properties located within 75 feet of the highway. The distance between the Piʻilani Highway centerline and the project's property line is approximately 140 feet. Along Piʻilani Highway in particular, according to data reported in the Final Environmental Impact Statement for the New Kihei Elementary School, prepared by Comprehensive Consulting Services of Hawaiʻi in April 1992, heavy traffic volumes along Piʻilani Highway traveling at 50 miles per hour generate a noise level of 62 dBA at the edge of pavement. Therefore, based on the sizable distance between the highway and the project site, it is anticipated that traffic noise attributed to Piʻilani Highway will not adversely impact the proposed project.

Noise measurements, after completion of the highway, should determine the extent of the noise impact and applicable mitigation measures. Potential noise mitigation measures may include construction of landscaped earthen berms, use of sound barriers, setbacks, and air conditioning. The applicant will work with the State DOT, the DOH, and other agencies in complying with all applicable noise standards.

ROADWAYS

The following will be added to Section II.D.1. Roadways of the Final EIS.

The applicant will ensure that all proposed roadway development and improvements are in accordance with the Hawaiʻi Revised Statutes, Maui County Code, and other applicable rules and regulations. This includes the Hawaiʻi Standard Specifications for Road and Bridge Construction dated 2005, the Standard Details for Public Works Construction, 1984, as amended, and the Manual on Uniform Traffic Control Devices for Streets and Highways, 2003.

The TIAR recommends mitigation measures and improvements to be implemented for the project. These are outlined above and on page 56 of the TIAR. As noted in the State Department of Transportation's (DOT) letter of November 21, 2007, agreement on the mitigation measures and improvements to be implemented by the applicant will be determined with the DOT Highways Division. This would occur as part of the applicant's engineering design process and the preparation of specific onsite and offsite roadway and intersection improvement plans. DOT approval will be required prior to finalizing plans and undertaking these roadway and intersection improvements.

The Department of Public Works and the DOT Highways Division will be given the opportunity to review and approve roadway construction plans to ensure that applicable regulations are satisfied.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The Kihei Residential Project may be subject to the provisions of Chapter 14.62. Although the specific traffic impact fee schedule for the South Maui region has not yet been adopted by ordinance, the final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

Lastly, the project presents an opportunity to promote non-automobile travel for recreational and household pursuits. In order to minimize vehicle trips particularly outside the project, a limited commercial area within the project limits is planned to serve the needs of the adjacent community. Accommodations to support public bus transportation services may be provided in the commercial area to facilitate an alternative travel mode. Also, recreational needs will be served by the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths and walking trails will connect these areas and promote recreational activity and also serve to reduce residents' reliance on automobiles.

DRAINAGE SYSTEM

The following will be added to Section II.D.4. Drainage System of the Final EIS.

The applicant will ensure that runoff from parking lots and driveways will be directed to nearby landscaped areas and detention basins to minimize drainage-related impacts resulting from project implementation. Also, native plants which require less water will be sought for the landscaped areas within the project.

Further, appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the design process. During construction, the contractor will implement the following recommended Best Management Practices (BMPs) for erosion and sedimentation control.

- **Constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site**
- **Staging construction**
- **Protecting of natural vegetation**
- **Stockpiling topsoil, and covering or stabilizing of the soil stockpiles**
- **Using wind erosion control**
- **Intercepting runoff above disturbed slopes**
- **Constructing of benches, terraces, or ditches at regular intervals to intercept runoff on long or man-made slopes**
- **Providing linings or other method to prevent erosion of storm channels**
- **Using seeding and fertilizing or other soil erosion control**
- **Providing vehicle wheel wash-down facilities**
- **Using stabilized construction entrances**
- **Using vegetated filter strips**

Greater detail of the design information for the proposed drainage and erosion control plan will be provided when the project progresses to the engineering design phase of development.

ATTACHMENT 5

The following information will be added to Section VII. Unresolved Issues in the Final EIS.

Other unresolved issues for the project, which will be decided prior to project implementation, include a fair-share educational contribution, parks and playgrounds contribution, traffic impact fees, participation in Kihei wastewater system improvements, the potential presence of arsenic at the property, and an affordable housing agreement.

The 2007 Legislature passed a bill establishing school impact fees. Under this new law, the project may be required to pay an impact fee. The State Department of Education noted that they do not know the fee amount per residential unit at this time, but may have a better idea of the fee amount in early 2008. The applicant will work with the Department of Education in formulating an appropriate fair-share agreement for the subject project.

The applicant has been in coordination with the County of Maui, Department of Parks and Recreation to ensure satisfactory compliance with parks and playgrounds assessment requirements. Preliminarily, it is estimated that the park assessment would amount to just under seven (7) acres for a 600-unit residential subdivision in South Maui. The applicant is currently exploring the possibility of creating a new park adjacent and north of the existing Hale Pi'ilani neighborhood park to satisfy its parks and playgrounds assessment requirements.

The County of Maui is in the process of establishing traffic impact fees for the South Maui region, as set forth in Chapter 14.62 of the Maui County Code. The Kihei Residential Project may be subject to the provisions of Chapter 14.62. Although the specific traffic impact fee schedule for the South Maui region has not yet been adopted by ordinance, the final impact fee amount will be calculated upon adoption of the fee schedule by the County Council.

The project site is located within the Wastewater Reclamation Division's Kihei Assessment Area No. 3 and, as such, the applicant will be required to pay assessment fees for treatment plant expansion costs. The applicant remains in coordination with the Wastewater Reclamation Division regarding assessment fees for the treatment plant expansion, as well as any necessary off-site improvements to the collection system and wastewater pump stations. The applicant will consult with the Wastewater Reclamation Division staff concerning the extension of the R-1 water line for non-drinking water usage. The applicant will also explore the availability of other non-drinking water sources.

The applicant acknowledges that the State Department of Health, Hazard Evaluation, and Emergency Response (HEER) Office noted the potential for arsenic and other residual pesticides in former agricultural lands that are proposed for urban use and

the applicant has contacted the HEER Office regarding an appropriate soil testing program. It should be noted that there is no specific evidence of hazardous materials at the property. In its letter of November 19, 2007, the HEER Office stated that detailed guidance for the investigation of former agricultural lands is currently under preparation. The applicant will continue to work with the HEER Office to develop and implement a mutually acceptable soils testing program for this site prior to development with the understanding that corrective actions may be necessary.

The applicant has been in discussion with the County of Maui, Department of Housing and Human Concerns to develop an appropriate affordable housing program pursuant to the provisions of the Maui Residential Workforce Housing Policy (MRWHP). As provided under the MRWHP, the sales prices for affordable units will be established at the time of development, and based on Maui's median family income at that time. The applicant must formulate and execute an affordable housing agreement with the Department of Housing and Human Concerns prior to project implementation.

ATTACHMENT 6

LIST OF DOCUMENT AUTHORS

<u>Document Name</u>	<u>Author</u>
Archaeological Inventory Survey Report:	Cultural Surveys Hawai'i, Inc.
Botanical and Fauna Surveys:	Robert W. Hobdy
Cultural Impact Assessment:	Cultural Surveys Hawai'i, Inc.
Environmental Impact Statement:	Munekiyo & Hiraga, Inc.
Market Study and Economic Impact Analysis:	ACM Consultants, Inc.
Preliminary Engineering Report:	R.M. Towill Corporation
Preliminary Drainage and Erosion Control Report:	R.M. Towill Corporation
Traffic Impact Analysis Report:	Austin, Tsutsumi & Associates, Inc.

ATTACHMENT 7

The EISPN comment period was from April 8, 2007 to May 8, 2007. The Draft EIS comment period was from October 8, 2007 to November 23, 2007. Where indicated, the agency, organization, or individual submitted comments.

Entity Consulted	Early Consultation (EISPN) Letter Received	Draft EIS Letter Received
FEDERAL		
Natural Resources Conservation Service		10/22/07
Department of the Army		
U.S. Fish and Wildlife Service		11/5/07
National Marine Fisheries Service		
U. S. Army Corps of Engineers		
STATE OF HAWAII		
Hawai'i Dept. of Transportation	4/16/07	11/21/07
Hawai'i State Civil Defense		11/16/07
Dept. of Accounting and General Services	5/9/07	10/12/07
Department of Agriculture		
Dept. of Business, Economic Development and Tourism, Office of Planning	5/8/07 and 3/19/07	11/23/07
Dept. of Business, Economic Development and Tourism, Energy, Resources & Technology Division		
Department of Defense		
Department of Education	5/1/07	11/6/07
Office of Environmental Quality Control	4/23/07	
Office of Hawaiian Affairs	5/8/07	11/26/07
Department of Hawaiian Home Lands		
State Land Use Commission		11/28/07
State Historic Preservation Division	3/20/08	
Department of Land and Natural Resources	4/9/07	11/16/07
Department of Health – EPO	4/5/07	11/19/07
Department of Health – Maui	4/17/07	11/9/07
University of Hawai'i Environmental Center		11/26/07

The EISPN comment period was from April 8, 2007 to May 8, 2007. The Draft EIS comment period was from October 8, 2007 to November 23, 2007. Where indicated, the agency, organization, or individual submitted comments.

Entity Consulted	Early Consultation (EISPN) Letter Received	Draft EIS Letter Received
University of Hawai'i Water Resource Research Center		
COUNTY OF MAUI		
Office of the Mayor		
Maui Civil Defense Agency		
Department of Fire and Public Safety		
Department of Housing and Human Concerns	4/10/07	
Councilmember G. Riki Hokama		
Councilmember Danny Mateo		
Councilmember Michelle Anderson		
Councilmember Gladys Baisa		
Councilmember JoAnne Johnson		
Councilmember Bill Medeiros		
Councilmember Michael Molina		
Councilmember Joseph Pontanilla	4/18/07	10/10/07
Councilmember Michael Victorino		
Department of Planning		1/11/08
Department of Parks and Recreation	4/24/07	11/6/07
Police Department	5/3/07	10/19/07
Department of Public Works	5/11/07	10/19/07
Department of Environmental Management		12/19/07
Department of Transportation		
Department of Water Supply	5/9/07 and 6/18/07	

The EISPN comment period was from April 8, 2007 to May 8, 2007. The Draft EIS comment period was from October 8, 2007 to November 23, 2007. Where indicated, the agency, organization, or individual submitted comments.

Entity Consulted	Early Consultation (EISPN) Letter Received	Draft EIS Letter Received
OTHER ORGANIZATIONS AND INDIVIDUALS		
Maui Electric Company	4/16/07	10/22/07
Maui Memorial Medical Center		
Hawaiian Telcom	4/17/07	
Oceanic Time Warner		
Kihei Community Association	4/16/07	
Zandra Souza-Amaral (resident)		
Chris and Marilyn Chapman (residents)	4/17/07	
Kihei Public Library		
Hawai'i Documents Center		
Kahului Public Library		
Department of Business, Economic Development & Tourism Library		
Hamilton Library, Hawaiian Collection		
Legislative Reference Bureau		
Maui Community College Library		
Honolulu Advertiser, Editor		
Honolulu Star Bulletin, City Editor		
Maui News, Editor		
Moloka'i Dispatch, Editor		

ATTACHMENT 8

The following will be added in Section V. Summary of Unavoidable Impacts and Commitment of Resources in the Final EIS.

To minimize potential adverse impacts to natural resources in building design, the Office of Environmental Quality Control's publication entitled "Guidelines for Sustainable Building Design in Hawai'i" has been reviewed. As a result, the following measures to conserve natural resources and to promote energy efficiency will be undertaken in the planning, design, construction, and operation of the project.

- **Site buildings to take advantage of natural features and maximize their beneficial effects by providing for solar access, daylighting, and natural cooling.**
- **Design south, east, and west shading devices to minimize solar heat gain.**
- **Locate buildings to encourage bicycle and pedestrian access and pedestrian oriented uses.**
- **Consolidate utility and infrastructure in common corridors to minimize site degradation and cost, improve efficiency, and reduce impermeable surfaces.**
- **Provide tenant sub-metering to encourage utility use accountability.**
- **Design space for recycling and waste diversion opportunities during occupancy.**

The following will be added in Section II.D.2. Water System in the Final EIS.

Further, regarding measures to reduce drinking water consumption, the applicant will explore the availability of non-drinking water sources in the region. The applicant would like to be able to utilize R-1 recycled water, where appropriate, such as for irrigation of common areas and dust control during construction. The applicant will examine partnership opportunities for the potential use of non-drinking water and will consult with the Department of Environmental Management staff concerning the extension of the R-1 water line from the Kihei Wastewater Reclamation Facility.

Additionally, the applicant will explore the availability of other non-drinking water sources for landscape irrigation purposes, which will be pursued further during the civil design phase of the project. The information on "Maui County Planting Plan – Plant Zone 3" from the Department of Water Supply, will be utilized, as applicable, to place plants in landscaping, which will help to conserve water and protect the watershed from degradation. Rain sensors will be provided on all automated irrigation controllers in common landscaping areas. The applicant will initiate a

regular maintenance program to check and reset the automated irrigation controllers.

Plumbing fixtures will be installed in accordance with Maui County Code Section 16.20A.680, which requires the utilization of low-flow fixtures and devices in an effort to conserve water. The applicant will advise owners to maintain fixtures and devices to minimize leakage.

ATTACHMENT 9

LIST OF ACRONYMS

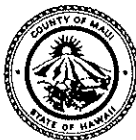
AaB	Alae Sandy Loam
ALISH	Agricultural Lands of Importance to the State of Hawai'i
AMSL	Above Mean Sea Level
BMP	Best Management Practices
CIZ	Change in Zoning
CPA	Community Plan Amendment
CWRM	Commission on Water Resource Management
DBA	District Boundary Amendment
DLNR	Department of Land and Natural Resources
DOE	Department of Education
DOH	Department of Health
DOT	Department of Transportation
DPW	Department of Public Works
DWS	Department of Water Supply
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HAR	Hawai'i Administrative Rules
HC&S	Hawaiian Commercial & Sugar Company
HCZMP	Hawai'i Coastal Zone Management Program
HEER	Hazard Evaluation and Emergency Response
HRS	Hawai'i Revised Statutes
HUD	United States Housing and Urban Development
KWRF	Kihei Wastewater Reclamation Facility
LOMR	Letter of Map Revision
LOS	Level of Service
LSB	Land Study Bureau
MCC	Maui County Code
MECO	Maui Electric Company
MRWHP	Maui Residential Workforce Housing Policy
NPDES	National Pollutant Discharge Elimination System
OHA	Office of Hawaiian Affairs
PpA	Pulehu Silt Loam

SHPD	State Historic Preservation Division
SLUC	State Land Use Commission
SMA	Special Management Area
TIAR	Traffic Impact Analysis Report
TMK	Tax Map Key
USF&WLS	United States Fish and Wildlife Service
W1D2	Waiakoa Extremely Stony Silty Clay Loam
WgB	Waiakoa Very Stony Silty Clay Loam
WWRD	Department of Environmental Management, Wastewater Reclamation Division

OCT 12 2007

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COUNTY COUNCIL
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793
www.mauicounty.gov/council

October 10, 2007

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

Dear Mr. Ginoza:

SUBJECT: Draft Environmental Impact Statement For The Proposed Kihei Residential Project :Tax Map Key (2)3-8-004:002 (por.), 022 (por.) and 030 (por.).

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Proposed Kihei Residential Project at Tax Map Key (2)3-8-004:002 (por.), 022 (por.) and 030 (por.). After review of the document, I would like provide the following comments:

1. Promote effort toward partnership with County of Maui and other adjoining land entities to extend existing gray line (recycled R-1 waterline) to the project site for utilization of recycled water for irrigation and fire protection of proposed project site, and extended uses for truck farmers, Monsanto, and appropriate future purpose.
2. Provide sub-station sites for the Department of Police and the Department of Fire.
3. Provide site for an active park.
4. A traffic plan noting existing and proposed regional and collector roadways and the positive/negative impacts on the proposal's Traffic Impact Assessment Report (TIAR)

Sincerely,


JOSEPH PONTANILLA,
COUNCIL MEMBER

CC: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Director Office of Environmental Quality Control



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

MARK ALEXANDER ROY
KYLE GINZA
April 23, 2008

Honorable Joseph Pontanilla
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Councilmember Pontanilla:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated October 10, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. Regarding the use of R-1 recycled water, the applicant would like to be able to utilize R-1 recycled water, where appropriate. The applicant will examine partnership opportunities for the potential use of non-potable water and will consult with Department of Environmental Management staff concerning the extension of the R-1 water line. Additionally, the applicant intends to explore the availability of other non-potable water sources for landscape irrigation purposes.
2. The applicant has been in consultation with the Department of Police and the Department of Fire and Public Safety. While neither department voiced a need for substation sites within the project limits, continued coordination with these agencies will be undertaken as the project progresses in the event their facility requirements should change.
3. The applicant has been in consultation with the Department of Parks and Recreation concerning the development of an active park within the project site. The proposed active park is planned adjacent to the existing 2-acre Hale Pi'ilani neighborhood park.
4. The project's traffic impact analysis report (TIAR) describes the existing and proposed regional and collector roadways in the vicinity of the project site, including the Mokulele Highway Widening project that is currently under construction. Additionally, the TIAR also discusses the potential impact of the planned Kihei-

Upcountry Bypass Road. The TIAR estimates that the Kihei-Upcountry Bypass Road would improve traffic conditions and result in an approximately 25 to 30 percent reduction in traffic along Mokulele Highway and Pi'ilani Highway north of Kaonoulu Street. The TIAR also discusses the possibility of a proposed future mauka collector road that parallels Pi'ilani Highway. However, since completion of both the Kihei-Upcountry Bypass Road and the proposed mauka collector roadway are not anticipated within the project's development timeframe, it was not factored into the traffic impact analysis. No other new collector roadways are anticipated in the vicinity of the project.

The applicant is pursuing the project to respond to the burgeoning need for affordable and workforce housing by Maui residents. To address traffic concerns, roadway improvements and mitigation measures recommended in the TIAR will be undertaken in consultation with the State Department of Transportation and the Maui Department of Public Works. Also, the applicant will pay applicable traffic impact fees as it relates to Maui County Code, Chapter 14.68.

The applicant also envisions the project as an opportunity to promote non-automobile travel for recreational and household pursuits. In order to minimize vehicle trips particularly outside the project, a limited commercial area within the project limits is planned to serve the needs of the adjacent community. Also, recreational needs will be served by the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths and walking trails will connect these areas and promote recreational activity and also serve to reduce residents' reliance on automobiles.

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



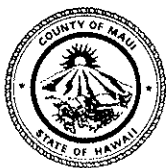
Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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OCT 26 2007



CHARMAINE TAVARES
MAYOR

OUR REFERENCE
tj
YOUR REFERENCE

POLICE DEPARTMENT

COUNTY OF MAUI

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 19, 2007

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

Dear Mr. Ginoza:

SUBJECT: Proposed Kihei Residential Project at
TMK (2) 3-8-004:002 (por.), 022 (por.) and 030 (por.)

Thank you for your letter of October 4, 2007, requesting comments on the above subject.

We have reviewed the information submitted for this project and have enclosed a copy of our comments. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

A handwritten signature in black ink, appearing to read "Charles Hirata".

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

c: Jeff Hunt, Planning Department (w/o DEIS Notice)
Anthony Ching, State Land Use Commission (w/o DEIS Notice)

Enclosures

COPY

TO : THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI
VIA : CHANNELS
FROM : BRAD HICKLE, POLICE OFFICER III, DISTRICT VI KIHEI
SUBJECT : DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED KIHEI RESIDENTIAL PROJECT LOCATED AT TMK (2) 3-004:002 (por.), 022 (por.), and 030 (por.)

Sirs, on 10/12/07 this Officer received a copy of the Draft Environmental Impact Statement for the proposed Kihei Residential Project.

APPLICANT INFORMATION:

The application was prepared by Munekiyo & Hiraga, Inc. for the applicant, A & B Properties, Inc.

The applicant is requesting review of the Draft Environmental Impact Statement (DEIS) in preparation for the proposed development of approximately 600 residential dwelling units in the Kihei Residential area. The project will include single-family and multi-family housing types and will further include affordable housing. The developer will include a small neighborhood commercial area as well as a park and open space areas with trails and bike paths.

The proposed area for the development of this project is located at TMK (2) 3-004:002 (por.), 002 (por.), and 030 (por.) which is approximately 94.3 acres.

IMPACT ON POLICE:

With the development of any undeveloped land in the South Maui area there will undoubtedly be greater opportunities for crime and criminal opportunities to occur. With this residential development there will also be a need for additional trained Police personnel to work this area.

This is a very large residential development. This development combined with the many other proposed developments of residential and commercial properties currently under construction in South Maui will have a definite impact on Police services.

The problem and impact on Police services will be created because the Police and other emergency service agencies are not able to provide trained personnel quickly enough to match the pace of the new-continually developing communities around us.

IMPACT ON TRAFFIC:

A residential development of this size will undoubtedly contribute heavily to vehicle traffic in the Kihei area.

Per the Traffic Impact Analysis Report (TIAR) submitted for this project, overcapacity conditions are anticipated to occur by the build-out year (2016) even without this project being built.

South Maui is already burdened by heavy motor vehicle traffic and other infrastructure issues. It is reasonable to assume a residential housing project of this size will also have an impact on traffic and Police services and these issues should be addressed before allowing a residential project of this size to be developed.

RECOMMENDATION:

It is recommended that this document be returned to the proper authority for review of our comments and concerns regarding this project.

Respectfully Submitted,

Officer Brad Hickle



10/16/07

08:30 hours

*St [unclear] out
10/16/07*

*CONCERN WITH OFFICIAL HICKLES ASSESSMENT
REGARDING IMPACT ON POLICE SERVICES AS A
RESULT OF FUTURE RESIDENTIAL DEVELOPMENTS
OF THIS (SCALE.)*

*Dept - L 4127
10/17/07
10:10 AM,*

*PROJECT SIZE WILL IMPACT POLICE &
PUBLIC SAFETY. TRAFFIC MUST
ALSO BE ADDRESSED.*

a (all) [unclear] 10/17/07



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

MARK ALEXANDER ROY
KYLE GINGZA
April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Chief Phillips:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated October 19, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. We appreciate your concern that any new land development has the potential to create opportunities for crime and criminal opportunities. Please note, however, that the project residents and businesses will contribute additional revenues to the County of Maui, principally in the form of real property taxes, which would be used to support governmental services, including the provision of additional trained police personnel.

As the project site is located adjacent to an existing residential development, there will be a limited extension of police and emergency service coverage to accommodate the project. Further, access to the project is planned from three (3) primary entry points to facilitate quick response to all portions of the project.

2. As reflected in your comments, the applicant's traffic engineer noted deteriorating traffic conditions along Pi'ilani Highway even without the project. The applicant is pursuing the project to respond to the burgeoning need for affordable and workforce housing by Maui residents. To address traffic concerns, roadway improvements and mitigation measures recommended in the TIAR will be undertaken in consultation with applicable State and County agencies. Also, the applicant will pay applicable traffic impact fees as it relates to Maui County Code Chapter 14.68.



Thomas Phillips, Chief
April 23, 2008
Page 2

The applicant also envisions the project as an opportunity to promote non-automobile travel for recreational and household pursuits. In order to minimize vehicle trips particularly outside the project, a limited commercial area within the project limits is planned to serve the needs of the adjacent community. Also, recreational needs will be served by the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths and walking trails will connect these areas and promote recreational activity and also serve to reduce residents' reliance on automobiles.

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

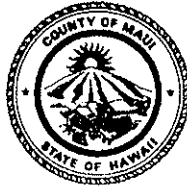
KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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NOV 15 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 Nako'a Street, Unit 2, Wailuku, Hawaii 96793

November 6, 2007

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

**SUBJECT: Draft Environmental Impact Statement (DEIS)
Proposed Kihei Residential Project, Kihei, Maui, Hawaii
TMK (2) 3-8-004:002 (por.), 022 (por.) And 030 (por.)**

Dear Mr. Ginoza:

We have met with the applicant to discuss the proposed location of approximately seven (7) acres of land that will be dedicated to the County of Maui to fulfill the park assessment requirements for the proposed project. In our discussion, we raised concern that the collector road needed to be realigned to allow the park to be one contiguous parcel. We also discussed park requirements for grading, grassing, automatic irrigation, restroom facilities and parking. We are continuing our discussions with the applicant in planning for this proposed park.

Thank you for the opportunity to review and comment on this matter. Please feel free to contact me or Mr. Baron Sumida, CIP Coordinator Parks Planning and Development, at 270-6173 should you have any other questions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Tamara Horcajo".

TAMARA HORCAJO
Director

xc: Patrick Matsui, Chief of Parks Planning & Development
Baron Sumida, CIP Coordinator Parks Planning & Development

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

MARK ALEXANDER ROY
KYLE GINOZA

April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Ms. Horcajo:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated November 6, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai`i.

We acknowledge the discussions we have had with your staff regarding the satisfaction of park assessment requirements. Based on these discussions, the applicant will be revising the project layout to reflect a realignment of the project's collector road so that the project's park area is contiguous with the existing Hale Pi'ilani Park. As required, the proposed park space will be graded, grassed, automatically irrigated, and will contain restroom facilities and parking.

We appreciate the input we received from your office. 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: Dan Yasui, A&B Properties, Inc.

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OCT 25 2007

CHARMAINE TAVARES
Mayor

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

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

CARY YAMASHITA, P.E.
Engineering Division

MICHAEL M. MIYAMOTO
Deputy Director

BRIAN HASHIRO, P.E.
Highways Division



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

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

October 19, 2007

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

Dear Mr. Ginoza:

SUBJECT: APPLICATION FOR DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED KIHEI RESIDENTIAL PROJECT; TMK: (2) 3-8-004:002 (por.), 022 (por.), 030 (por.)

We reviewed the subject application and have the following comments:

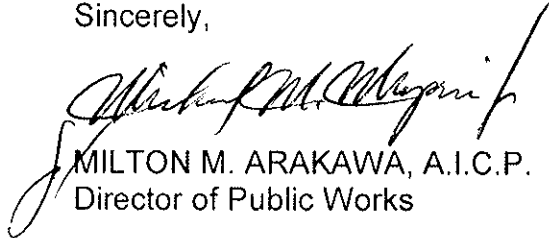
1. Sight distance setbacks and easements will not be allowed for all roadways, public or private. Road right of way must accommodate sight distance allowances.
2. The applicant shall be responsible for all required improvements, as required by Hawaii Revised Statutes, Maui County Code and rules and regulations.
3. 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.
4. Worksite traffic control plans/devices shall conform with the "Manual on Uniform Traffic Control Devices for Streets and Highways", 2003.

Mr. Kyle Ginoza
October 19, 2007
Page 2

5. These comments are in addition to those provided for the Environmental Impact Statement (EIS) preparation notice. Memorandum dated May 7, 2007 is attached.

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: Office of Environmental Quality Control
State Land Use Commission
Highways Division
Engineering Division

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

MARK ALEXANDER REY
KYLE GINZA

April 23, 2008

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

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Arakawa:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated October 19, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. As mentioned in our August 27, 2007 letter to you, a site plan and a sight distance report to determine required and available sight distances at the proposed intersections of the subject project will be provided to the Department during the construction plans review process.
2. The applicant's civil engineer will ensure that all required improvements, as required by the Hawai'i Revised Statutes, Maui County Code, and other applicable rules and regulations are addressed. This includes the Hawai'i Standard Specifications for Road and Bridge Construction dated 2005, the Standard Details for Public Works Construction, 1984, as amended, and the Manual on Uniform Traffic Control Devices for Streets and Highways, 2003.
3. The responses we provided by letter dated August 27, 2007 to your May 7, 2007 memorandum are still applicable. A copy of the August 27, 2007 letter is attached as reference.

Milton Arakawa, Director
April 23, 2008
Page 2

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Kyle Ginoza', with a long horizontal flourish extending to the right.

Kyle Ginoza
Project Manager

KG:yp

Enclosure

cc: Dan Yasui, A&B Properties, Inc. (w/enclosure)

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MICHAEL T. MUNEKIYO
GWEN ORASHI HIRAGA
MITSURU "MIKE" HIRANO
KARLYNN KAWAHARA

MARK ALEXANDER BOY

August 27, 2007

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

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Kihei Residential Project TMK Nos. (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Dear Mr. Arakawa:

Thank you for your letter dated May 11, 2007, providing comments on the EISPN for the subject project.

On behalf of the applicant, A&B Properties, Inc., we offer the following responses to your comments Nos. 10 through 21, which are arranged below in the same order as they appear in your letter. Please note that responses to comments Nos. 1 through 9 have been sent directly to the Department of Environmental Management.

10. Please note that the Flood Insurance Rate Map (FIRM) for this area of Maui was amended by a Letter of Map Revision (LOMR Case No. 03-09-0438P) that was approved by FEMA and effective as of July 1, 2004. The revised FIRM for this area of Maui designates the project site as being located within Zones B and C, areas of minimal flooding. The revised FIRM will be included in the Draft EIS. The Draft EIS will address measures taken by the applicant to ensure proper conformance to Ordinance No. 1145, which pertains to flood hazard districts, if applicable.
11. It is noted that road-widening lots may be required by the County to provide for future right-of-way and will be improved to County standards. The said lots will be dedicated to the County upon completion of the improvements.
12. A Traffic Impact Assessment Report (TIAR) has been prepared by Austin Tsutsumi & Associates for the subject project. A copy of the TIAR will be included in the Draft EIS for review. The TIAR did not find Kaiolohia Street to be impacted; its current classification is sufficient for the future build-out scenario.

13. The TIAR mentioned above takes into account in its analysis proposed roadways, which are reasonably certain to be constructed by the end of the project build-out. The proposed future collector road that parallels Pi'ilani Highway is discussed in the TIAR, but was not factored into the analysis, due to its uncertainty with regards to completion of construction by 2016, the anticipated project build-out year.
14. All structures such as walls, trees, etc., will be removed from the road-widening strip. In addition, the rear boundaries of the road-widening strip will be clearly marked to ensure that said structures have been properly removed and relocated.
15. A 30-foot radius will be provided at the intersections of the proposed access points and the adjoining County (Kaiwahine Street) and State (Pi'ilani Highway) roadways.
16. The Preliminary Drainage Report (PDR), prepared by R.M. Towill Corporation in May 2007, verifies that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties. The PDR will be included in the Draft EIS.
17. 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.
18. All existing features will be shown on the project plat map.
19. A site plan and a sight distance report to determine required and available sight distances at the proposed intersections of the subject project will be provided to the Department during the construction plans review process.
20. The Maui Police Department commented in a letter dated May 3, 2007, that they will make assessments after receiving the TIAR. Their assessments, in addition to responses to their comments, will be included in the Final EIS.
21. Preliminary construction plan submittal will include a technical assistance review performed by the Disability and Communication Access Board (DCAB) for

Milton Arakawa, Director
August 27, 2007
Page 3

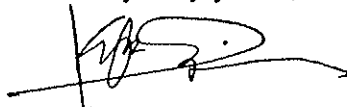
compliance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for all infrastructure elements that may be dedicated to the County. The applicant acknowledges that all technical and structural infeasibility assessments are the responsibility of the developer and that an agreement waiving the County of Maui of any future liability, including redesign and reconstruction of said facility, will be recorded with the State Bureau of Conveyances.

Please note, we responded to the questions involving the environmental management section of your former department directly to the Department of Environmental Management.

We appreciate the input we received from you. A copy of the Draft EIS 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

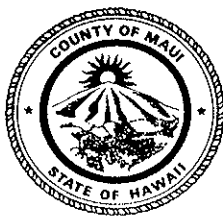
KG:yp

cc: Daniel Yasui, A&B Properties, Inc.
Bert Saruwatari, Department of Business, Economic Development & Tourism, Land
Use Commission

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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
Munikiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

**SUBJECT: KIHEI RESIDENTIAL PROJECT
DRAFT EIS
TMK (2) 3-8-004:002 (POR.), 022 (POR.) AND 030 (POR.), KIHEI**

Dear Mr. Ginoza,

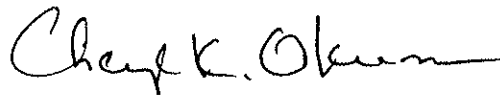
We reviewed the subject project as a pre-application consultation and have the following comments:

1. Solid Waste Division comments
 - a. None.
2. Wastewater Reclamation Division comments:
 - a. Although wastewater system capacity is currently available as of 12/6/07, the developer should be informed that wastewater system capacity cannot be ensured until the issuance of the building permit.
 - b. Provide discussion and calculations (sewer impact study) to substantiate that the existing wastewater system is adequate to serve this project. May require upgrades of Kihei Pump Station #2, forcemain, and other sewer facilities. Also, flow conditions of all gravity lines upstream of Pump Station #6 to Piilani Highway will need to be checked and verified.
 - c. Wastewater contribution calculations are required before building permit is issued.

- d. Developer shall pay assessment fees for treatment plant expansion costs in accordance with ordinance setting forth such fees (Kihei Assessment Are #3).
- e. Developer is required to fund any necessary off-site improvements to collection system and wastewater pump stations.
- f. Plans should show the installation of a single service lateral, advanced riser, and property cleanout/manhole for each lot.
- g. Indicate on the plans the ownership of each easement (in favor of which party). Note: County will not accept sewer easements that traverse private property.
- h. Kitchen facilities within the proposed project shall comply with pre-treatment requirements (including grease interceptors, sample boxes, screens etc.)
- i. Non-contact cooling water and condensate should not drain to the wastewater system.
- j. The Kihei Wastewater Reclamation Facility has a cumulative allocated capacity of 6.6 MGD. Add this information to the "Existing Conditions" portion of the Wastewater System section (pages 46 - 47) of the document.

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

Sincerely,



Cheryl Okuma, Director

April 23, 2008

Cheryl Okuma, Director
Department of Environmental Management
2200 Main Street, Suite 175
Wailuku, Hawai'i 96793

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Ms. Okuma:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated December 19, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

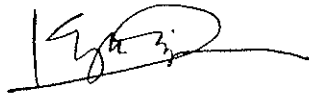
1. We acknowledge that wastewater capacity cannot be ensured until the issuance of the building permit.
2. A discussion and calculations related to wastewater usage are included in the Preliminary Engineering Report, which may be found in Appendix F of both the Draft EIS and Final EIS. The applicant will continue to coordinate with the department to determine the need for potential upgrades to sewer facilities.
3. We note that wastewater contribution calculations are required before the building permit is issued.
4. The applicant will pay assessment fees for treatment plant expansion costs in accordance with Maui County Code, Chapter 14.34.
5. We acknowledge that the developer is required to fund any necessary offsite improvements to the collection system and wastewater pump stations.
6. The project plans will show the installation of a single service lateral, advanced riser, and property cleanout/manhole for each lot.
7. Ownership of sewer easements will be shown on the project plans. It is noted that the County will not accept sewer easements that traverse private property.

Cheryl Okuma, Director
April 23, 2008
Page 2

8. Kitchen facilities within the proposed project will comply with pre-treatment requirements, including grease interceptors, sample boxes, screens, etc.
9. Provisions to prevent non-contact cooling water and condensate will be implemented to prevent drainage into the wastewater system.
10. The Final EIS will include the cumulative allocated capacity of 6.6 million gallons per day (MGD).

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

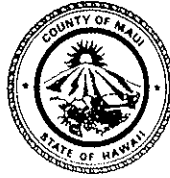
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CHARMAINE TAVARES
Mayor

JAN 16 2008

JEFFREY S. HUNT
Director

COLLEEN M. SUYAMA
Deputy Director



COUNTY OF MAUI
DEPARTMENT OF PLANNING

January 11, 2008

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

Dear Mr. Ginoza:

**SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)
COMMENTS FOR THE PROPOSED A&B PROPERTIES,
INC., KIHEI RESIDENTIAL PROJECT ON 94.3 ACRES
LOCATED MAUKA OF PIILANI HIGHWAY, ISLAND OF
MAUI, HAWAII AT TMK: 3-8-004:002 (POR), 022 (POR) AND
030 (POR) EAC 2007/0035)**

The Maui Planning Department (Department) is in receipt of the above-referenced document for the proposed Kihei Residential Project. As represented in the Draft EIS document, the proposed action includes the following:

- Development of a master-planned residential community on approximately 94.3 acres mauka of Piilani Highway in Kihei. The project includes a mix of Single-family detached and Multi-family residential units as well as a small neighborhood commercial area;
- The project will include approximately 67.9 acres of Multi-family, 25 acres of Single-Family, and 1.4 acres of commercial;
- The applicant will be submitting applications for a Community Plan Amendment from Agriculture to Multi-family, Single-Family and Commercial and Change in Zoning from Agriculture to A-1 Apartment, A-2 Apartment, R-1 Residential and B-2 Community Business District upon completion of the EIS process.

Based on the foregoing, the Department provides the following comments in preparation of the Draft EA :

1. The land use designations for the project area are as follows:
 - a. State Land Use – Agriculture
 - b. Community Plan – Agriculture
 - c. County Zoning – Agriculture
 - d. Other – Not located within the SMA
2. The Department concurs that the proposed community plan amendment and use of State and County lands are "triggers" that require compliance with Chapter 343, Hawaii Revised Statutes (HRS);
3. The State Land Use Commission has agreed to be the accepting authority for the EIS pursuant to Chapter 343, HRS;
4. On March 2, 2007, the applicant filed a petition with the State Land Use Commission for a District Boundary Amendment from Agriculture to Urban;
5. The applicant will also be filing Community Plan Amendment and Change in Zoning applications for the project;
6. The EIS shall include Transportation Demand Management Measures for the project which reduces or mitigates traffic impacts. Consideration should be given to measures that demonstrate that the project will not increase traffic on our congested roadways;
7. The Draft EIS states that the project will provide affordable housing in accordance with the County's Workforce Housing Policy and that the applicant will coordinate with the Department of Housing and Human Concerns an appropriate affordable housing program; and
8. The County of Maui is currently updating the Maui County General Plan, developing a Maui Island Plan that will establish growth boundaries and updates of its Community Plans. The Department requests justification of the necessity for this project to proceed in advance of the General Plan update process. Your response should discuss the community benefits that this project will provide beyond what is required by County and State ordinances.

The Planning Department may not be supportive of a Community Plan Amendment in advance of the General Plan Update, especially

Mr. Kyle Ginoza
January 11, 2008
Page 3

since the county's legislative branch has not made a decision on the Updated General Plan and Maui Island Plan with its growth boundaries. The Planning Department may not support the State Land Use District Boundary Amendment application filed with the State Land Use Commission since it may be premature for such an action. The County of Maui has not established the land use policy for the property and it has not been established that the property will be included in the growth boundaries mandated by the General Plan process.

Thank you for the opportunity to comment. Should you require further clarification, please contact Current Planning Supervisor Ann Cua by e-mail at ann.cua@mauicounty.gov or at 270-7521.

Sincerely,



JEFFREY S. HUNT, AICP
Planning Director

xc: Colleen M. Suyama, Deputy Planning Director
Clayton I. Yoshida, AICP, Planning Program Administrator
John Summers, Planning Program Administrator
Ann T. Cua, Current Planning Supervisor

CIY:ATC:bv

Project File
General File

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

MARK ALEXANDER ROY
KYLE BINDZA

April 23, 2008

Jeffrey S. Hunt, AICP
Planning Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawai'i 96793

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Hunt:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated January 11, 2008, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

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

1. The Final EIS will contain a section addressing Transportation Demand Management Measures for the project. The applicant will implement local roadway improvements in consultation with the State DOT and County DPW. As noted in the EIS, several vehicular access points are being planned to facilitate traffic circulation and connectivity with adjacent properties. Direct access (right-turn in/right-turn out) from the project site to Pi'ilani Highway is planned to lessen traffic through the adjacent Hale Pi'ilani residential subdivision and at the intersection of Kaiwahine Street and Pi'ilani Highway. Additionally, design of the project will allow for future mauka access points to adjacent properties and future connector roads.

The project presents an opportunity to promote non-automobile travel for recreational and household pursuits. In order to minimize vehicle trips particularly outside the project, a limited commercial area within the project limits is planned to serve the needs of the adjacent community. Accommodations to support public bus transportation services can be provided at the commercial area to facilitate an alternative travel mode. The applicant will coordinate with the County Department of Transportation concerning the creation of a bus stop at or near the subject property. Also, recreational needs will be served by the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths

and walking trails will connect these areas and promote recreational activity and also serve to reduce residents' reliance on automobiles.

2. The applicant acknowledges that the Maui Residential Workforce Housing Policy must be satisfied. The applicant will develop, in conjunction with the Department of Housing and Human Concerns, an appropriate affordable housing agreement.
3. We acknowledge that the County of Maui is currently updating the Maui County General Plan and note that the applicant has delayed the Kihei Residential project based on the County Planning Department's recommendations over the last few years. The applicant continues to respect the General Plan Update process. However, given the time frames ordinarily associated with the Chapter 343, Hawaii Revised Statutes process, as well as the State Land Use District Boundary Amendment (DBA) process, it was deemed appropriate to initiate the environmental disclosure and DBA processes without filing land use applications with the County of Maui. The applicant is encouraged that the recently released initial draft of the Maui Island Plan includes the project site within the urban growth boundary.

We understand that over the next several months, the General Plan Advisory Committee (GPAC) will continue its work on the Maui Island Plan. During this period, the EIS process will be concluded, and the State Land Use DBA proceedings will be initiated. The applicant also understands that the Department of Planning's position in the Land Use Commission's (LUC) proceedings may be influenced by the progress of the General Plan Update process at the time of the LUC's proceedings. With this in mind, the applicant will continue to be an active participant in the GPAC process and will continue to work with the Department to ensure that entitlements timing issues are appropriately coordinated.

The project's most significant community benefit is the provision of needed affordable and primary housing for Maui residents. As you are aware, the availability of housing for Maui residents continues to be a major community wide concern. The proposed project will increase the supply of affordable and primary housing for Maui residents. Over the past five (5) years, the demand for housing on Maui has intensified due to steady population growth, high employment and historically low interest rates. This strong demand, coupled with limited supply, has led to rising housing prices. The long-term projection of housing conditions in South Maui indicates that the increase in households over the next five (5) years will outnumber the existing supply of new homes. A significant increase in housing supply will be needed to accommodate the region's anticipated growth. In view of these housing conditions and the lengthy timeframes typically required for project entitlement and development, it was deemed appropriate to commence this process at this time.

Jeffrey S. Hunt, AICP
Planning Director
April 23, 2008
Page 3

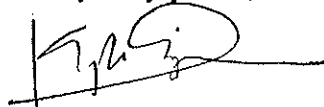
A minimum of 240 affordable housing units will result from the project. A range of housing types will address the housing needs of the region at an attractive and central location in North Kihei. Additional housing product choices will provide healthy competition and allow for a more balanced housing market. In light of the current and projected housing market conditions, the proposed Kihei Residential project will provide a significant community benefit by offering residents new opportunities to secure affordable and primary housing.

Other benefits will also result from the project. Recreational benefits will result through the addition of an active park adjacent to the existing Hale Pi'ilani neighborhood park. A network of bicycle paths and walking trails will promote recreational activity and less reliance on automobiles. Infrastructure for the project, including drinking water source, storage and transmission facilities, drainage facilities and on-site and off-site roadway improvements will be developed. The benefits of these improvements will extend beyond the project. Additional park space will also serve existing residences to the south, water system improvements will bolster the regional water system and an additional mauka-makai collector road will provide needed traffic circulation and emergency evacuation alternatives. Additionally, the project will contribute towards improvements to educational and sewer facilities within the region.

These and other project benefits, impacts and mitigation measures are discussed in greater detail in the EIS.

We appreciate the input we received from your office. 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: Dan Yasui, A&B Properties, Inc.

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October 22, 2007

Munekiyō & Hiraga, Inc.
Attn: Mr. Kyle Ginoza
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Ginoza,

Subject: Proposed Kihei Residential Project
Kihei, Maui, Hawaii
TMK: (2) 3-8-004:002 (por.), 022 (por.), and 030 (por.)

Thank you for allowing us to comment on the Draft Environmental Impact Statement for the proposed subject project, which was received on October 9, 2007.

In reviewing our records and the information received, Maui Electric Company (MECO) has no objection to the project at this time. However, the addition of this project's anticipated load demand will have a substantial impact to our system. Therefore, in addition to an electrical line extension, upgrades to our substation, transmission, and/or distribution system may be necessary to accommodate a project of this magnitude. 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



MICHAEL T. MUNEKIYO
EWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY
KYLE GINOZA

April 23, 2008

Neal Shinyama, Manager - Engineering
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawai'i 96732

SUBJECT: Proposed Kihei Residential Project (TMK (2) 3-8-004:002 (por.),
022 (por.), and 030 (por.))

Dear Mr. Shinyama:

We are writing to you on behalf of the applicant, A&B Properties, Inc., to thank you for your letter dated October 22, 2007, regarding the Draft EIS for the Kihei Residential Project located in Kihei, Maui, Hawai'i.

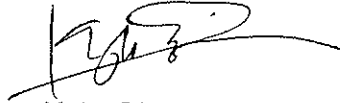
We offer the following comments, which reflect information provided in our August 27, 2007 letter to you, in response to your remarks:

1. We acknowledge that MECO will require an electrical line extension, access, and easements in order to provide service to the proposed project.
2. The applicant will coordinate with MECO to address the need for system upgrades which may be necessary to accommodate the anticipated load demand from the proposed project. The project electrical consultant will submit electrical drawings and a project time schedule, as early as practicable, to facilitate the provision of service. Please note that the project requires several discretionary land use approvals from both the State and County prior to proceeding, and that this is an initial step in that approval process. Upon receipt of these land use approvals, project parameters and detailed system requirements will be more specifically known.
3. Energy conservation measures will be considered as part of the project design phase of development. Coordination with the Demand Side Management Group will be undertaken at that time.

Neal Shinyama, Manager - Engineering
April 23, 2008
Page 2

We appreciate the input we received from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,



Kyle Ginoza
Project Manager

KG:yp

cc: Dan Yasui, A&B Properties, Inc.

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XI.XIII. REFERENCES

XI.XIII. REFERENCES

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APPENDIX A.
**Market Study and Economic
Impact Analysis**



A Real Estate Appraisal, Research & Advisory Group

February 16, 2007

06-9181

A&B PROPERTIES, INC.
P.O. Box 3440
Honolulu, Hawaii 96801

Re: Market Analysis for the proposed Kihei Residential Project in Kihei, Island and County of Maui

In accordance with your request, we have inspected the above-referenced property in order to provide a defined scope market study for the proposed Kihei Residential Project in Kihei, Island and County of Maui. This counseling report, and the conclusions herein, are based on the on-site inspection of the property, a study of current political and economic conditions, and a historical review of the real estate market in South Maui and on Maui overall. The effective date of this report is January 23, 2007.

The subject consists of approximately 94 acres of land and is currently zoned Agricultural District. The project, which is still in its preliminary planning stage, is identified as the Kihei Residential Project to be located just mauka of the Pillani Highway.

The assignment will include the following reports:

Market Analysis The Consultant agrees to provide a market analysis for this proposed project by (1) defining and delineating the market area; (2) identifying and analyzing the current supply and demand conditions that comprise the specific real estate market segment; (3) identifying, measuring and forecasting the effect of anticipated developments or other changes on future supply in each market segment; and (4) to the extent possible, forecasting the effect of anticipated economic or other changes on future demand.

The proposed project is planned to include A-1 and A-2 Apartment, R-1 Residential and Commercial zoned land.

The following report presents a narrative review of the market study and our analysis of data along with other pertinent materials on which this report is predicated. It contains data and exhibits gathered in our investigations, and will include a description of the analytical process and our conclusions.

PREPARED FOR: A&B PROPERTIES, INC.
P.O. Box 3440
Honolulu, Hawaii 96801-3440

EFFECTIVE DATE: January 23, 2007


A MARKET STUDY & ECONOMIC IMPACT ANALYSIS OF THE PROPOSED
KIHEI RESIDENTIAL PROJECT, KIHEI, ISLAND OF MAUI, HAWAII



2073 Wells Street, Suite 100 ♦ Wailuku, Maui, HI 96793 ♦ Telephone: (808) 242-6481 ♦ Fax: (808) 242-1852

Thank you for allowing us the opportunity to work on this interesting assignment.

Respectfully submitted,
ACM Consultants, Inc.


Glenn K. Kumihisa, MAI
Certified General Appraiser,
State of Hawaii, CGA-39
Expiration: December 31, 2007


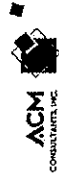

Shane S. Nishimoto
Certified General Appraiser
State of Hawaii, CGA-696
Expiration: December 31, 2007

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PART I – INTRODUCTION

A. EXECUTIVE SUMMARY

Background

The proposed Kihel Residential Project is located on the mauka side of Pihani Highway in the District of Kihel, Island and County of Maui. The subject will consist of approximately 94 acres of land and is currently zoned Agricultural District. The project is still in its preliminary planning stages and will need to attain a State Land Use District Boundary Amendment, a Community Plan Amendment and a Change in Zoning by the County of Maui. The Consultant has been provided with a Conceptual Master Plan which has been prepared by Chris Hart & Partners. According to the plan, the land use allocations are:

Land Use	Approximate Land Area
A-1 Apartment	52.8 Acres
A-2 Apartment	15.1 Acres
R-1 Residential	25.0 Acres
Commercial	1.40 Acres

Study Objectives

ACM Consultants, Inc. has been retained by A&B Properties, Inc., to analyze each of the specified segments of the real estate market as it relates to this proposed project. In particular, the Consultants studied economic trends and demographics, and supply and demand factors for single-family and multi-family residential, properties. In the process, they gathered as much information as possible on real estate sales on Maui while focusing on the South, West, and Central Maui markets.

The objectives of the market analysis were as follows: (1) to define and delineate the market area; (2) to identify and analyze the current supply and demand conditions specific to the subject's market; and (3) identify, measure and forecast the effect of anticipated developments or other factors on future supply.

Summary of Conclusions

Maui in general has seen growth in its population, tourism and economy over the past two decades. Similar to many real estate markets on the mainland, Maui's real estate market has seen significant increases in the last few years. Median prices as well as sales volume are at record highs and affordable housing is in very short supply.

Residential Component

The short-term supply of single-family homes in Maui appears to be insufficient for the next 5 or so years. If economic conditions remain the same, it is probable that prices will continue to rise over the long-term despite recent softening in the real estate market. This will be further magnified if no new supply is brought onto the market.

With additional inventory on the market, and assuming positive growth over the next decade, it is our opinion that bringing the proposed project's 600 units to the market would help provide affordable housing to Maui's workforce in the near as well as long term and will be well accepted by the public due to the broad spectrum of real estate products that it will offer.

The proposed development is very attractive because the local community possesses an intense desire for property in this neighborhood. Additionally, during the time that the project is approved and construction begins, much, if not all of the existing supply in ongoing projects will most likely be depleted if no new housing developments are approved.

The additional choices that buyers will have in the real estate market will provide healthy competition and allows for a more balanced market. Consequently, it is the Consultant's opinion that the development of the Kihai Residential Project will be well received based on historical absorption of developments in this high-demand neighborhood. It will also add much needed supply to the market and will help alleviate the high cost of housing on Maui.

B. PURPOSE OF THE REPORT

The purpose of this report, as of January 23, 2007, is to generate a market analysis report with respect to A&B Properties' proposed Kihai Residential Project.

C. INTENDED USE OF THE REPORT

The intended use or function of this report is to provide real property information and real estate market data upon which preparation of an Environmental Impact Statement, State Land Use District Boundary Amendment, Community Plan Amendment and Change in Zoning by our client may be based.

D. SCOPE OF THE REPORT

The Consultant has agreed to provide a current market analysis of this project by (1) defining and delineating the market area; (2) identifying and analyzing the current supply and demand conditions that make up the specific real estate market; and (3) identifying, measuring and forecasting the effect of anticipated developments or other changes on future supply. The market analysis will be developed and prepared in conformity with, and subject to, the requirements of the Code of Professional Ethics and the Standards of Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice.

E. STATEMENT OF COMPETENCY

ACM Consultants, Inc. (formerly ACM, Real Estate Appraisers, Inc.) has been actively involved in the real estate appraisal business since 1982. Our business emphasis has focused mainly on the valuation of residential and commercial properties located within the State of Hawaii. The company considers itself competent to conduct a market and economic impact analysis for the proposed project.

F. EXTRAORDINARY ASSUMPTIONS AND HYPOTHETICAL CONDITIONS

1. As of January 2007, the project was still in the preliminary stages of planning. A Conceptual Master Plan dated January 18, 2007 and prepared by Chris Hart & Partners provided a visual indication of the proposed layout of the development and anticipated land uses. The consultant is not liable for any changes in the project plan past this date, nor for information that has not been released or communicated to the Consultant.
2. The Consultant has no control over economic conditions and other international events that could have an affect upon Hawaii's economy and the Maui real estate market. As a result, this report has not made any assumptions regarding potential conflicts with other nations, or external factors affecting economic conditions here.
3. The counseling report is also subject to standard "Limiting and Contingent Conditions" located in the pages following.

G. CONFIDENTIALITY PROVISION

The contents of this market study and economic impact report are confidential. Release of this counseling report by ACM Consultants, Inc. is limited to you and the approving government agencies for your preparation of an Environmental Impact Statement, State Land Use District Boundary Amendment, Community Plan Amendment and Change in Zoning for the proposed Kihai Residential Project. Any further release of this report, or portions herein, is strictly prohibited and you shall accept the risk and liability for any such release without the previous written consent of ACM Consultants, Inc. Further, you shall indemnify and defend ACM Consultants, Inc., and its individual consultants/appraisers, from any claims arising out of any such unauthorized disclosure.


H. CERTIFICATION


The undersigned does hereby certify that except as other-wise noted in this counseling report:

1. The Consultant has no present or prospective interest in the property that is the subject of this report, and no personal interest or bias with respect to the parties involved.
2. The Consultant has personally inspected the property, and is a signatory of this Certification.
3. To the best of the Consultants' knowledge and belief, all statements of fact and information in this report are true and correct, and the Consultant(s) have not knowingly withheld any significant information.
4. No other person provided significant professional assistance to the person(s) signing this report.
5. The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal unbiased professional analyses, opinions and conclusions.
6. All analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Appraisal Practice.
7. This counseling report is subject to and in conformance with the Code of Professional Ethics and Standards of Professional Conduct of the Appraisal Institute. The analyses, opinions and conclusions of this counseling report have been made in conformity with, and is subject to, the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.
8. This counseling report is to be used only in its entirety and no part is to be used without the whole report. All conclusions and opinions concerning the real estate are set forth in the counseling report were prepared by the Consultant(s) whose signature(s) appears on the counseling report. No change of any item in the counseling report shall be made by anyone other than the Consultant, and the Consultant shall have no responsibility for any such unauthorized change.
10. The Appraisal Institute, of which this Consultant is a member, has a legal right to review this report.

11. The qualifications of this Consultant, including completed educational requirements of his/her candidacy are located in the Addendum to this report. Any member signing the report has completed the requirements of the Appraisal Institute's continuing education program.

ACM Consultants, Inc.


 Glenn K. Kunitaka, MAI
 Certified General Appraiser,
 State of Hawaii, CGA-039
 Expiration: December 31, 2007


 Shane S. Nishimoto
 Certified General Appraiser,
 State of Hawaii, CGA-696
 Expiration: December 31, 2007

I. LIMITING AND CONTINGENT CONDITIONS

- 1) This is a Counseling Report which is intended to comply with the reporting requirements set forth under Standards Rule 5 of the Uniform Standards of Professional Appraisal Practice for a Counseling Report. The information contained in this report is specific to the needs of the client and for the intended use stated in this report. The Consultant is not responsible for unauthorized use of this report.

This report has not been prepared for federally-related mortgage financing purposes, and has not been prepared in compliance with the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.

- 2) No responsibility is assumed for legal or title considerations. Title to the property is assumed to be good and marketable unless otherwise stated in this report.
- 3) The property analyzed is free and clear of any or all lines and encumbrances unless otherwise stated in this report.
- 4) Responsible ownership and competent property management are assumed unless otherwise stated in this report.
- 5) The information furnished by others is believed to be reliable. However, no warranty is given for its accuracy.
- 6) All engineering is assumed to be correct. Any plot plans and illustrative material in this report are included only to assist the reader in visualizing the property.
- 7) It is assumed that there are no hidden or unapparent conditions of the property, subsoil, or structures that render it more or less valuable. No responsibility is assumed for such conditions or for arranging for engineering studies that may be required to discover them.
- 8) It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations and laws unless otherwise stated in this report.
- 9) It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined, and considered in this counseling report.
- 10) It is assumed that all required licenses, certificates of occupancy or other legislative or administrative authority from any local, state, or national governmental or private entity or organization have been or can be obtained or renewed for any use on which the

value estimates contained in this report are based.

- 11) Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. Maps and exhibits found in this report are provided for reader reference purposes only. No guarantee as to accuracy is expressed or implied unless otherwise stated in this report. No survey has been made for the purpose of this report.
- 12) It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described and that there is no encroachment or trespass unless otherwise stated in this report.
- 13) The Consultant is not qualified to detect hazardous waste and/or toxic materials. Any comment by the Consultant that might suggest the possibility of the presence of such substances should not be taken as confirmation of the presence of hazardous waste and/or toxic materials. Such determination would require investigation by a qualified expert in the field of environmental assessment. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The Consultant's value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value unless otherwise stated in this report. No responsibility is assumed for any environmental conditions, or for any expertise or engineering knowledge required to discover them. The Consultant's descriptions and resulting comments are the result of the routine observations made during the analysis process.
- 14) Unless otherwise stated in this report, the subject property is evaluated without a specific compliance survey having been conducted to determine if the property is or is not in conformance with the requirements of the Americans with Disabilities Act. The presence of architectural and communications barriers that are structural in nature that would restrict access by disabled individuals may adversely affect the property's value, marketability, or utility.
- 15) Any proposed improvements are assumed to be completed in a good workmanlike manner in accordance with the submitted plans and specification.
- 16) The distribution, if any, of the total valuation in this report between land and improvements applies only under the stated program of utilization. The separate allocations for land and buildings must not be used in conjunction with any other appraisal and are invalid if so used.
- 17) Possession of this report, or a copy thereof, does not carry with

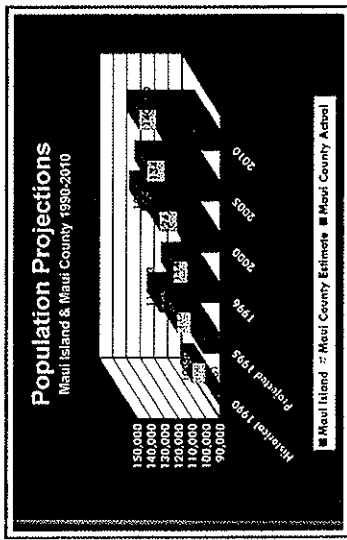
it the right of publication. It may not be used for any purpose by any person other than the party to whom it is addressed without the written consent of the consultant, and in any event, only with property written qualification and only in its entirety.

18) Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the Consultant, or the firm with which the Consultant is connected) shall be disseminated to the public through advertising, public relations, news sales, or other media without prior written consent and approval of the Consultant.

PART II – FACTUAL DATA

A. REGIONAL DATA – MAUI COUNTY

Maui County is the third most populous of the four counties of Hawaii, with a total resident population of 128,241 (2000 Census) and a change of 27.6 percent since 1990. Maui County consists of the islands of Maui, Molokai, Lanai, and Kahoolawe. Ninety percent (90%) of County residents live on Maui; the 2000 U.S. Census of Population reported 7,404 residents on Molokai and 3,193 on Lanai. The island of Maui consists of a total of 734.5 square miles, or 470,080 acres. Population Projections for Maui County and the island Maui are illustrated on the table below.



Like all the Hawaiian Islands, Maui, Molokai and Lanai are blessed by warm air temperatures year-round, and ocean waters that range from 72-77° F in winter to 77-81° in summer. The islands' distance from other continents, the moderating effects of the surrounding water and the tropical location combine to create this pleasant climate. Hawaii's topography, particularly the mountains and valleys and location of each island, contributes to the great variety of microclimates within very small areas. On Maui, the West Maui Mountains and Haleakala are the primary geological features affecting the weather.

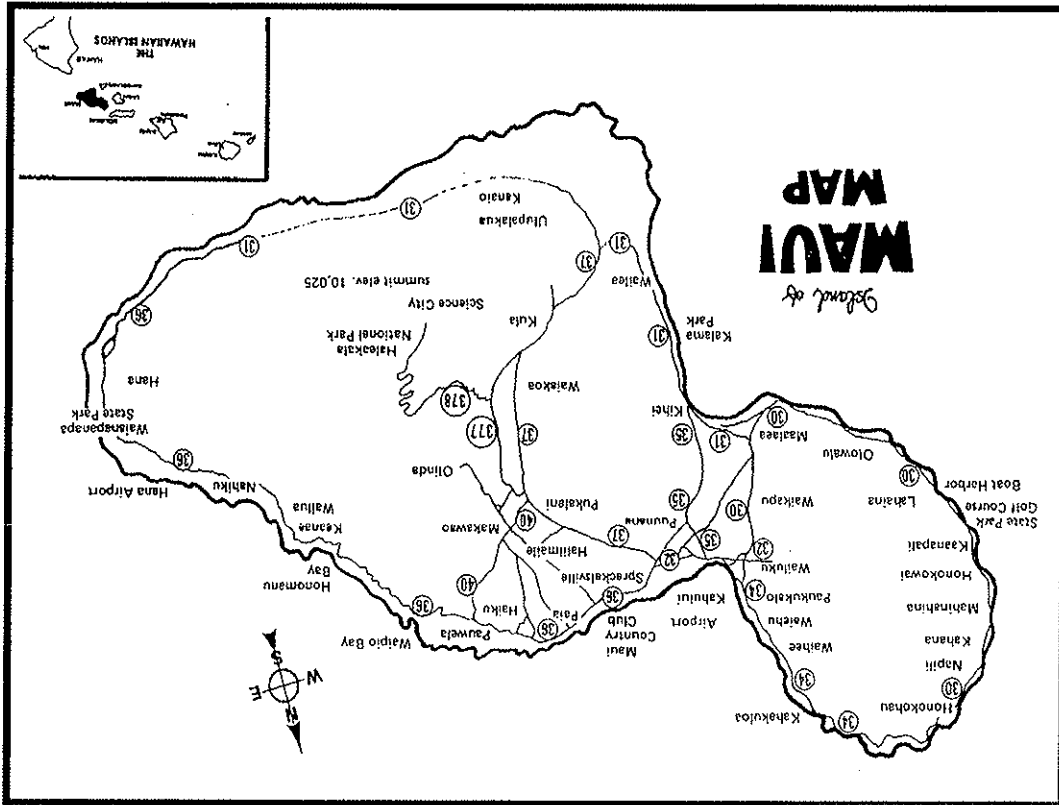
Due in part to the above geographical factors, Maui has, for twelve years, been selected "Best Island in the World" by readers of Conde Nast Traveler magazine. Maui has clearly dominated the tourism competition between the neighbor islands (excluding Oahu), drawing more tourists than the other Neighbor Islands of Hawaii and Kauai

combined, and has consistently had the highest occupancy rates of all island (Oahu included).

Overall, Maui's performance has exceeded other counties during the state's ongoing string of job losses that began in late 1992. In 1999, Maui led the state's four counties in job creation, up almost 3% for the year. A falling Maui County unemployment rate corroborates the tightening labor market since the mid 1990's, Maui's unemployment rate has steadily declined and is currently the lowest in the state.

Kihiki Residential Project (A&B Properties, Inc.)

ACM Consultants, Inc.



B. NEIGHBORHOOD DESCRIPTION

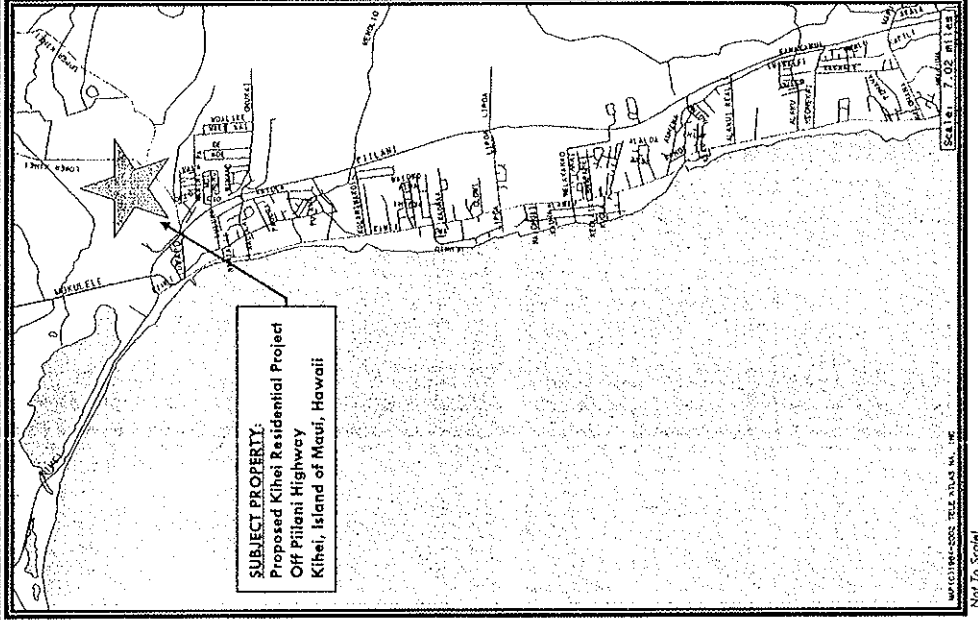
Since real estate is fixed in location, its marketability and rentability are strongly influenced by economic and social trends in its immediate environment. The continuing attractiveness of this neighborhood environment to potential users and tenants, and its competitive relation to those of substitute properties, must therefore be evaluated and forecast. In particular, perceived neighborhood trends affect both the quality and quantity of the revenues the subject property can reasonably be expected to generate.

The geographic area surrounding the subject property is defined by physical and man-made boundaries, and encompasses an area known as Kihei-Makena. This area extends along the western shoreline of east Maui at the foot of Haleakala.

The boundaries of the Kihei-Makena planning region begin at the shore where Kapuni Gulch enters the ocean. Starting at this point, the boundary travels mauka to the Kahikini forest reserve, then in a westerly direction along the unimproved Pihani Highway to the Kula Highway at Ulupalakua, then along the highway to the jeep trail running through the center of the Kamaole Ahupua'a, then makai along the jeep trail to the unimproved portion of Waiakea Road, then in a northerly direction along the unimproved improved portions of Waiakea Road to its intersection with Spanish Road north of Pulehu Gulch. The boundary then extends along Spanish and Waikapu Roads which traverse the length of the island's isthmus to a point just east of Waikapu at Waikapu Stream, then in a southwesterly direction to Honoapiilani Highway, and finally along the highway to Pohakea Gulch. The boundary then goes mauka along the centerline of the gulch to the ridge line, and then makai along the centerline of Manawainui Gulch to the shoreline.

The region is comprised of four communities: Maalaea, Kihei, Wailea, and Makena. Community form in the planning region consists of a small shoreline-oriented community at Maalaea and a linear pattern of urbanization extending from the south end of Kealia Pond to Makena. This consists of Kihei proper, extending from Kiloana Drive, and the planned resort destination areas at Wailea and Makena.

Kihei is the central residential and commercial area of south Maui. Included in the Kihei area are single family subdivisions, residential and resort condominiums, shopping centers, schools, and recreational



NEIGHBORHOOD MAP

and religious facilities. Kihei also provides the bulk of residential oceanfront properties available for private ownership. Access to Kihei is provided by two major thoroughfares: the Mokulele Highway which services traffic from Kahului to Kihei and the North Kihei Road which services traffic from Waialua Town and Lahaina to Kihei. Both thoroughfares are two-lane asphalt paved roads. The newer Piliāni Highway connects with both highways and is considered the "express thoroughfare" while the older South Kihei Road provides access to the majority of properties via numerous secondary and tertiary roads.

All public utilities including electricity, water, sewer, and telephone service are available to the greater Kihei area. Police, fire and ambulatory services are provided by stations directly in Kihei or in nearby Waialuku or Kahului.

A major factor in the growth and development of the Kihei region is tourism. This area of Maui has a sunny climate and possesses beautiful white-sand beaches, and, there, is a popular tourist destination. As a result, hotels have been successfully developed in the area.

Kihei in general experienced rapid and perhaps uncontrolled growth in the 1970's. This growth stabilized during the early 1980's and made a strong return in the latter half of the decade. There are numerous residential subdivisions in Kihei, making it one of Maui's larger suburban areas. Additionally, numerous residential and resort condominiums occupy nearly 20 percent of Kihei proper. The steady growth of Kihei and the south Maui area has also encouraged the development of new shopping complexes and other support facilities serving the resident and visitor population. The Wailea resort area with its luxury hotels, exclusive residential lots, condominiums, and recreational facilities is located on the outskirts of Kihei, and the Makana and Seibu resort areas are also located on the southern outskirts of Kihei.

The expansion of the Wailea Resort, along with other developments indicate a boom in the region as dramatic as the one that transpired in West Maui in the 1970's. Currently, there is a very high level of interest by mainland investors in the resort projects of Wailea and Makana. A particularly high level of activity is observed in oceanfront properties and in subdivisions along the golf courses.

The Kihei region within the past ten years has experienced rapid growth in residential population and further growth is projected for this community. Population in this region had grown by about 50 percent between 1990 and 2000, resulting in an increasing demand for residential housing. Recently developed subdivisions have sold briskly and prices have been rising at a rapid rate. As a result,

developers have been increasing their efforts to find suitable parcels of land to develop residential subdivisions in Kihei and several more are being built. Presently, there are several notable new residential projects being developed in Kihei and Wailea.

The condominium projects in Kihei include the 18-unit *Waiala Maui*, the 112-unit *Kai Makani*, the 66-unit *Nu'u Aina Estates*, the 152-unit *Hokulani Golf Villas*, and the 146-unit *Ke Alii Ocean Villas*. Single-family subdivisions being developed include the 23-lot *Kihei Kauhale* subdivision, 31-lot *Kilohana Waena* subdivision, the 65-lot *Liloa Village* subdivision, the 90-unit *Kamalii Aloyna* Subdivision, and the 90-unit *Moana Estates*.

In *Wailea* and *Makana* neighborhoods, the *Wailea Beach Villas* has completed construction and consists of 98 condominium units on an 11-acre beachfront site. Prices ranged from \$1,350,000 for a two-bedroom unit without views, to \$5,600,000 for a three-bedroom, oceanfront unit. Another high end development, *Mauiānia* at *Wailea* is a planned oceanfront community currently under construction that will feature 14 custom-designed luxury condominium residences on 10.5 acres of land. The custom homes will range in size from 5,200 to 12,000 square feet. Prices of the oceanfront homes range from about \$7,000,000 to \$18,000,000. Currently, six of the fourteen homes have been sold.

Other notable on-going projects in *Wailea* include the 38-unit *Kanani Wailea* condominium project, the 120-unit *Hoolie* luxury condominium project, the 24-unit *Papali* luxury condominium project, and the 150-unit *Kai Malu* resort condominium.

With the growth in tourism and resident population, Kihei's commercial activity has expanded, especially along South Kihei Road which runs in a general north-south direction through the entire town of Kihei. It provides the more scenic ocean drive through the town and allows for easy access to all parts of the community. For this reason, this roadway is highly traveled by tourist and resident alike.

Evidence of the commercial growth of this community may be seen in the recent developments along South Kihei Road. In the past, shopping facilities in Kihei were relatively isolated; however, the recent commercial expansion has seen the development of a number of small shopping centers along South Kihei Road.

Further evidence of the expansion of South Maui can be seen in the number of developments that are being constructed on the eastern (mauka) side of Piliāni Highway. Previously, the only developments were the Hale Piliāni and Maui Meadows residential subdivisions, and the Maui Research and Technology Park and Piliāni Business Park

commercial developments. The Eleair Golf Course is also situated on the eastern side of the highway. Presently, two luxury residential developments are being built on lands surrounding the golf course, and are the first luxury developments in South Maui that are outside of the Wailea and Makena resort neighborhoods. The Honouliuli project, formerly known as Wailea 670, is a proposed project on the eastern side of Piilani Highway just east of the existing Wailea resort.

The continued growth of the south Maui region as a large urban area as well as the continued growth of the Wailea and Makena areas into major resort destinations is anticipated to be a catalyst for further growth in residential, commercial, and various support facilities in the Kihei and Kihei town areas.

C. PROJECT DATA

Environments

The subject is located on the mauka (mountain) side of Piilani Highway in Kihei, Island and County of Maui. Piilani Highway runs in a general north-south direction, and provides an alternate route to South Kihei Road for those traveling to the resort neighborhoods of Wailea and Makena.

Along the subject's southern boundary is the Hale Piilani residential neighborhood. The northern eastern and southern boundaries are bordered by vacant agricultural lands. On the western side of Piilani Highway is the Kihei Villages condominium project. Further south along the western side of Piilani Highway are various single family subdivisions which include Kenolio Estates and Piilani Village Phase I. Just south of the Hale Piilani Subdivision is Ohukai Road which provides access to the only established light industrial subdivision in South Maui, the Piilani Business Park. Also in this neighborhood is the Kihei Commercial Center which consists of four (4) buildings containing retail, office and industrial spaces. Adjacent to this project is the Kihei Commercial Plaza which will contain similar uses.

In the past few years, there has been a strong residential demand for the Kihei area as evidenced by the rapid absorption of homes in single family as well as multi-family developments. Similarly, demand for commercial and industrial space in the neighborhood has also been strong.

The proposed Kihei Residential Project will expand the urban core of Kihei slightly north of its current limits. With the exception of the aforementioned Hale Piilani subdivision and Piilani Business Park, Maui Meadows in South Kihei and the Maui Research and Technology Park which is a low density, technology park in Central Kihei are the only other developments on the east side of Piilani Highway. Just west of the Maui Research and Technology Park is the Eleair Golf Course. Currently, sitework has commenced for the Hokuani Golf Villas and Nu'u Alina Estates projects which will abut the golf course. These projects will be unique since they will consist of high end, luxury units.

Description of the Proposed Project

The project consists of approximately 94 acres of land and is currently zoned Agricultural District by the State Land Use Commission and the County of Maui. The project, which is still in its preliminary planning stage, will be located mauka of the Piilani Highway and will possess views of the ocean, the West Maui Mountains and Haleakala. The project's Conceptual Master Plan envisions a mixture of single family and multi family units. In addition, neighborhood commercial uses are also planned. The land use breakdown is as follows.

Land Use	Approximate Land Areas
A-1 Apartment	52.8 Acres
A-2 Apartment	15.1 Acres
R-1 Residential	25.0 Acres
Commercial	1.40 Acres

Although development plans have not been finalized, the developer has indicated that the A-1 Apartment component is planned to consist of approximately 300 detached single family condominium units, while the A-2 Apartment component will include approximately 200 units within multi-family townhouse or stacked flat type buildings. The R-1 Residential component is planned to consist of approximately 100 detached single family residential dwellings.

PART III -- ANALYSIS AND CONCLUSION

For the purpose of estimating the market response to this project, a market study was conducted to determine how current supply and demand for residential homes might be affected by the development of the project. The extent of our survey encompassed new, ongoing and proposed developments on Maui to give the reader the best perspective of the overall market.

A. RESIDENTIAL MARKET ANALYSIS

RESIDENTIAL SUPPLY CHARACTERISTICS

The Kihai Residential Project is conveniently located in north Kihai and has relatively uniform travel times to each of the other major population centers on Maui. It follows that subject's primary market area is the South Maui region, while Central Maui and West Maui are expected to be secondary markets. South Maui has become a tourist destination with its expansive beaches and retail establishments targeted towards the visitor industry. The resort neighborhoods of Wailea and Makena are also located in South Maui. Central Maui is home to the County and State government offices and is the industrial center of the island with convenient access to the major transportation facilities. West Maui is also a major tourist destination and is home to the famous Front Street retail corridor which allows for pedestrian access to numerous retail establishments within Old Lahaina Town. Further north of Lahaina are the Kaanapali and Kapalua master planned resorts.

Due to robust economic conditions and a strong real estate market, there are numerous housing projects under construction or in various entitlement phases.

The Land Use Forecast Report prepared by PlanPacific for the Maui County General Plan 2030 indicated that there will be a surplus of 6,298 resident housing units in the South Maui region by 2030. This analysis includes potential units as indicated by the County's Long Range Planning Division. Many of the units in this inventory have been built already or have been sold under binding contracts. Therefore, it may not reflect an accurate count of the actual potential housing units in the South Maui region. This same report also indicates that there may be a deficit of 5,459 resident units in the Central Maui Region by 2030. Since the Central Maui and South Maui regions are adjacent to each other, their boundaries may be considered somewhat flexible, South Maui developments may be able to relieve some of the strains on the demand for Central Maui housing units. However, for the purposes of this report, the primary supply and demand factors for

the proposed project are considered to be from the South Maui region.

Available Residential Supply In New Maui Projects

Research was conducted in order to determine the number of housing units in new developments that are currently available in the market. According to this survey, there are 2,095 housing units which are currently for sale on the Maui market within recent, on-going projects and those developments which will be constructed within the next one to two years. It is noted that two large projects, Hale Mua and Spencer Home's The Waikapu Gardens subdivision will consist of approximately 11 percent of this total. Based solely on historical annual absorption rates of other new projects (469 units per year), the short-term market supply would be expected to last approximately 4.5 years. Of course, a multitude of other factors can influence the capture rate. For instance, the larger percentage of affordable units in the future supply points to a faster-than-normal absorption. Also, the number of buyers from the U.S. mainland and from foreign countries can fluctuate from year to year, and their presence in the market is not as predictable as the demand from local residents.

Shown in the table on the following page is the list of projects representing the short-term housing supply for the island of Maui. Many of these projects are currently under construction but have not actually closed on their units. Those that have not begun construction are undergoing their financing processes and are expected to commence construction within the next year. Included in this list are both single-family and condominium units from the island's four major population centers: Central Maui (Waikuku-Kahului); South Maui (Kihei-Wailea); Upcountry (Pukalani-Makawao-Kula) and West Maui (Lahaina to Kapalua). Of the projects named in the following table, Koa at Kehalani, Sand Hills, Maluhia at Wailea, Lanikeha and Mahanaluia Nui Phase IV have already begun closing sales of their units.

The number of units indicated in the table below reflects the number of remaining units that are not under contract and are available for sale.

In South Maui, the subject's primary market, most of the available inventory is within developments with high end luxury units or units targeted to second home buyers. This leaves only two developments, which are intended for Maui's working class residents seeking entry level homes, Kamalii Alayna and Liloa Village. However, the Kamalii

Alayna subdivision is currently the only single family subdivision being built while Liloa Village is still going through its entitlements process.

Table 1 - Remaining Inventory in Ongoing Projects on Maui

Name	Location	# Units remaining	Type of Units	Market Segment
CENTRAL MAUI				
Koa at Kehalani	Kehalani Proj Dir	24	SF Lots/Homes	High End Resident
China at Kehalani Phase II	Kehalani Proj Dir	1	SF Homes	Resident Market
Sand Hills @ Maui Lani	Maui Lani Proj Dir	11	SF Lots	Resident Market
Fairways at Maui Lani	Maui Lani Proj Dir	30	SF Lots	Resident Market
Laysan Phase II	Maui Lani Proj Dir	71	SF Homes	Resident Market
Waikapu Affordable Homes	Waikapu	230	SF Homes	Affordable Housing
Cottage at Kehalani	Kehalani Proj Dir	114	SF Homes	Resident Market
Aloha	Kehalani Proj Dir	97	SF Homes	Resident Market
Waikuku	Waikapu	105	SF Lots	Resident Market
Maui O Waikuku	Waikuku	1	Ag Lots	High End Resident
Waialani Pikohe	Waikapu	11	SF Lots/Homes	Resident Market
Aloha O Kona	Kahului	103	MF	Affordable Housing
Hei Hei Maui	Waikuku	466	SF Lots/Homes	Affordable Housing to High End Resident
SOUTH MAUI				
Maikolo at Wailea	Wailea	2	Detached Condos	Luxury/Second Home
Milohana Waianae	South Kihei	31	SF Lots	High End Resident
Kaunani Wailea	Wailea	2	Detached Condos	Luxury/Second Home
Moana Estates	South Kihei	34	SF Homes	High End Resident
Ke Aie Ocean Villas	South Kihei	101	MF Condos	High End Resident/Lux/Sec Home
Liloa Village	South Kihei	65	SF Homes	SF Homes
Holiday	Central Kihei	112	Detached Condos	Luxury Condominiums
Popoia	Wailea	16	MF Condos	Luxury Condominiums
Kamalii Alayna	Wailea	10	Detached Condos	Luxury Condominiums
Maikolo	North Kihei	36	SF Homes	SF Homes
Maikolo	Waikuku	69	MF Condos	Luxury Condominiums
Maikolo	Central Kihei	66	MF/SF Condos	Luxury Condominiums
UPCOUNTRY/EAST MAUI				
Koolau	Pukalani	49	SF Lots	Resident Market
Kaunani	Kula	11	SF Lots	Resident Market
E Hoopua Ka Paha'a	Steinbockville	16	SF Lots	High End Resident
WEST MAUI				
Lanikeha	Kaanapali	60	SF Lots	Residential House Lot
Kaanapali Golfside Estates	Kaanapali	19	Ag Lots	Agriculture Lots
Kaanapali 10-H	Kaanapali	18	SF Lots	Residential House Lot
Mahana Nui Phase IV	Leanukapala	4	Ag Lots	Agriculture Lots
Kohokiki Grove Condominiums	Hanalei	90	MF Condos	MF Condos
Total units				2,095

Maui's Potential Residential Projects

It is also important to discuss the developments on Maui that could be brought to the market over the next 5 to 20 years. As mentioned earlier, many external factors, such as economic or social factors, could affect the supply and demand for real estate in the future. These factors cannot be controlled by developers who must constantly assess market conditions for their prospective construction and sales periods. Many of these projects are still in the planning phases and must still complete governmental requirements before bringing their products to the market. Combine these factors with "informal" events that could affect a developer, and predicting which developments will actually make it to market becomes more difficult. This list also includes long term projects that are under way such as the Kehalani and Maui Lani Project Districts.

Table 2 - Long Term Residential Projects

Name	Location	Project Size (Acres)	Total # of Units	# Units remaining	Entitlement Status	Types of Developments within Project
CENTRAL MAUI						
Maui Lani	Kahului	1,012	3,000	2,200	Project District	Golf Course & Non-Golf Course units
Kehalani	Wailea	550	2,400	1,100	Project District	Various Residential Products
Maalaea Maui	Maalaea	257	1,150	1,150	None	Various Residential Products
SOUTH MAUI						
Wailea 670 (Honouliuli)	Wailea	670	1,400	1,400	MPC Approval	Various Residential Products
UPCOUNTRY/EAST MAUI						
None						
WEST MAUI						
Kaanapali 2020	Kaanapali	4,040	1,870	1,870	None	Various Residential Products
Puuhihi Maui	Kaanapali	260	940	940	None	Various Residential Products
Wailea	Lelekaia	240	750	750	None	Various Residential Products
Kapalua Maui	Kapalua	925	690	690	None	Various Residential Products
Pulehahaione	Honokahua	300	690	690	MPC Approval	Various Residential Products
Total units			12,890	10,790		

Projects With Entitlements

Maui Lani consists of approximately 1,012 acres of land in the Central Maui plains that has approximately 800 units completed. Completed phases include the Greens, Grand Fairways North, Grand Fairways, The Island and The Bluffs. Presently, there is one project under construction, the Legends, Phase II. An upcoming project called Village/Mixed Use will consist of a mixed use product that will allow both residential and small scale commercial uses. This phase will consist of approximately 650 units. In addition to the phases already completed and the upcoming Village/Mixed Use phase, approximately 2,200 units remain to be developed within Maui Lani.

Kehalani is situated at the base of the West Maui mountain range in Waialuku and consists of approximately 550 acres of developable land area. Currently, there are numerous ongoing residential developments such as Koa at Kehalani, The Cottages at Kehalani and Akolea. There are approximately 1,100 units remaining within this project district.

Kapalua Maui has announced plans to expand into the pineapple fields on the slopes above the existing West Maui destination. Their plan calls for development of about 690 units on more than 9.25 acres. Kapalua Maui would be built around the Village Course, one of three championship courses there. It would also be expanded from 18 holes to 27 holes and given another clubhouse. Although the resort is zoned for an additional hotel, there are no plans to add one at this point in time. As part of the project, Kapalua will develop a 35-acre park, and pineapple cultivation north of Napili is expected to end. Conversations with the developer, Maui Land and Pineapple Co. has indicated that there is a Phase I Project District Approval for some of its residential units as well as the clubhouse renovation. Construction is expected to begin at the end of 2008 but is dependent upon market conditions at that time.

Projects Without Entitlements

Nevertheless, below are projects that are in their preliminary stages of development, but are considered to be potential sources of additional supply to Maui's housing market.

Pulehahaione will also be developed by Maui Land and Pineapple Company and will be situated between Honouliuli Highway and the Kapalua Airport on approximately 300 acres of land. This community will consist of single family and multi-family residential units, churches, schools, and other civic services. There will be a total of 690 residential units with approximately 50 percent being marked as affordable units targeted to buyers earning between 80 and 140 percent of the county's median income level. Preliminary designs of the community show that it will be "complete" and have a small town feel to it. Narrow roadways are expected to keep the development pedestrian oriented and naturally reduce traffic speeds within the neighborhood. The County's Land Use Committee is in the process of reviewing the Change in Zoning, Project District Phase I application and, Community Plan Amendment for its recommendation to the full Council for vote.

Waiala 670 (Honouliuli) This project first surfaced in the late-1980s and, in 2001 it received a Maui Planning Commission recommendation for approval of the developer's request to rezone the land from an agricultural district to residential and commercial districts. The land use measure, however, has yet to be heard by the Maui County

Council. Initially, the developers planned to build approximately 2,600 units of housing and resort lodging, along with two golf courses. Today, renamed Honua'ula, the new scaled-down version features 1,400 single-family homes and multi-family units, which amounts to only 2.1 units per acre. There will be only one golf course and approximately 80,000 square feet of commercial space. The developers of Honua'ula say they will address their own infrastructure needs with the construction of a water well on site, a sewage system, roads, pedestrian paths and bikeways. These new changes were announced in March 2005, which arose in part from changes in market conditions and public comments on the project made more than a decade ago.

Kaanapali 2020, on about 4,300 acres in Kaanapali, is currently in the planning stage. In 2002, the planning had already taken three years and the permit process is expected to take another four years. The project is still in its preliminary stages and must be approved by the State Land Use Commission for a District Boundary Amendment. The development will include a mix of products needed by both the community and Amfac. It was reported that the developer is dedicating approximately 60 to 70 percent to open space. This project will also include cluster housing, single-family residential, multi-family residential, commercial, schools, churches, medical facilities, a cultural center, golf course and transportation center. Preliminary plans call for a total of 2,810 housing units to be built out over the next 20 to 30 years. Pu'ukohli Village is a former plantation camp and is also part of the Kaanapali 2020 plan and is expected to be the first section of the plan that will be developed. It contains 260 acres of what was formerly a plantation camp and 940 of the 2,810 housing units in Kaanapali 2020 is proposed for Pu'ukohli Village. The developer, Kaanapali Development Corp. is in the process of revising the original Pu'ukohli approvals to allow for development before the construction of the by pass road. A revision to the affordable housing requirements is also in the works.

Waialea will be located on the mauka side of Honoapiilani Highway. Situated along the eastern boundary of the Lahaina Aquatic Center and Recreation Center, this development will consist of approximately 240 acres of land once a plantation camp. The developer, Kaanapali Development Corporation, is currently undergoing the planning and entitlement process for this project but has yet to submit for approvals by the Maui Planning Commission. The development will contain approximately 1,100 housing units with approximately half being set aside as affordable housing for the residents of West Maui.

Maalaea Mauka is still in the planning and approval phase and may potentially bring a total of 1,150 housing units to the Maalaea neighborhood of Central Maui. Located on the mauka, or mountain,

side of Honoapiilani Highway, the development is expected to consist of a variety of different products including affordable, market priced and luxury units. Although, the property already is designated as a project district in the Central Maui Community Plan, a district boundary amendment and change in zoning at the County level is still needed before development can begin.

South Maui's Residential Active Listings

Besides the properties available in the projects, the number of resale listings on Maui is a good indication of real estate market conditions. This market evidence is generally viewed as a "counter-cyclical" indicator, which means that it is typically lower in strong markets and higher in weak ones.

The Consultant researched listings of residential, houselots, condominium and single-family homes in the South Maui district (excluding Wailea and Makena) and found that there are currently active listings (See Exhibit B at the end of this report). The investigation of the Maui Multiple Listing Service revealed the following:

Single-Family

There were a total of 213 resale listings of residential properties in the Multiple Listing Service. This total was broken down as follows:

Range of Prices	No. of Listings	Average DOM Not Applicable
Below \$400,000	0	
\$400,000 to \$650,000	44	64
\$651,000 to \$900,000	74	95
\$901,000 to \$1,500,000	63	105
Over \$1,500,000	31	125

Clearly, the residential resale market supply of single-family homes is very low in the affordable bracket of "below \$400,000" where there were no listings.

According to the Affordable Sales Guidelines published by the Housing & Community Development Corporation of Hawaii the highest sales price of an affordable home in Maui is approximately \$469,300, which is based on 160 percent of the 2006 median income as determined by HUD. According to this survey, there are only two (2) single family properties that are listed for sale at or below this price level.

From \$400,000 to \$650,000, there are a total of forty four (44) listings with the lowest priced being \$425,000 for two (2) one-bedroom/one-bath dwellings at 155 Auhana Road. These units were

once part of a larger property containing 10 dwellings which appear to be in the process of being condominiumized. They have been on the market for 70 and 77 days respectively.

This price range is seen as the market segment which would be affordable to Maui's working class households. Over the past few years, the luxury and second home markets have been well represented by new projects while increasing real estate prices have left the working class unable to afford to purchase homes. It is noted that the median price for a single family property in Maui has ranged from approximately \$400,000 to \$780,000 in the past two years. Therefore, it is surprising that this segment has the most number of active listings on the market. The average DOM in this category was 64 days. Of the listings within this range 14 of the 44 have had their prices reduced from 1.03 percent to 14.16 percent with an average reduction of 5.99 percent. Neighborhoods with prices in this range include the Kamoi'i Alayna Subdivision, Pilliant Village subdivisions, Meadowlands, and Hale Pilliant neighborhoods. List prices for properties within the Hale Pilliant neighborhood, which is adjacent to the subject, range from \$625,000 to \$779,000. The properties were built between 1985 and 1988 and include three to seven bedroom homes with three having an additional dwelling. The living areas range from 1,075 to 2,236 square feet with an average of 1,685 square feet.

From \$651,000 to \$900,000, there are a total of seventy four (74) listings with an average "Days on Market" of 95 days. Although it is a higher price range, many of the properties in this segment are priced around the median price range for residential properties on Maui. Thus it is expected to be the most active segment of the market. At the \$900,000 level, the prices border the "high-end" or "luxury" segment of the real estate market. Of this group 29 listings have had their prices reduced while another two listings have had their prices increased. The reductions ranged from 1.24 percent to 15.41 percent. The two price increases were 0.72 percent and 4.03 percent.

The survey of active residential properties found a total of sixty three (63) properties listed between \$900,000 and \$1,500,000. In recent years it was unheard of to find a non-oceanfront property in Kihei selling for more than \$900,000. Properties priced in this range were typically found in the Maui Meadows, Wailea and Makena neighborhoods. However, properties in South Kihei and even North Kihei have been increasing steadily and include developments such as Honu Alahele and Aili Village in North Kihei and Kiloahana Ridge, Moana Estates and Ke Alii Kai in South Kihei. Although there are other projects, these represent the most recent successful developments to offer and sell out their product. The average Days on Market for

these listings was 105 days. Of these listings, 14 have had their prices reduced from 2.35 to 15.06 percent. Two listings have seen price increases of 4.55 and 7.51 percent. The average price change was a negative 6.72 percent.

Above \$1,500,000, there are a total of thirty one (31) listings with the highest being \$6,488,000 for a five bedroom/five bath property on Ululu Road with 3,150 square feet of living area. The average Days on Market is 125. As the price range increases, the higher Days on Market can be attributed to a more limited market.

The active residential listings included nineteen residential condominiums ranging in price from \$425,000 to \$5,825,000.

Residential Listings - Property Type/Avg. Living Area/Median Price

To better illustrate the type of residential properties currently being offered in the market, the Consultant analyzed the breakdown of the property types based on bedroom count. An analysis was also done to illustrate the difference in average dwelling living area when compared to other residential property types (based on bedroom count).

As mentioned earlier there were 212 active listings of residential properties in South Maui (excluding Wailea and Makena). Of this total, the highest number of listings is of three-bedroom homes, of which there are 112 listings, or 53 percent of the total. Three bedroom properties have an average living area of 1,527 square feet with a median price of \$787,500. Surprisingly, two-bedroom properties, which make up only 7.5 percent of the total with only 16 listings, have a higher median price at \$797,000 despite having a significantly lower average living area at 1,135 square feet. Two of the two-bedroom listings were properties within the proposed Hokulani Golf Villas luxury condominium project and two were situated along Halama Street but included second dwellings on their respective properties. The majority of units within new luxury condominium projects in the resort neighborhoods of Wailea and Makena have been sold to buyers that do not reside on Maui. These units are seen as vacation rental or second homes for non-resident owners. The Hokulani project is expected to be similar in nature despite its location in Central Kihei. The Halama Street neighborhood is located along the oceanfront and its locational factors make it ideal for the vacation rental or second home market.

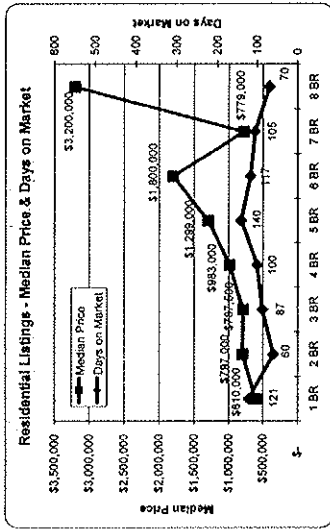
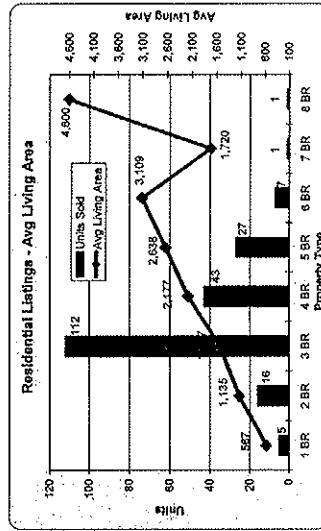
The average marketing times range from 60 to 140 days with the lowest being the two-bedroom properties. Marketing times increase steadily from the two-bedroom properties to the five-bedroom properties. However, the average days on market drop for six,

seven-, and eight-bedroom properties. This may be due to the limited sample size for these types of properties.

In addition to having the highest number of listings on the market, three-bedroom properties also have the most sales. Although it may appear that there is an over supply of three-bedroom properties, they are expected to be the most active property type. This is further evidenced by having the second lowest marketing times of all the residential property types. The high number of listings may be contributing to the fact that the median list price for three-bedroom properties is lower than that of two-bedroom properties.

Table 3 - Residential Listings Analysis

Property Type	Number of Listings	Percent of Total	Average Living Area	Median List Price	Average DOM
1 BR	5	2.4%	567	\$ 610,000	121
2 BR	16	7.5%	1,135	\$ 797,000	60
3 BR	112	52.8%	1,527	\$ 787,500	87
4 BR	43	20.3%	2,177	\$ 983,000	100
5 BR	27	12.7%	2,638	\$ 1,299,000	140
6 BR	7	3.3%	3,109	\$ 1,800,000	117
7 BR	1	0.5%	1,720	\$ 779,000	105
8 BR	1	0.5%	4,600	\$ 3,200,000	70
Total	212	100.0%			



Vacant House Lots

The number of vacant house lots on the market at this time is 26 listings in South Maui (excluding Wailea and Makena); however, their market prices are prohibitive to developing an affordable product. For instance, the lowest priced house lot is \$395,000, for a 9,540 square foot property on Waikalani Hema Place in the Alili Village subdivision. Based on a construction cost of about \$250 per square foot and a minimal house size of approximately 1,200 square feet the cost to build would be approximately \$300,000. After adding the acquisition price of the lot the total cost to build would be approximately \$695,000 which is significantly above the \$469,300 price indicated by HUD. This benchmark price is based on 160 percent of the median household income as defined by HUD which is the upper limit of the affordable housing guidelines.

The highest priced listing is a 1.400 acre parcel in South Kihai. This property is in the process of gaining SMA approval for a 48 lot subdivision. It is listed for \$7,600,000 and has been on the market for 11 days. The same property was sold in September 2006 for \$6,000,000

Of the 26 listings, 10 have had price changes with reductions ranging from 1.04 percent to 20.00 percent. The average price reduction was a negative 8.38 percent. The slow down in the high end market can be seen as the price reductions on average, are the highest in this category.

Condominiums

This category typically dominates the number of sales in Maui and fee simple condominium listings in South Maui total 441, approximately 65 percent of the total listings for South Maui. These listings of condominium units in South Maui, range from \$229,000 for a fee simple studio unit at Kihei Bay Surf, to \$4,900,000 for a three bedroom, three and-a-half bath unit at Hale Pau Hana off of South Kihei Road.

Condominiums have been in great demand as an alternative to single-family living, as home prices have been on the rise during the past few years. In addition, many condominium projects in South Maui are being purchased as vacation rentals and second homes for off island buyers. This is especially true in the Wailea and Makena resorts where 50 to 60 percent of the buyers of new condominium units were not Maui residents. Although the listings in these neighborhoods are not included in this analysis, numerous condominium developments in Kihei cater to vacation rental or second home ownership. These include, Kamaole Sands, Maui Banyan, Maui Kamaole, Maui Vista, and Kauhale Makai.

Condominium Listings – Property Type/Avg. Living Area/Median Price

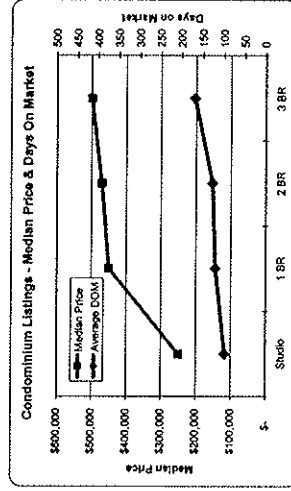
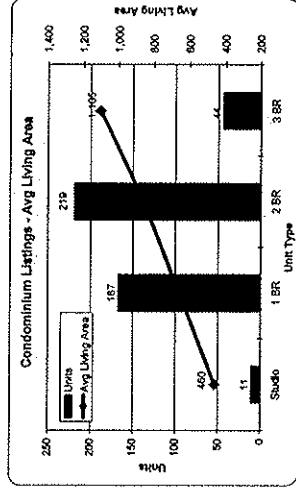
To better illustrate the type of condominium units currently being offered in the market, the Consultant analyzed the breakdown of the unit types based on bedroom count. An analysis was also done to illustrate the difference in average unit living area when compared to other unit types (based on bedroom count).

As mentioned earlier, there were 441 active listings of condominium units in South Maui (excluding Wailea and Makena). Of this total, the highest number of listings is of two-bedroom units, of which there are 219 listings, or 50 percent of the total. Two-bedroom units have an average living area of 858 square feet with a median price of \$470,000. The largest jump in price is seen between the studio and one-bedroom units where the median price jumps from \$249,000 to \$450,000, an increase of approximately 80 percent. The price increases from one-bedroom to two-bedroom units and from two-bedroom to three-bedroom units is approximately 4 and 6 percent, respectively.

The number of studio listings as well the low median price seems to indicate that the demand for such units is significantly less than units with at least one bedroom.

Table 4 - Condominium Listings Analysis

Unit Type	Number of Listings	Percent of Total	Average Living Area	Median List Price	Average DOM
Studio	11	2.5%	460 \$	249,000	98
1 BR	167	37.9%	688 \$	450,000	120
2 BR	219	49.7%	858 \$	470,000	127
3 BR	44	10.0%	1,105 \$	499,000	169
Total	441	100.0%			



New Construction

According to the Maui County Data Book 2005, new single-family construction has fallen from its high in 1988 and appears to be trending upward in the 2000s.

Table 5 - New Construction Island of Maui

Year	Number of New Single-Family Units	Five-Year Average
1980	803	
1981	398	
1982	530	
1983	547	
1984	638	
Subtotal	2,916	583
1985	984	
1986	911	
1987	1,119	
1988	1,453	
1989	1,136	
Subtotal	5,603	1,121
1990	1,068	
1991	694	
1992	810	
1993	660	
1994	673	
Subtotal	3,905	781
1995	473	
1996	601	
1997	532	
1998	574	
1999	647	
Subtotal	2,827	565
2000	904	
2001	778	
2002	787	
2003	877	
2004	1,104	
Subtotal	4,450	890

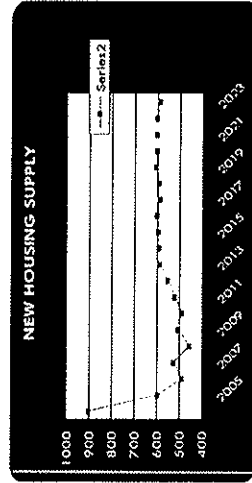
Source: Maui County Data Book 2002, 2003, 2004 & 2005

New single-family construction averaged 583 units during the five years between 1980 and 1984. During the next five years, 1985 to 1989, single-family housing starts increased significantly to an average of 1,121 per year. During 1990, house construction was also good at 1,068 units, but declined significantly following the Persian Gulf War and the economic slowdowns on the U.S. mainland and in Japan. Consequently, between 1990 and 1994, there was an average of 781 new single-family units built per year. From 1995 to 1999, construction of these units declined even more, with an average of only 565 units per year. In 2000, the number increased significantly to 904 units and then declined in 2001 to 778 units. The number of units remained nearly identical in 2002 with 787 units. In 2003 this number increased again to 877 units. Single family building permits in 2004 reached a total of 1,104 which is its highest levels since the late 1980's. The average for the past 5 years is 890 units per year. (Refer to Table 5 on the preceding page).

Without an adequate supply of new construction projects, the shortage of housing typically causes prices in general to move up. As a result, those at the bottom end of the income scale usually find it most difficult to purchase real estate. Historically, supply has lagged demand and is a significant limiting factor in the affordability of real estate in the Maui market.

Hawaii Housing Policy Study

In comparison, to the supply survey conducted by the Consultant, the Hawaii Housing Policy Study 2003 indicated that approximately 2,573 housing units will be built over the next five years, from 2006 to 2010, an average of 514.6 units per year. This was calculated from the projected total housing units as indicated by the Hawaii Housing Inventory Report. It is also similar to the average number of units absorbed by the market over the past 10 years. This count will be explained later in this report. This inventory report is based on the standing inventory of housing units in 2002 and forward projections of housing units. Over the next 19 years to 2024, the total resident housing supply will total 10,692 units.



RESIDENTIAL DEMAND CHARACTERISTICS

Demand is analyzed from two perspectives: The first is "demographic" demand, the number of units needed for a given market or employment base. Second is "effective" demand, the financial demand equation which involves looking at the number of buyers who would be qualified and interested in purchasing residential real estate.

Population

Overall, population growth for the County of Maui during 1980 to 1990 was 41.67 percent. With this growth in population came a surge in real estate prices in the late-1980s. This increase, driven primarily by foreign and domestic investment and speculation, put the price of homes in Maui County well above the reach of many local residents.

The downturn in the economy between 1991 and 1997 led to the development of lower-priced housing as large land parcels became more affordable to developers. Zero-lot-line zoning was adopted by the County of Maui and the Meadowlands project in Kihel was among the first to be built. Three smaller zero-lot-line subdivisions were developed in West Maui between 1996 and 1998 and were highly successful.

Meanwhile, the population of Maui County continued to grow during the 1990s. Between the 1990 and 2000 censuses the population increased by 28.5 percent, making Maui the fastest growing county in the State of Hawaii. According to Claritas Market Comparison Report (See Exhibit A at the end of this report), leading the growth on Maui was the South Maui region of Kihel which reflected growth of 51.3 percent increase over the 10-year period. The Central Maui region of Kahului and Wailuku registered growth of 26.0 percent; while the West Maui region indicated a growth factor of 23.3 percent over the same 10-year period. The growth trend has continued since the end of 2000. The 2006 population estimates have indicated growth rates for South and West Maui in the 13 percent range while growth in Central Maui has increased by approximately 11 percent over the respective population indicated in the 2000 census.

The growth in the number of households in these regions paralleled the population pattern. Household numbers grew in the south, west and central regions at the respective rates of 53.5, 23.9 and 26.4 percent.

According to the Population and Economic Projections for the State of Hawaii to 2030, the projected population of Maui County is expected to be 199,550 by the year 2030. This represents a 54.7 percent increase over the 2000 census numbers.

Employment and Household Income

The unemployment rate in Maui has been on a decline since 1992 when unemployment was at 8.0 percent. In 1998 the unemployment rate was 6.2 percent while most recently in 2004 this rate was at 3.1 percent. (Maui County Data Book 2005, Page 173).

Household income figures have also been increasing. The estimated median household income in Maui in 2006 is \$56,370 (Source: Claritas) annually, a rise of approximately 14 percent over the 1999 median household income of \$49,489 (Source: US Census 2000) and a 45 percent increase over the 1989 figure of \$38,771 (Source: US Census 1990). During the seven year period from 2000 to 2006, this represented an average increase of approximately 2 percent per year.

In comparison, and further described below, re-sales in the Pihani Village Subdivision, Phase II have indicated prices appreciating at a rate of approximately 30 to 150 percent per year during a similar time frame. With home prices increasing at a faster rate than household incomes, many potential buyers are priced out of the market.

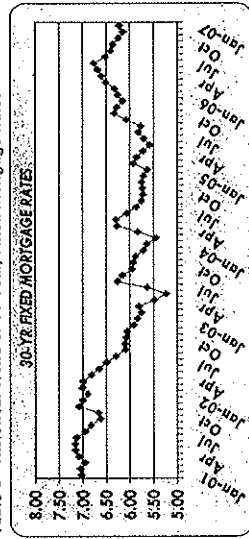
Mortgage Interest Rates

Mortgage rates have been steadily decreasing for the past six years and momentarily dipped to around 5.00 percent in 2003. As of January 18, 2007, the average interest rate on 30-year, fixed-rate mortgages was at 6.23 percent according to Freddie Mac.

The recent bounce in mortgage rates was spurred by rising yields in the long term Treasury bond market. In addition, short term interest rates have been rising due to concerns of inflation by the Federal Reserve Board. A constraint on oil production in the Middle East has led to a rise in fuel prices as well as prices for consumer goods. This has a considerable effect on Hawaii due to the increased cost of shipping.

Housing markets throughout the nation have risen in the past five years but have recently showed signs of stabilization due to the rising interest rate environment. The current mortgage rates are still at historically low levels which are still very conducive to home buying (See Table 6 on following page).

Table 6 - Historical Trend of 30 Year, Fixed Mortgage Rates



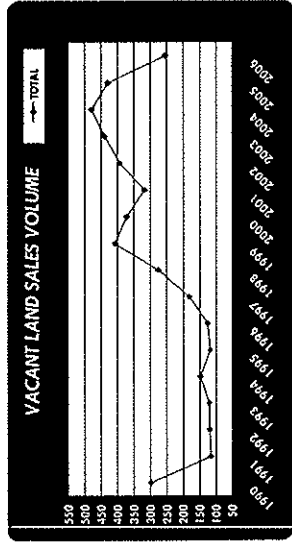
Source: Freddie Mac-Primary Mortgage Survey

**General Residential Sales Activity
Island of Maui**

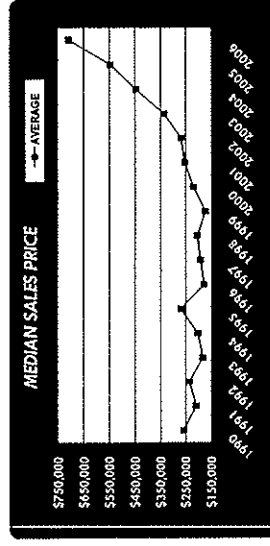
The number of units sold is the most basic indicator of market activity and is useful in helping estimate the number of new units which a specific market segment may be capable of absorbing. Zero-lot-line housing projects were popularized during this period as developers strived to make housing affordable to Maui residents. Since 1998, however, real estate began a strong recovery. As evidenced in the following section, prices and number of sales increased while marketing times decreased. The tables on the following pages illustrate the general market trends over the past 17 years on Maui as well as the year-to-date 2006 sales activity.

Vacant Land

Sales of vacant land fell sharply after 1990 (298) to a level wavering around 100 to 150 sales for the next 6 years. Weakest sales, in terms of units sold, occurred in 1991 when only 116 properties were sold. In 1998, the number of land sales increased to 276 and in 1999, increased again to 408, reflecting a gain of 48 percent. Sales have fallen slightly since 1999 with 372 sales in the year 2000 and 318 sales in 2001; however, these figures rebounded in 2002, 2003 and 2004 to 393, 439 and 479, respectively. Vacant land sales for 2005 showed a slight decrease at 429 transactions but dropped significantly in 2006 to a total of 253 sales.

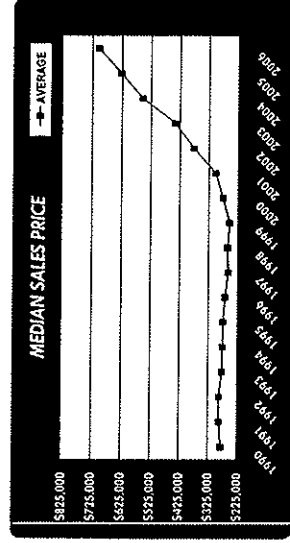


Meanwhile, median prices slowly regained ground from a low of \$173,458 in 1999 to \$269,691 in 2002, and then sharply increased to \$336,690 in 2003, \$446,563 in 2004, and \$546,081 in 2005. In 2006 the median price jumped approximately 30 percent to \$709,000.

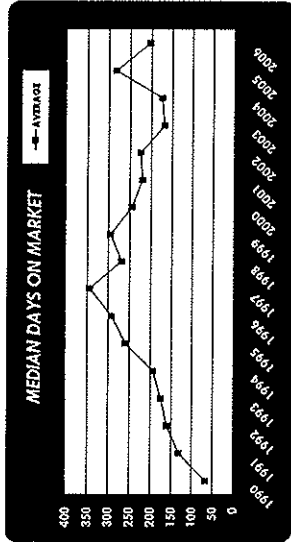
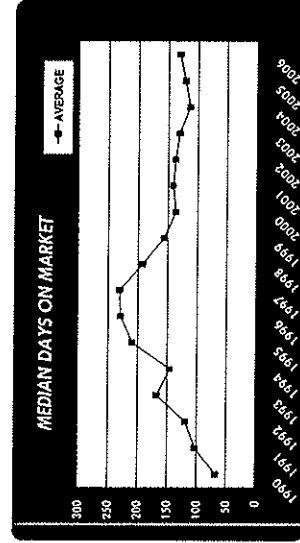


Median monthly days-on-market figures increased steadily from 67 in 1990 to 352 in 1997, but had fallen to 225 in 2002, to 168 days in 2003, increasing slightly to 174 days in 2004. This average escalated in 2005 to 283 days but dropped to 204 days in 2006.

Median prices in 2001 showed a 9.5 percent increase from \$275,620 in the year 2000, and reached a high for the past decade with a median of \$302,022. In 2002, the median price increased even more to a level of \$377,361, an enormous increase of 25 percent over 2001. Median prices for 2003 indicated an increase of about 17 percent to \$441,921; then another large 25 percent increase to \$552,833 in 2004. This trend continued in 2005, with a median sales price of \$627,123, translating into a 13 percent increase. For 2006, prices continued their climb with an increase of 12 percent over the 2005 median. The median price now stands at \$703,000.

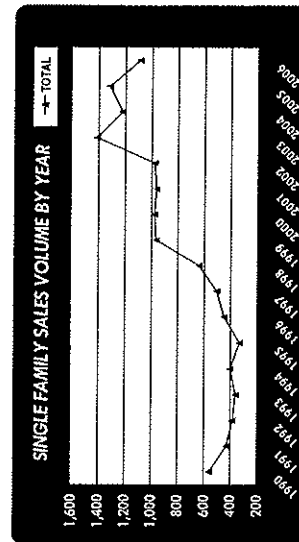


Average monthly days-on-market figures increased steadily from 67 in 1990 to 231 in 1997, but steadily fell to 137 in 2000. It has remained relatively level since that time, except in 2004 when that figure fell to 114 days, before rebounding to 121 days in 2005. The increase continued in 2006, rebounding to 131 days.



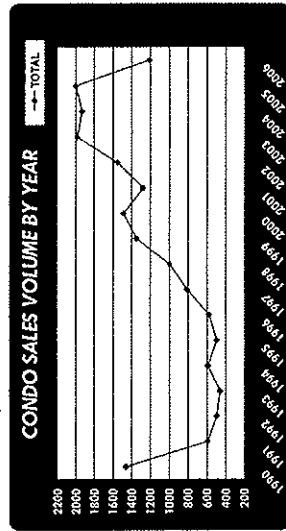
Single-Family

Sales of single-family properties exhibited a decrease after 1990 (560) to a level wavering around 350 to 450 sales for the next 6 years. Weakest sales, in terms of units sold, occurred in 1995 when only 331 properties were sold. In 1997, the number of single-family sales increased to 507 and in 1998, exceeded 1990 results with a figure of 641. The number of sales in 1999 (965 units) was 51 percent more than the number of sales in 1998 (641). Sales were slightly higher in 2000 at 981 units sold, but leveled off in 2001 at 964 units and 978 units in 2002. Sales sharply increased in 2003 to 1,411 transactions, and then decreased slightly in 2004 to 1,221, before climbing to 1,317 transactions in 2005. In 2006, the total sales dropped to 1,088 for the year. Since 2003, it appears that the general residential market has been in decline in terms of sales volume.

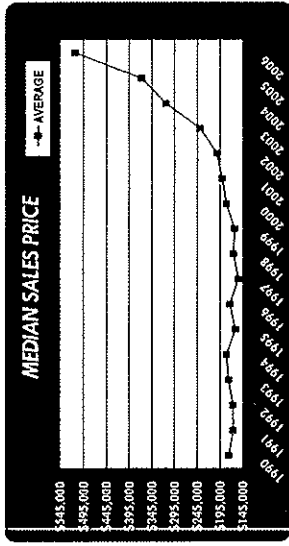


Condominiums

Sales of condominium units fell sharply after 1990 (1,459) to a level wavering between 400 to 600 sales for the next 6 years. Weakest sales, in terms of units sold, occurred in 1993 when only 461 properties were sold. In 1997, however, the number of sales increased to 812 and up to a record number of 1,986 units in 2003. 2004 showed a drop in sales, to 1,933 units. This was followed by another high volume year in 2005, with 2,000 units sold. However, sales volume dropped approximately 40 percent to 1,210 units in 2006



Median prices remained in a range from \$154,296 to \$180,892 between 1990 and 2000. However, since then, the average monthly median price increased 5 percent to \$190,321 in 2001, 6 percent to \$201,623 in 2002, and 19 percent in 2003 to \$239,217. 2004 indicated a sharp increase of 31 percent, with an average median price of \$314,052, followed by a 17 percent gain in 2005, to \$367,656. Despite a drop in sales volume in 2006, the median price increased to \$512,000, an approximate 40 percent increase over 2005.



Average monthly days-on-market figures increased steadily from 77 days in 1990 to 230 days in 1996, but had decreased considerably to 134 days by the end of 2002. This figure fell to 118 days in 2003, then to 92 days in 2004, before rebounding to 109 days in 2005. It has risen further in 2006 to 139 days.

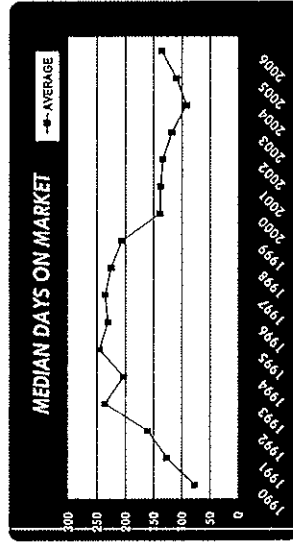


Table 8 - Units Absorbed Per Year (West Maui)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
KAHANA RIDGE	228	32	195	19	1						228
KAHANA MAHARAHINA	19										19
KAHANA MAHARAHINA (I to III)	104	33	10	19	41						104
VINTAGE	73										73
KE AHI SUB'D III	12										12
PINEAPPLE HILL II	30										30
MAKUA I	19										19
OCOWAII MAKUA	5										5
OCOWAII MAKUA	14										14
COCOA HILL GROVE AT KAPALUA	36										36
PUNOA SUBDIVISION	14										14
KAHANA NUI SUB'D (I & II)	17										17
PINEAPPLE	33										33
SUMMIT	18										18
Phase I (Pulled off Market)	17										17
Phase III	19										19
MAKUA VILLAS PH I	100										100
MAKUA VILLAS PH II	44										44
KE AHI SUB'D I	15										15
KAPUA VILLAGE	45										45
KAPUA VILLAS PH III	40										40
MAKUA II	24										24
HONOLUA RIDGE	25										25
VILLAS AT KAHANA RIDGE	117										117
MAHANA NUI IV	36										36
LAKESHA	139										139

Table 9 - Units Absorbed Per Year (South Maui)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
WAIPIA PULANI	92	2	10	19	29	5	1				92
WAIPIA FAIRWAY ESTATES	50	2	2	2	2						50
MEADOWLANDS	32										32
MAKUA PLACE	10										10
KAMAOLE HIGHS	40										40
MEADOWLANDS II	88										88
WAIPIA FAIRWAY VILLAS	118										118
BIKINI VILL II	114										114
MAKUA AT WAIPIA	14										14
KE AHI KAI	96										96
KONOIO (KONOIO) ESTATES	51										51
MA HALE O MAKUA	40										40
KEAHOU AT MAKUA	7										7
BIKINI VILL III	117										117
KOHAU AIAHELE	64										64
KILOHANA RIDGE	73										73
KILOHANA HEMA	29										29
VILLAS AT KONOIO	140										140
ONE PALUVA	17										17
MAI VILLAGE	27										27
KONOIO MAUKA	12										12
HALE KAHANI	72										72
WAIPIA BEACH VILLAS	98										98

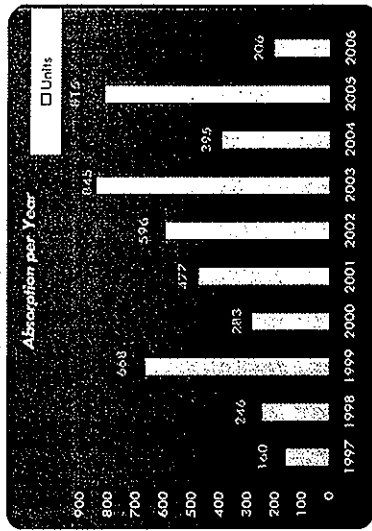
Table 9 - Units Absorbed Per Year (South Maui)

Table 10 - Units Absorbed Per Year (Upcountry/East Maui)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
WAIPIA PULANI	92	2	10	19	29	5	1				92
WAIPIA FAIRWAY ESTATES	50	2	2	2	2						50
MEADOWLANDS	32										32
MAKUA PLACE	10										10
KAMAOLE HIGHS	40										40
MEADOWLANDS II	88										88
WAIPIA FAIRWAY VILLAS	118										118
BIKINI VILL II	114										114
MAKUA AT WAIPIA	14										14
KE AHI KAI	96										96
KONOIO (KONOIO) ESTATES	51										51
MA HALE O MAKUA	40										40
KEAHOU AT MAKUA	7										7
BIKINI VILL III	117										117
KOHAU AIAHELE	64										64
KILOHANA RIDGE	73										73
KILOHANA HEMA	29										29
VILLAS AT KONOIO	140										140
ONE PALUVA	17										17
MAI VILLAGE	27										27
KONOIO MAUKA	12										12
HALE KAHANI	72										72
WAIPIA BEACH VILLAS	98										98

Table 10 - Units Absorbed Per Year (Upcountry/East Maui)

Table 11 - Total New Project Absorption 1997 to YTD 2006



Project Sales in South Maui

The success of projects in South Maui can be attributed to the desirability of the South Maui region with respect to visitor attractions, complimentary professional services, commercial establishments, as well as its moderate weather patterns. New developments like the proposed project often create excitement in the market, especially when the product is perceived to offer a particular value to the buyer. Project sales in South Maui, at all price levels, have met good demand from the market in recent years. As shown on the following page, absorption rates have been rapid in recent years. In many subdivisions, especially the lower-priced homes, the residences are immediately reserved and waiting lists are as long as the reservation list.

A schedule of absorption rates of recently completed subdivisions and condominium projects in South Maui appears on the following page. They show that recent developments have been very productive in the market. In many of the projects, most of the homes or lots were reserved and in escrow prior to the commencement of construction. Developers have been pressed to speed up the construction process due to the heavy demand. It goes without saying that supply is the limiting factor in the current real estate market. The release of more supply into the market such as those that are proposed by the subject project should be well received based on historical information. Additionally, the added competition in the market may have a secondary effect of stabilization or even lowering of prices in the region. This is turn will help make housing more affordable to Maui's residents.

Table 12 - South Maui Projects

No.	Project Name	No. of Units	Project Type	Lot Size	Living Area of Dwellings	Price Range	Closing Period in Months	Units Sold Per Month
1	Hopeli Wailea, Maui, Hawaii CMI Group Hawaii	120 Luxury Condominiums	Condo	N/A	3,300 sf	\$1.0mil to \$3.3mil	No Closings	99
2	Papaia Wailea, Maui, Hawaii Papaia/Manstein	24 Luxury Detached Condominiums	Condo	N/A	3,000 sf	\$2,945mil to \$2,995mil	No Closings	12
4	Ki Ki Maui Wailea, Kihikihi, Maui A&B Prop/Armstrong	152 Luxury Duplex Condominiums	Condo	N/A	1,796 to 1,852 sf	\$1.0mil to \$1.8mil	No Closings	132
5	Kaunani Wailea Wailea, Kihikihi, Maui Pasland and Homes, LLC	38 Luxury Condominiums	Condo	N/A	2,000 to 2,300 sf	\$1.2mil to \$1.7mil	No Closings	34
6	Kamalii Aiea Kihikihi, Maui, Hawaii Bentley/Clarity Maui	92 House and Lot Packages	Single Family	4,500 to 10,000 sf	1,000 to 2,200 sf	\$675,000 to \$850,000	No Closings	56
7	Moana Estates Kihikihi, Maui, Hawaii Towns Development	90 House and Lot Packages	Single Family	7,525 to 16,989 sf	1,658 to 2,634 sf	\$870,000 to \$1.3mil	No Closings	56
8	Ki Ki All Ocean Villas Kihikihi, Maui, Hawaii Towns Development	145 Condominiums	Condos	N/A	1,335 to 1,717 sf	starting at \$650,000	No Closings	45
9	Wailea Beach Villas Wailea, Kihikihi, Maui Lai Homes LLC	98 Luxury Condominiums	Condo	N/A	1,900 to 2,900 sf	\$1.2mil to \$5.0mil	No Closings	80
10	Hono Aholele Kihikihi, Maui, Hawaii Pillwalle Partners	63 House Lots	Single Family	7,505 to 13,987 SF	N/A	\$1,69,900 to \$222,900	No Closings	50
11	Wailea Fairways Villas Wailea, Kihikihi, Maui SCD Development	118 Luxury Condominiums	Condo	N/A	N/A	\$214,000 to \$664,000	No Closings	116
12	Kamalia Estates Kihikihi, Maui, Hawaii Kawanas	51 House and Lot Packages	Single Family	7,503 to 11,399sf	1,211 to 2,203sf	\$252,500 to \$349,000	14	51
13	Villas at Keneloa Phase I Kihikihi, Maui, Hawaii Kawanas	139 Condominiums	Lowrise Condos	N/A	875 to 1,200 SF	\$167,120 to \$300,000	14	139
14	Kilohana Ridge Kihikihi, Maui, Hawaii Towns Realty	72 House and Lot Packages	Single Family	7,800 to 11,000 sf	1,547 to 3,375 sf	\$450,000 to \$735,000	5,72	72
15	Kilohana Home Kihikihi, Maui, Hawaii Spanner Homes	29 House and Lot Packages	Single Family	7,561 to 21,854 SF	N/A	\$195,000 to \$460,000	4	29
16	Ki Ki Ki Subdivision Kihikihi, Maui, Hawaii Towns Realty	79 House and Lot Packages	Single Family	6,518 to 13,000 sf	1,404 to 2,147 sf	\$359,990 to \$459,336	19	96
17	Pilloni Village Phase II Kihikihi, Maui, Hawaii Spanner Homes	114 House and Lot Packages	Single Family	4,441 avg	980 to 1,780 sf	\$179,900 to \$255,293	7	114
18	Pilloni Village Phase III Kihikihi, Maui, Hawaii Spanner Homes	117 House and Lot Packages	Single Family	N/A	980 to 1,780 sf	\$179,900 to \$255,293	5	117

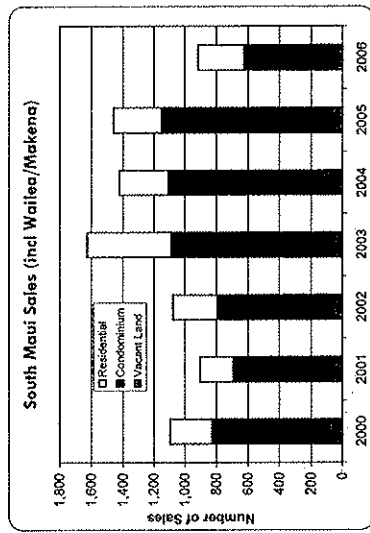
**Historical Sales Activity
In South Maui
(Past 7 Years)**

According to the Realtors Association of Maui, Multiple Listing Service, there has been an average of 1,215 sales of condominium, residential and vacant land properties in South Maui over the past seven years. During this period, the number of vacant land sales ranged from 32 in 2006 to 129 in 2004, with an average of approximately 77 sales each year. Condominium units ranged from a low of 592 in 2006 to 1,084 units in 2005. Single family properties ranged from 214 in 2001 to 537 in 2003. After a big drop in sales in 2004, the final two years of this period saw sales continue downward.

The slowing market is evidenced by the 37 percent drop in sales volume in 2006 when compared to previous year.

Table 13 - Historical Sales Activity in South Maui (Past 7 Years)

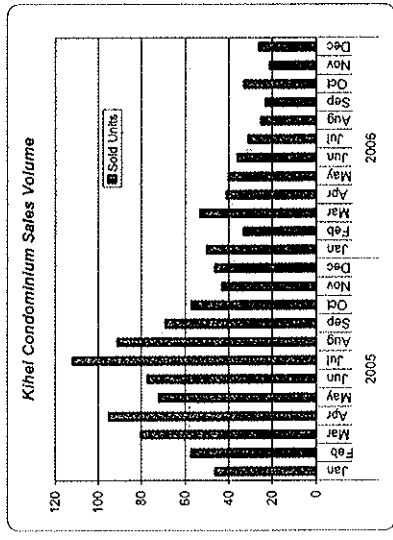
	2000	2001	2002	2003	2004	2005	2006	Total
Vacant Land	92	63	55	52	129	65	32	488
Condo	735	627	739	1,036	975	1,084	592	5,788
Single Family	269	214	284	537	318	311	293	2,226
Total	1,096	904	1,078	1,625	1,422	1,460	917	8,502



Source: Realtors Association of Maui MLS

**Historical Resale Activity
South Maui
(2005 to YTD 2006)**

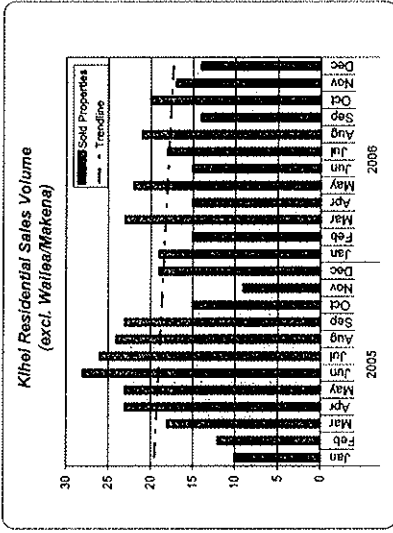
Condominiums Units



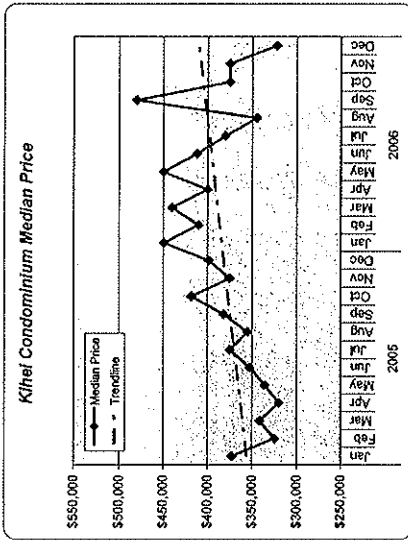
As seen above in the historical sales history of South Maui, 2006 has proven to be a slow year in terms of volume of units sold which follows projections of the overall market. A closer look at Kihai's condominium market since the beginning of 2005 further illustrates the significantly changing real estate market. From its peak in July of 2005, sales volume has been trending downward to its low in November of 2006. December volume has rebounded slightly but continues to signal a downturn in sales volume.

The Days on Market for Kihel condominium units have been increasing since December 2005 which shows signs of waning demand as units sit on the market for a longer period. Marketing times are still below their peak in July and August of 2005 but have been increasing steadily.

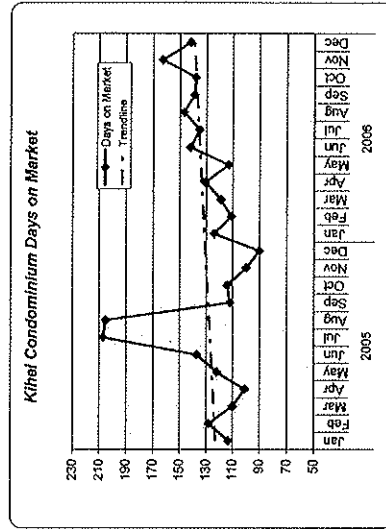
Single Family

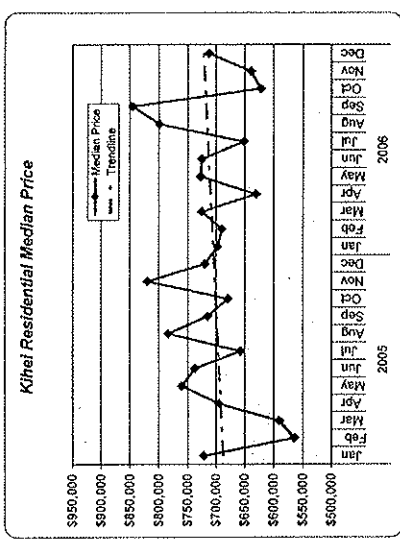


The slowdown in residential sales in Kihel does not appear to be as obvious as condominiums. Since its peak in June of 2005 sales volume took a huge dive to its lows in November of 2005. Since then volume counts have been erratic with sales up one month and down the next. It is noted that the peak volumes have been decreasing from March 2006.

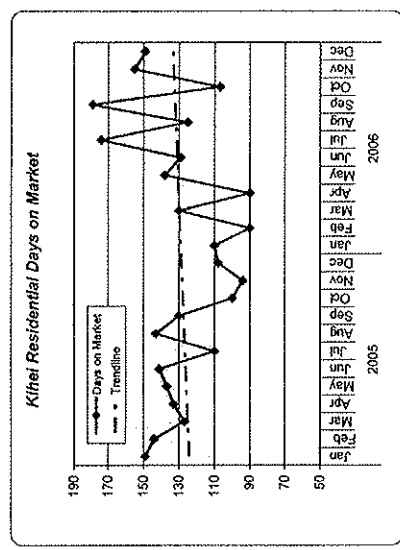


Median prices of condominium units in Kihel appeared to be rebounding from its lows in April 2005 until it started on its current downturn in June of 2006. Prices hit a low in August 2006 but spiked the next month only to see another drop in October which continued into December where it hit a yearly low of \$322,500, a level not seen since early 2005. If demand for units continues to dry up, prices may fall further as sellers try to price their units to sell.





In the most recent month of December, the median sales price for residential property in Kihai saw a steady increase off of its low set in October. From the beginning of 2005 prices appeared to be on a climb up to November of the same year. Since December of 2005 and continuing through 2006, the median price of residential properties in Kihai has been unstable but still show a slight increase over the two year period.



Similar to median prices, the Days on Market for residential properties were beginning to show strong demand for most of 2005, even up to February 2006. Since then Days on Market have been increasing up to its peak in September of 2006.

Vacant land sales since 2005 total only 44 sales during this period, an average of only two sales a month. Statistics for this property type would appear to be unreliable due to the small sample size. Additionally, these sales include a mixture of land uses as well as a wide range of property sizes. Therefore, graphs for this property type were not prepared for this market analysis.

Despite the slowdown in sales volume since mid-2005, as well as waning demand for real estate, the long term outlook for the market suggests that current market conditions are a temporary break from rising prices. However, assuming that population growth on Maui and in South Maui in particular, will continue as projected, there will be a shortage of homes in the region over the next five years. Compounding this problem is the fact that there are very few approved large projects to accommodate this growth once the existing supply is depleted.

Price Appreciation

In addition to the historical market activity as indicated by the MLS, the Consultant analyzed recently completed residential projects in South Maui to illustrate the rate of price appreciation. We specifically focused on single family subdivisions, condominium projects, and residential house lot subdivisions in the South Maui neighborhood to give an indication of the demand for housing and its affect on prices within these projects. These developments were selected knowing that these products represent moderately priced market developments.

In South Maui, our focus on single family and condominium projects included resales in the Ke Alii Kai, and Kaonolu Estates Subdivisions as well as resales in the Hale Kanani and Villas at Kenolio condominium projects. These are among the most recently completed projects in South Maui and the price appreciation of resales in these projects provides a good representation of the demand for residential units.

Ke Alii Kai Subdivision - Original closings ranged from \$360,000 to \$915,000 between February 2002 and October 2003. Since then there have been many resales with the highest reaching \$1,295,000. Analysis of the individual sales indicate that the prices are about 13 to 142 percent higher than original sales prices and on average, the increase was about 75 percent more than the original sales prices. On a monthly basis, these sales indicated price increases of 1.9 to 5.4

percent per month, or 23 to 65 percent per year. Some immediate resales showed increases of 11 to 38 percent per month.

Kaanolu Estates Subdivision – Original closings ranged from \$245,000 to \$410,000 between March 2002 and May 2003. Since then, resales have reached \$860,000 in March of 2006. Analysis of the individual sales indicate that the prices range from 10 to 207 percent greater than original sales prices and on average, the increase was about 86 percent more than the original sales prices. On a monthly basis, these sales indicated price increases of 1.2 to 6.4 percent per month, or 14 to 76 percent per year.

Villas at Kenolio - This is one of the most recently completed condominium projects in South Maui and original sales prices ranged from \$157,000 to \$455,500 with closing dates from January 2003 to February 2006. According to public records there have been numerous resales beginning in August of 2003. These resales indicated increases of approximately 18 to 149 percent over the original prices. On a monthly basis, these resulted in increases of 2.3 to 20 percent per month. Immediate resales of units showed increases of 54 to 93 percent.

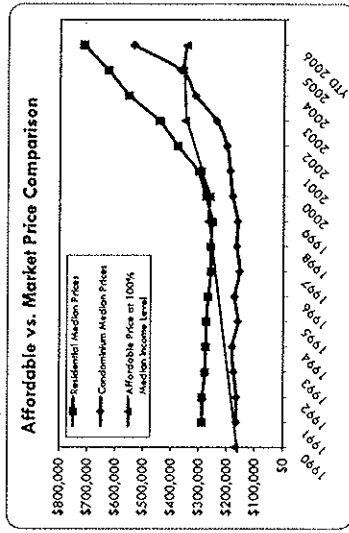
Hale Kani - This is the most recently completed condominium project in Kihei and original sales prices ranged from \$260,000 to \$480,500 with closing dates from June 2005 to October 2006. According to public records there have been ten (10) resales beginning in November of 2005. These resales indicated increases of approximately 25 to 100 percent over the original prices. On a monthly basis, these resulted in increases of 2.0 to 65.3 percent per month.

The high rates of appreciation over the past few years are due to the favorable interest rate environment which pushed up real estate values. Combined with the slow response of supply coming on the market, developments saw significant increases in sales volume and price appreciation with many owners establishing significant equity in their new purchases before they even closed or moved into their homes.

An analysis was done to compare the increase in affordable prices to the increase in the median prices for residential and condominium units. The affordable price is based on the median income level for the County of Maui and typical mortgage interest rates and loan requirements. This calculation assumed a typical 80 percent loan to value ratio and a 35 percent debt to income level. Since 1990, interest rates have dropped from 10.13% to 6.37% as of July 2006.

In addition to the steady increase in the median income level, lower interest rates allow housing to be more affordable. As shown in Table 14, the price which is affordable to earners of the median household income was compared to the median prices of residential and condominium prices in the market.

Table 14 – Comparison of Affordable and Market Prices



As income levels rose from 1990 to 2000, residential properties became more affordable to those earning the County's median income level, although it wasn't until 1999 that the median price for a residential property was actually lower than the price that can be afforded by a household earning the County's median income. During this period, the only option was to purchase a condominium unit, which for larger families can be less accommodating. In 2001, the nation's economy hit a recession, which was followed by the lowering of short term interest rates by the government. Consumer money flowed out of the stock market and into bonds and treasuries, which pushed long term interest rates lower. This, combined with other factors, caused a surge in demand for real estate, which sent prices skyrocketing within a few years.

By 2002, the soaring prices outpaced the County's median income level despite steadily falling interest rates. At the same time, condominium units were found to be a more feasible alternative and sales in this category started to pick up their pace.

From 2003 to today, sales prices for residential properties continue their climb to record levels, making it unaffordable for most of Maui's residents. Condominiums also began their record climb and by 2005

the median price surpassed the price that would be affordable to those earning the County's median income level.

By 2006, this situation has reached critical levels as prices for both residential and condominium units continue upwards. It does not help that mortgage rates have also been trending slightly upwards, which lowers the affordability to buyers needing to finance their purchase.

In past few years, when demand far exceeded supply, prices were driven upwards and many of Maui's residents could not afford to buy or even rent homes. To help alleviate this situation, more housing units should be brought to the market. The added supply may help to slow the rising prices, especially in categories where Maui's residents are being priced out of the housing market.

Residential Demand Model (Survey of Short Term Supply)

An effort was made to measure the effective demand for the subject's housing units. A model was developed that considered the increase in population and the current competitive supply in the market. This model is illustrated as Table 15 - Residential Demand Model below.

Table 15 - Residential Demand Model

	Housing Demand - South Maui Study Period 2006 - 2011	
	South Maui	Maui Island
1. Population change during period (Maui Island) [1]		11,637
2. Population change during period (South Maui) [1]	2,385	
3. Average household size (Maui Island) [1]		2.88
4. Average household size (South Maui) [1]	2.55	
5. Total new housing units demanded (Maui Island) (#1 ÷ #3)		4,041
6. Total new housing units demanded (South Maui) (#2 ÷ #4)	935	
7. # of subject type units demanded each year (#5/#5 ÷ 5 (yrs))	187	808
8. Current market area supply of subject type units [2]	544	2,095
9. Total market area residual demand (#6 - #8)	391	1,946
10. Duration of existing supply without subject (years) (#8 ÷ #7)	2.9	2.6
11. Duration of existing supply with subject's remaining units (years) [(600 + #8) ÷ #7]	5.3	3.2

Although the subject will be situated in North Kihei and its primary market is South Maui, the subject's secondary market area was determined to include the population centers of Central and West Maui. Due to the island-wide demand for developable residential land on Maui, it was felt that interested buyers will come from all areas of the island. This is especially true since South Maui has seen

significant growth in recent years. As indicated in the last census, Kihei saw the highest growth rate in the state. Furthermore, being a tourist destination, employment opportunities include many retail and visitor industry jobs. This in turn increases the need for housing near major employment centers.

Island of Maui

Housing Demand Analysis

Over the next 5 years, the total population of Maui is expected to increase by 11,637 persons, while the expected average household size is projected to be approximately 2.88 persons per household. Based solely on this population increase, the total demand for housing units is projected to be 4,041 units over the next 5 years.

It is estimated that there will be a current and near-future supply of 2,095 units currently available on the market. Based on the average amount of demand for the next five years (808 units per year), this supply will last for 2.6 years. This resulted in a residual demand of 1,946 units over the next five years. This indicates that during the analysis period, demand levels will exceed the supply for homes by nearly a 2 to 1 margin.

South Maui

Housing Demand Analysis

South Maui is a highly desirable destination for both visitors and residents alike. South Maui has an abundance of beaches and shoreline activities and thus has been a major destination for Maui's visitors. This has created many employment opportunities which cater to the visitor industry and employees have long been seeking housing in South Maui. This is evidenced by the success of condominium and residential developments in recent years. South Maui also features the Wailea and Makena resorts which are world renowned for their luxury hotels.

For these reasons, South Maui has approximately 18 percent of the total jobs on the Island of Maui, according to the U.S. Census Bureau (<http://censtats.census.gov/cb00nacs/cb00nacs.htm>). Despite the relatively stable employment count, payroll in the region has been steadily increasing since 2002 and reflects the employment opportunity of South Maui. As mentioned before residential projects in South Maui have been met with great demand and all have sold out within a short period. Due to the highly desirable location of South Maui, a separate Housing Demand Analysis was completed based on the supply and demand factors of South Maui.

During the 5 year study period, the projected population increase is expected to be 2,385 people, with an average household size of 2.55 persons per household. This amounts to a demand for 935

housing units that will be needed during this study period. Since the subject project is planned to include a mixture of single-family lots, house and lot packages, and multi-family units, a wide range of prices are represented by this mix. When compared to the current supply in the market of 544 units, an undersupply of 391 units is calculated for the next 5 years. Based on the average amount of demand for the next five years (187 units per year), this undersupply will last for 2.9 years. This indicates that the supply currently available in the market is not sufficient to meet the demand over the next 5 years. To fully meet this demand, which is based on the projected population increase in the region, more housing projects will need to be offered to the market and constructed during this period. The approval and construction of the proposed project's 600 planned housing units will contribute to the needed supply of housing in the next five years.

Buyer Profile

Up to this point, the demand model that has been presented only considers the demand from the increase in population over the specified time period. It does not consider the existing local residents who are potential participants in this market.

Most significantly, this model does not consider resident buyers who are moving up, or upgrading to higher priced homes. Over the past few years, prices have doubled in some Maui neighborhoods while the island wide median prices for single family homes has increased anywhere between 20 and 25 percent per year. These increases have built equity for existing homeowners just by the appreciation of their homes. This situation allows many current home owners to sell their existing homes at a profit and move their equity into another property. The demand model presented above does not account for this segment of the market, which may comprise a significant amount of the buyers of the project.

In addition to upgrade buyers, there are also local investors and partnerships that purchase units for long term investment purposes. There is also the market segment that purchases property on the island as a second home or vacation property. Once again, this model does not account for these segments.

Evidence of this additional demand can be seen when looking at the number of re-sales of existing properties in South Maui as indicated by the MLS, as well as the number of sales that have occurred at new projects over the past year.

According to the previously described Realtors Association of Maui MLS data, there has been an average of approximately 1,264 sales

of single family, condominium and vacant land properties in South Maui over the past 6 years.

Hawaii Housing Policy Study Update 2003

This study provides evidence of the need for additional housing in Maui (See Exhibit C at the end of this report). The balance between supply and demand has shifted greatly in recent years, as a result of the limited supply described herein as well as the low interest rate environment that makes home ownership easier for the consumer. This is evidenced by the rapid increase of prices of single-family homes and rental units on Maui. Prices for condominium and vacant land properties have also been on the increase. This most recent update of the study was completed in 2003.

Single-Family Home Prices

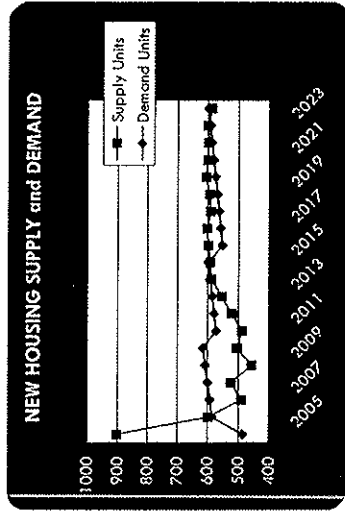
As mentioned before, single-family housing prices are increasing at a fast pace and have pushed prices for residential properties to historical highs. The Hawaii Housing Policy Study Update, 2003, revealed that 58 percent of the parties surveyed stated that the high prices are the reason why they do not want to purchase a home. (Source: *Hawaii Housing Policy Study Update 2003 - Table IV D-8*). The Kihnei/Makena and Paia/Haiku residents had the lowest percentage of this response at 39.3 and 20.3 percent respectively. Among all the regions on Maui, Waituku/Kahului residents had the highest percentage of this response at 73.5 percent.

County of Maui – Housing Demand Model

This study indicated that as of 2006, there was a current need for 3,755 resident housing units. This study also projected the effect of increasing population and the effect of decreasing household sizes on the supply and demand for residential units. The demand for housing units was calculated by comparing the increase in Maui's population to the average household size during a certain period. As population increases and household sizes remain the same or decrease, this would indicate the need for additional housing units. Conversely, if population decreases while household sizes remain the same, this would indicate a softening in demand for housing units.

According to the projections by SMS for the Housing Policy Update 2003, the supply and demand model indicates that from 2006 to 2014, demand will be higher than the available supply in the market. However, from 2015 to 2023 this balance will shift and provide a slightly higher supply of product versus demand. Theoretically, only at this point would prices begin to fall due to the oversupply in the market. However, this relief will not come for another 10 years.

The total supply that will become available between 2005 and 2024 (the end of the study period) will be 11,593 units, compared with the demand for 11,289 units.



Through this study period, the balance between supply and demand does not significantly shift to either side. However, this indicates that the original deficit of 3,755 units will not be reduced. In fact, this deficit will increase and by the end of the study period there will still be a need for 4,156 additional resident housing units.

It is also noted that resident housing units (RHU) only account for 70 percent of the total housing units in any given year. According to the Hawaii Housing Policy Study 2003, the remaining units include vacant units which is generally 5 percent of the total and non-resident housing units which account for approximately 25 percent of the total housing unit inventory. Non-resident units are defined as units that are set aside for rental pools and are targeted to transient visitors. These units are not available for County residents on an ongoing basis.

Based on these allocations, the actual number of additional housing units that need to be built in order to remove the deficit of resident housing units in 2024 is 5,937 units.

EFFECTIVE DEMAND

Effective demand considers the ability of market participants to purchase a home. The Hawaii Housing Policy Study 2003 compared the profiles of potential buyers and renters from previous studies conducted in 1997 and 1992.

"Own Now" - The 2003 study indicated that approximately 48 percent of potential buyers currently own housing unit. This is down from previous studies in 1992 and 1997 when the percentages were 50 and 53 percent respectively. Similarly, only 6 percent of potential renters have indicated that they currently own a housing unit, down from 12 and 14 percent in the past studies.

"Makes Over \$25,000 per Year" – Despite lower ownership numbers, buyers are earning more than they were in the past. The 2003 study indicated that 55 percent of the respondents make \$25,000 or more per year. Past surveys in 1992 and 1997 showed only 23 and 30 percent were making that amount. In 1997, only 7 percent of potential renters were making \$25,000 or more per year. This number jumped six fold in 2003 to 43 percent.

"Have Household Incomes of \$75,000 or More" – Since 1992, this percentage for potential buyers has been steadily climbing from 10 percent in 1992 and 18 percent in 1997 to 30 percent in 2003. The rate for potential renters increased slightly since 1992 but has generally held steady at 7 percent.

"Currently Employed" – The employment rates for potential buyers has steadily increased from 93 percent in 1992 to 97 percent in 2003. However, employment rates for renters have fallen below 1992 levels. Most recently this rate was estimated at only 85 percent. Previous studies indicated employment rates of 87 percent in 1992 and 92 percent in 1997.

"Have More than \$40,000 for Down Payment" – Despite, strong indicators of increasing effective demand by potential buyers, this category has slipped since the initial study in 1992, when 32 percent of respondents said that have more than \$40,000 for a down payment. These numbers dropped to 22 percent in 1997 and to 18 percent in 2003. This number has remained level for potential renters, at 8 percent.

The survey conducted in 2003, has indicated that the effective demand by potential buyers has increased since earlier surveys conducted in 1992 and 1997. With the exception of down payment, potential buyers seem to have increased their ability to purchase a home as employment and income levels have made steady increases. Potential renters offer a mixed indication of effective demand as income has increased while employment rates have dropped.

B. HOUSING PRODUCT ANALYSIS

While the subject project is still in the preliminary planning stage the conceptual master plan indicates the various housing types planned within the different land use components. As mentioned earlier, the A-1 Apartment component will include detached single family residential condominiums while the A-2 Apartment component will consist of multifamily buildings probably developed as townhouse or stacked flat structures. The R-1 Residential component is expected to provide detached single family dwellings on fee simple lots with 6,000 square feet of land area.

In 2006, the County of Maui's Residential Workforce Housing Policy (MRWHP) was enacted by the County Council. The MRWHP establishes affordable housing requirements applicable to all new projects. As required under the MRWHP, at least 40 percent of the proposed project's units must meet the affordable housing criteria. The Consultant has researched data regarding the types of properties that have been sold within the various affordable price ranges and will also relate the market activity with the projected pricing of the proposed project's affordable units. At this point, it is assumed that the subject project's affordable housing requirement will be fulfilled by the subject's A-1 and A-2 Apartment components.

A similar analysis will be made for the subject's R-1 Residential component. Although the dwellings will most likely be priced out of the affordable housing price range, an analysis of R-1 sized properties in the market should give the reader a more clear indication of what type of product will be most acceptable in the market.

Affordable Housing Price Ranges

Listed below are the income ranges which qualify for the affordable housing income requirements as well as the breakdown of the allocated unit counts within each income range. This table is used by the County of Maui-Department of Housing and Human Concerns and reflects the HUD defined median income for 2006 for four (4) person households. Also, the price range for the affordable housing type has been given for each income range by property type. The price range was based on an assumption of 6.25 percent mortgage rate as of the effective date of this report.

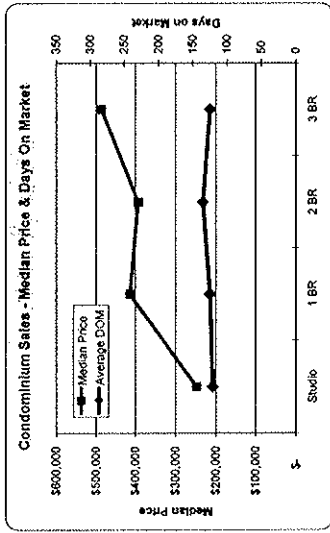
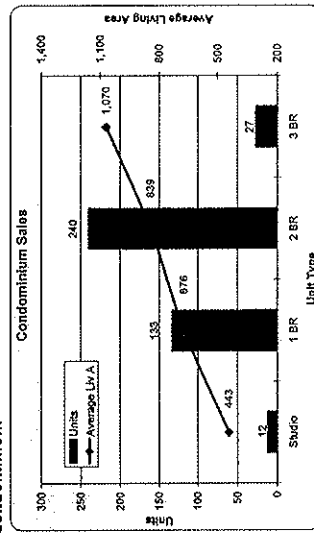
Table 16 - Affordable Housing Price Ranges

Income Group	Income Range (% of Median Income)	Affordable Unit Allocation %	Unit Count	Single Family Price Range
Below Moderate Income	80-100	30%	72	\$ 231,250 - \$ 275,000
Moderate Income	100-120	30%	72	\$ 257,500 - \$ 317,500
Above Moderate Income	120-140	20%	48	\$ 327,000 - \$ 397,400
Gap Income Group	140-160	20%	48	\$ 397,400 - \$ 487,300

General Product Characteristics

Research was conducted for sales over the past 12 months for single family residential and condominium units in Kihei. Vacant land sales were excluded since they are not offered for sale as an improved residential product. Properties in Wailea and Makana were also excluded from this analysis since the subject will not offer resort type housing units. There were a total of 412 condominium sales and 221 residential sales within Kihei over the past 12 months. The following chart compares the general property characteristics of the two property classes.

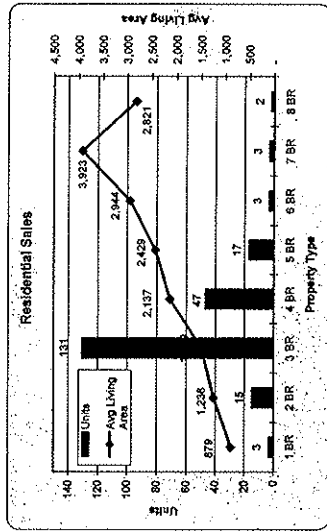
Condominium



Condominium units that sold over the past year included Studio units to three-bedroom units with the most sales being of two-bedroom units. Two-bedroom units accounted for 240 sales or approximately 58 percent of the total sales over this period. The median price of two-bedroom units was \$392,500. Interestingly, sales of one-bedroom units, which had the second most sales at 133, had a higher median price than two-bedroom units, at \$413,750. It is difficult to explain why this occurred in the market without examining each of the 133 sales. This may be due to the fact that one-bedroom units may be situated in oceanfront developments which may be more suited for second home or vacation rental units. Buyers of second home or vacation rental units, may have a higher net worth or household income, and are able to pay higher prices for these units when compared to Maui's workforce resident buyers. It is also possible that some of the one-bedroom units may be situated in superior, oceanfront projects which typically have higher prices.

The average living areas ranged from 443 to 1,070 and increased consistently from each unit type to the next. The overall average living area was approximately 790 square feet. Despite having the most sales, two-bedroom units had the highest marketing times with an average of 135 days. The marketing times for studio, one-bedroom, and three-bedroom units were slightly lower at 121, 125, and 125, respectively. The overall days on market was calculated to be 131 days.

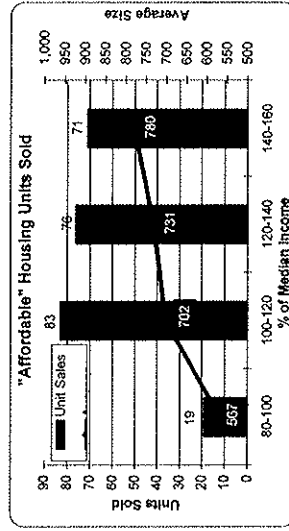
Residential



Properties Sold within Affordable Housing Price Ranges

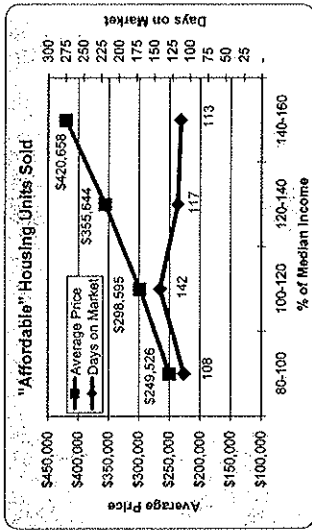
To assist the developer in determining an appropriate product design for each affordable price range, historical sales of properties within each price range were analyzed to determine an appropriate bedroom and both count, unit size and pricing.

The following charts compare the characteristics of sold properties within the median income levels



Residential properties sold over the past year ranged from one- to eight-bedroom properties and 63 of the 221 properties sold had an accessory dwelling besides the main dwelling. The most sales were of three-bedroom properties of which there were 131 sales or approximately 59 percent of the total sales. They had a median price of \$685,000 and an average living area of 1,489 square feet.

Sales of two-bedroom properties, which had the fourth most sales at 15, had a higher median price, at \$695,000, than three-bedroom properties. Median prices climbed steadily up to its peak of \$995,000 for six-bedroom properties and then fell approximately 20 percent for the seven- and eight-bedroom properties. The average



80 to 100 Percent of Median Income

Based on the HUD's affordable pricing guidelines, which assumes a 6.25 percent mortgage rate, the appropriate price range is \$206,900 to \$263,600 for multi family properties. The price range for single family properties is \$211,200 to \$267,900; however, there were no sales of single family properties within this price range. Over the past 12 months, there were 19 sales of condominiums within this price range. They ranged from \$225,000 to \$263,000 and consisted of studio, one- and two-bedroom units. The range of bathrooms included one-, one-and-a-half, and two-bathroom units. Unit Sizes ranged from 443 to 750 square feet with a mean and median of 567 and 516 square feet respectively. The average price was \$249,526 while the median was \$254,000. The average Days on Market for units within this affordable price range was 108 days. These sales occurred in projects such as Southpointe, Kihai Bay Surf, Kihai Villages, Kihai Shores, Kalama Terrace, 85 Waiokoa, and Bay Vista Apartments.

# of Units Sold	Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
19	Average \$249,526	1.11	1.18	567	108
	Median \$254,000	1.00	1.00	516	

100 to 120 Percent of Median Income

The affordable price range for buyers earning 100 to 120 percent of the County's median income level is \$263,600 to \$325,400 for multi family properties. The price range for single family properties is \$267,900 to \$329,600. Again, there were no sales of single family properties within this price range. Over the past 12 months, there

were 83 sales of condominiums within this price range. They ranged from \$264,900 to \$325,000 and consisted of studio, one- and two-bedroom units. The range of bathrooms included one-, one-and-a-half, and two-bathroom units. Unit Sizes ranged from 445 to 936 square feet with a mean and median of 702 and 750 square feet, respectively. The average price was \$298,595 while the median was \$299,000. The average Days on Market for units within this price range was 142 days. The higher prices can be attributed to the larger living areas which provide greater utility while the longer marketing times can be attributed to the higher prices.

# of Units Sold	Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
83	Average \$298,595	1.73	1.46	702	142
	Median \$299,000	2.00	1.50	750	

120 to 140 Percent of Median Income

The price range for buyers earning 120 to 140 percent of the County's median income level is \$325,400 to \$387,100 for multi family properties. The price range for single family properties is \$329,600 to \$391,400. Once again, there were no sales of single family properties within this price range. Over the past 12 months, there were 76 sales of condominiums within this price range. They ranged from \$326,500 to \$385,000 and consisted of one-, two-, and three-bedroom units. The range of bathrooms included one-, one-and-a-half, and two-bathroom units. Unit Sizes ranged from 520 to 1,040 square feet with a mean and median of 731 and 750 square feet respectively. The average price was \$355,644 while the median was \$355,000. The average Days on Market for units within this price range was 117 days.

# of Units Sold	Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
76	Average \$355,644	1.67	1.44	731	117
	Median \$355,000	2.00	1.50	750	

140 to 160 Percent of Median Income

The price range for buyers earning 140 to 160 percent of the County's median income level is \$387,100 to \$464,800 for multi family properties. The price range for single family properties is \$391,400 to \$469,300. Over the past 12 months, there were 68 sales of condominiums within this price range and three sales of single-family residential properties within its appropriate range. Overall,

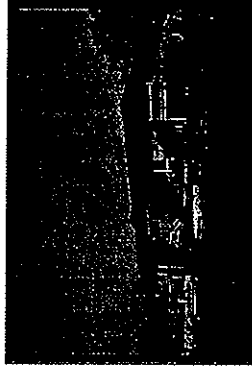
The sales ranged from \$387,500 to \$462,500 and consisted of one-, two-, and three-bedroom units. The range of bathrooms included one- to three-bathroom units. Unit sizes ranged from 550 to 1,040 square feet with a mean and median of 780 and 750 square feet respectively. The mean price was \$420,658 while the median was \$417,000. The average Days on Market for units within this price range was 113 days.

The three sales of residential properties consisted of detached single family condominium units at the Sleepy Hollow project off of South Kihel Road. All three units consisted of three-bedrooms and two-baths with living areas measuring 960 square feet. Closing prices ranged from \$430,000 to \$440,000 and all the sales closed from May to July of 2006. The marketing times ranged from 51 to 123 days. Although there are very few sales of single family detached condominiums in the Kihel market, the sales activity over the past year indicates the potential for this type of housing product. Therefore, in addition to multi-family townhouse or stacked flat type buildings, single family residential condominium units should also be considered for the provision of affordable housing units for the "140-160 percent" income level.

# of Units Sold	Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
71	Average \$420,658 Median \$417,000	1.76 2.00	1.60 2.00	780 750	113

Properties Sold – Detached Single Family Condominiums

Most condominium units on the market are within "stacked flat" type multi-family buildings. These buildings are characterized as having multiple levels containing individual single story living units on each floor. Examples of such projects include Kihel Villages, Southpointe, Maui Banyan, Maui Vista, and Hale Kanani. (See examples below)



Southpointe (Multi-Family Stacked Flats)



Hale Kanani



Maui Vista

In fact, most multi-family condominium and apartment projects on Maui are built as stacked flats. However, an emerging trend has been the popularity of detached single family condominium units in which the unit owner has exclusive ownership and use of the interior of a detached single family dwelling while everything else may be jointly owned as common elements with the other individual unit owners. In Kihei, detached single family condominium units exist in the Southpointe at Waiakoa, Alii Beach and Sleepy Hollow projects. (See examples below)



Southpointe (Detached SF Condo Unit)



Sleepy Hollow

Alii Beach (Photo not available)

The newest single family condominium projects are being built in the Wailea Resort neighborhood where there are two projects that are currently under construction. Hokuani Golf Villas and Nu'u Alina Estates are also single family condominium projects which are located on the eastern side of Pillani Highway. These projects, like those in Wailea are expected to consist of luxury units.

Over the past year, there have been 12 sales of detached condominium units with prices ranging from \$430,000 to \$5,250,000. The wide range of prices can be attributed to the fact that the higher

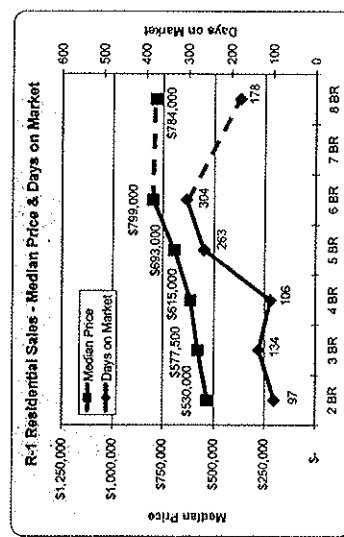
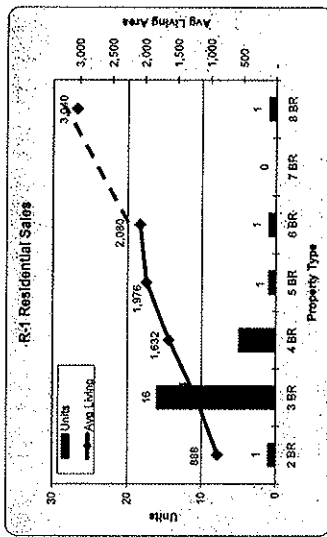
priced units were located along the oceanfront. All of the properties consisted of three-bedrooms and all but one property contained two-full baths while the last contained two-and-a-half baths. Based on the nine most recent sales at the Southpointe, Alii Beach and Sleepy Hollow properties, the average sales price was \$515,556 while the average living area was 1,068 square feet. The average Days on Market for the sales was 110 days.

As mentioned above, the closing prices of three of these sales fell within the affordable housing price range for households earning between 140 and 160 percent of the County's median income for a family of four.

# of Units Sold	Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
9	Average \$515,556	3.0	2.00	1,068	110
	Median \$450,000	3.0	2.00	960	

Properties Sold- R-1 Residential Properties

Research was conducted for sales of properties with the size range of R-1 Residential zoned lots. The purpose of this research was to determine the property characteristics and market acceptance of that specific segment of the market. R-1 Residential zoned properties must have a minimum lot size of 6,000 square feet. The general property size that was researched ranged from 6,000 to 7,500 square feet and included improved residential properties. There were a total of 25 sales over the past 12 months with prices ranging from \$470,000 to \$799,000. Sales over the past year in the neighboring Hale Piliani Subdivision indicated prices ranging from \$575,000 for a 960 square foot three-bedroom/two-bath house, to \$784,000 for an eight-bedroom/four-bath home with 3,040square feet of living area. The Consultant felt it would be prudent to take a closer look at the sales history of this specific subdivision since it is adjacent to the proposed project.



Of the 25 sales, 16 were three-bedroom units with a median price of \$577,500, and an average living area of 1,214 square feet. The average marketing times for three-bedroom properties was 134 days. Two- and four-bedroom properties saw shorter marketing times with an average of 97 and 106 days respectively. This may be due to the fact that there are more available listings on the market and the increased inventory creates more competition between owners to sell their properties.

Despite having longer marketing times than two- or four-bedroom properties, three-bedroom properties were once again the most active property type and of all the potential property types, should be the most well received in the market. The living area should be

consistent with what has been offered in the market. Divergence from the average may result in higher costs and/or less return for the developer. The same can be said for the list prices for such properties. Most prices for three-bedroom properties cluster around the \$550,000 to \$600,000 range. Significant deviation from this range may result in longer marketing periods if list prices are too high. If they are listed too low, return for the developer may be reduced, putting pressure on the economic feasibility of the project.

Summary of Housing Characteristics

Based on the proposed land uses and anticipated product mix the Consultant has provided analysis on the past market acceptance of the various housing unit types to be offered by the subject.

As previously noted, the MRWHP requires projects to provide a minimum of 40 percent of its units as affordable housing units to buyers with household incomes ranging from 80 to 160 percent of the County's median income level for a family of four. As detailed in the analysis beginning on Page 66, the Consultant has shown the most prevalent product characteristics for housing units that were sold in the past year at prices that fit affordable housing guidelines. In determining an appropriate product to develop, the developer would be prudent to consider the products that have the highest degree of market acceptance.

The Consultant has found that in all but the highest income level, multi-family stacked flat type buildings were the most common within the affordable price range. For the lowest income level of 80 to 100 percent of median income, one-bedroom/one bath units with approximately 520 square feet of living area were the most common and should be considered a highly feasible product to satisfy the affordable housing requirements at this income level.

Research of sales within the affordable price range for households earning 100 to 160 percent of median income indicated that two-bedroom/two-bath units were the most common unit type sold. This common characteristic was the same across properties sold within the three highest income levels: 100 to 120 percent, 120 to 140 percent, and 140 to 160 percent of median income. Aside from increasing prices, the only major difference between the unit characteristics of the three levels was the increase in average living area from 702 to 780 square feet, as the income levels/price ranges increased. At the highest level, 140-160 percent of median income, there were three sales of detached single-family condominium units

For the proposed A-2 Apartment component, which is planned to consist of approximately 200 units, the developer has indicated that stacked flats or townhouse units will be built. As seen from the

research, nearly all the properties sold within the affordable housing price ranges were of units within stacked flat buildings. Since affordable prices are set based on income level guidelines, one-bedroom/two-bath units should be considered for the lowest income level remaining income levels. To provide more variety in the units available to buyers at the highest income level, detached single family condominium units can also be developed as historical sales of this property type fall within affordable housing price guidelines. Although there are relatively few sales of single-family detached condominium units in South Maui, this type of product is gaining in popularity especially in the Milliani and Ewa communities on Oahu as it provides a more economical alternative to single family residential living. They are also the most common type of housing unit currently being built for high end luxury projects in Wailea and Kihai. Based on the sales on such products in South Maui, three-bedroom/two-bath dwellings appear to be the most appropriate dwelling type for detached condominium units with a general living area ranging from 1,000 to 1,200 square feet in size. Pricing at or near the median price of \$450,000 should meet with good demand in the market.

There was a wide variety of property types that were built on R-1 Residential lot sizes, but the most common was three-bedroom dwellings with an average living area of 1,200 square feet. As shown by the active listings and by sales over the last year, three-bedroom properties comprised the most sales of residential properties in South Maui and also had the most active listings available on the market. Although there are more active listings of three-bedroom properties than of all other residential property types combined, three-bedroom residential properties have been very active in the market and are in the greatest demand. The median price of approximately \$580,000 is consistent with other properties on Maui and would keep the subject's units competitive in the market.

The research of property characteristics was intended to provide a guidance of the type and pricing of products that should be offered by the project. As evidenced by recent real estate market activity, the condition of the market is not as predictable or favorable as it has been over the previous five or so years. The developer of the subject property should recognize this and develop products that are consistent with what has been historically well received by the market. These characteristics have been detailed above and any significant deviation from these may result in more risk to the developer or lower demand for the subject's product.

C. ECONOMIC CHARACTERISTICS

Besides the much needed housing for Maui's workforce, the proposed project will generate economic benefits for individual workers, local businesses, the County of Maui, as well as the State of Hawaii.

Construction Contracts

The first major economic effect will be the construction contracts that will be generated by the development of the property. Direct costs for earthwork, site preparation, infrastructure improvements, and the construction of single-family as well as multi-family dwellings are projected to generate approximately \$151,000,000 in construction contracts.

Wages and Salaries

Individual laborers and workers will also benefit from the jobs provided by the project. The project will employ carpenters, masons, plumbers, electricians, machine operators and drivers, as well as those in supervisory and administrative positions. The total wages earned over the course of the project is projected to total \$60,400,000, approximately 40 percent of the direct construction costs.

Maui County Real Property Tax

At the county level, the most significant economic benefit will come in the form of the Real Property Tax collected on the subject's 600 housing units. In the County of Maui, real property taxes are based on 100 percent of the assessed value of the property. The assessed value is then multiplied by the appropriate tax rate, which ranges from \$2.50 per \$1,000 of assessed value for homeowners, to \$14.00 per \$1,000 of assessed value for timeshare properties. Once the subject's units are built out, they will fall into the owner occupant, and improved residential categories.

All of the A-2 Apartment units are anticipated to be owner occupied due to anticipated owner occupant restrictions. The single family detached condominiums and R-1 Residential properties are projected to be 75 percent owner occupied based on historical assessments of recent projects.

The resulting unit mixes indicated in an annual real property tax base of \$341,000. The current property taxes for the property in its current state amount to \$8,583 for 2006.

State General Excise Tax

In addition to the revenues that will be taken in by the private contractors, taxes are expected to be paid to both the state and county levels of government. At the state level, this income will be in the form of the General Excise Tax. Based solely on the dollar value of the construction contracts that are forecasted to be generated by

the build out of the proposed Kihei Residential Project, the State of Hawaii is expected to receive approximately \$6,290,660.

D. CONCLUSION

Over the past decade, Maui has seen significant growth in virtually all aspects (e.g., population, visitor arrivals, economy) of the community. One of the most important issues facing Maui has been the need for housing for Maui residents. Increasing population and the low interest rate environment has increased the demand for homes. This demand has led to record prices and sales volume for real estate. Many single family subdivisions and condominium projects have been sold out prior to the completion of construction. In recent years a strong emphasis has been placed on the construction of affordable homes as housing prices have outpaced increases in household incomes.

The following points summarize the supply of real estate in Maui at this time.

RESIDENTIAL SUPPLY COMPONENTS

- As of January 2007, there are currently 2,578 active listings in the Realtors Association of Maui Multiple Listing Service for all types of residential properties on Maui.
- There are approximately 2,026 new housing units (single family residential, condominium and residential house lots) currently available in the market. This was determined to be the short term supply of new housing units or vacant lots available for purchase in the market. Of this total, approximately 475 units are located in South Maui while 1,284 units are located in Central Maui. West Maui has only 191 of the total short term supply while Upcountry Maui has 76 units.
- Based on historical annual absorption rates of the real estate markets, the current short term supply of units is expected to last approximately 4.3 years (2,026 units of supply ÷ 469 units of average absorption over 10 years). Equating the increase of households over the next five years with the required number of housing units, an average annual demand of 808 units per year is expected. Without additional inventory, the current supply will last 2.5 years. (2,026 ÷ 808)
- In addition to the existing supply, potential supply on the entire island of Maui is estimated to be an additional 10,790 units. These units include remaining units in existing, entitled projects that have not been built or brought to the market yet. This count also includes projects that are in the planning phases and may be developed in the future. Although there is

a chance that some of this potential supply may be built soon, it is difficult to gauge the timing of these projects until construction actually begins.

Economic changes, community intervention, market conditions or internal issues with the developers may affect the feasibility of many of these projects. In reality, some of these projects may never be approved and some of the larger ones are expected to take 20 to 30 years to be built out. For this reason, the number of units of potential supply that will actually be developed is expected to be much lower than the 10,790 units on the list.

- According to the Hawaii Housing Policy Study 2003, there will be a total of 10,692 resident housing units (RHU) available from 2006 to 2024. This does not include vacant units as well as units set aside for non-resident occupancy.

RESIDENTIAL DEMAND COMPONENTS

- Population on Maui between 1990 and 2000 grew by 27.6 percent. Population is expected to increase by 44 percent from 2000 to 2025. From 1990 to 2000, South Maui had the highest growth of all regions with a 51 percent increase in population.
- Mortgage rates remain at historical lows despite rising slightly since hitting a low in mid-2003. As of January 18, 2007, the average interest rate on a 30-year, fixed-rate mortgage was approximately 6.23 percent. These lower rates typically mean that real estate becomes more affordable to a larger segment of the population. At the same time, however, prices tend to rise faster and at rates higher than increases in household incomes. This factor serves to decrease the affordability of home ownership to many potential buyers.

- Real estate sales activity in land, single-family and condominium properties has been on emerging downward trend in terms of sales and median sales price since their peaks in mid-2005. The median sales price for residential properties is approximately 19 percent off its high while the median price of condominium units are off 20 percent. The median sales price of vacant land which is the most speculative type of property has seen some volatility in recent months. At the same time, marketing times or days-on-market for residential properties, condominium units and vacant land have been trending upward in the past few months.

- There is a strong demand for real estate in the neighborhood to be occupied by the Kihei Residential Project. Research of sales performance of the new projects in South Maui indicated rapid absorption of the new units and re-sales demonstrating very high appreciation rates. This is a good testament to the desirability of the South Maui properties.

- The Hawaii Housing Policy Study Update 2003 shows that there will be a demand for 11,103 new resident housing units (RHU) from 2006 to 2024.

- The Hawaii Housing Policy Study Update 2003 also indicates that annual demand will outweigh supply until the year 2016 when supply will be slightly higher than demand. In theory, and assuming stable market conditions, only at this point will lower prices be realized in the market due to the slight oversupply. The higher demand up to 2016 means that there is no short term relief for high sales prices.

- The Hawaii Housing Policy Study Update 2003 also estimated a deficit of approximately 3,755 needed resident housing units as of 2006. By the end of the study in 2024, this deficit will increase by approximately 10 percent to 4,156 units.

- A long term view of housing conditions in South Maui shows that increase in households over the next five years outnumbers the existing supply of new homes. A significant increase in supply in the market will be needed to accommodate the region's anticipated growth.

HOUSING CHARACTERISTICS

- Over the past year, two bedroom condominium units comprised 58 percent of all condominium sales in Kihei (excluding Wailea and Makana). Two bedroom units had an average of 839 square feet of living area and had a median sales price of \$392,000.

- The most common property characteristics for properties priced within the lowest affordable housing price range are one-bedroom/one-bath condominium units in stacked flat multi-family buildings with a typical living area of 500 to 550 square feet.

The most common property characteristics for properties in the three higher affordable housing price ranges are two-bedroom/two bath condominium units in stacked flat multi-

family buildings with living areas ranging from approximately 700 to 800 square feet.

There were 12 sales of single family detached condominium units over the past year. The most comparable to the project consisted of three-bedrooms and two-baths with one property having two-and-a-half baths. The median price for such properties was \$450,000 while the typical living area was between 1,000 to 1,100 square feet. Three of these sales were priced with the highest affordable housing price range.

- Over the past year, three-bedroom residential properties comprised 59 percent of all residential sales in Kihai (excluding Wailea and Makena). Three-bedroom properties had an average of 1,489 square feet of living area and had a median sales price of \$685,000. There were 25 sales of R-1 Residential sized properties over the last year with 16, or approximately 64 percent being, three-bedroom properties. Overall average living area was 1,422 square feet and overall median price was \$585,000.

The subject's proposed R-1 Residential component should consider three-bedroom/two-bath units with approximately 1,200 square feet of living area and priced near the median for similar properties, or approximately \$580,000.

- The developer should consider these characteristics in planning and building the subject's various land use components. These characteristics were shown to be the most common and therefore the most accepted characteristics for these specific properties and any significant deviation from them may result in lower demand in the market and thus slower sales.

ECONOMIC CHARACTERISTICS

- Direct construction costs is expected to total \$151,000,000
- Wages and salaries generated by the project is expected to be \$60,400,000.
- Real property tax to be paid to the County of Maui after full build out of the project is expected to be \$341,000 per year.
- State General Excise Tax to be generated is expected to be \$6,290,660 over the course of the construction period.

The short-term supply of single-family homes in Maui appears to be insufficient for the next 5 or so years. If economic conditions remain the same, it is probable that prices will continue to rise over the long-term despite recent softening in the real estate market. This will be further magnified if no new supply is brought onto the market. On a long term basis, from 5 to 20 years, it is difficult to reliably estimate the number of projects that will be actually brought to the market. As mentioned before, many projects have been delayed or have met with resistance from the community for various reasons. Some face the lengthy and uncertain tasks of securing needed land use approvals in order to proceed. This would seem to indicate that of all the potential projects that have been identified, many may never be realized, given the inherent risks in the entitlement process.

Meanwhile, demand for real estate on Maui has intensified over the past five years. These increases are being fueled by the steady population increases, the high employment rate, and the lowest 30-year mortgage interest rates in decades. The strong demand has resulted in rapidly rising prices in all communities of Maui.

With additional inventory on the market, and assuming positive growth over the next decade, it is our opinion that bringing the proposed project's 600 units to the market would help provide affordable housing to Maui's workforce in the near as well as long term and will be well accepted by the public due to the broad spectrum of real estate products that it will offer.

The proposed development is very attractive because the local community possesses an intense desire for property in this neighborhood. Additionally, during the time that the project is approved and construction begins, much, if not all of the existing supply in ongoing projects will most likely be depleted if no new housing developments are approved.

The additional choices that buyers will have in the real estate market will provide healthy competition and allow for a more balanced market. Consequently, it is the Consultant's opinion that the development of the Kihai Residential Project will be well received based on historical absorption of developments in this high-demand neighborhood. It will also add much needed supply to the market and will help alleviate the high cost of housing on Maui.

EXHIBITS

EXHIBIT A
Demographic Reports - Claritas, Inc.
SOUTH MAUI



Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total	%
Population		
2011 Projection	27,080	
2006 Estimate	24,695	
2000 Census	21,836	
1990 Census	14,428	
Growth 2006-2011	9.68%	
Growth 2000-2006	13.09%	
Growth 1990-2000	51.34%	
2006 Est. Population by Single Race Classification		
White Alone	24,695	
Black or African American Alone	13,166	53.31
American Indian and Alaska Native Alone	261	1.06
Asian Alone	134	0.54
Native Hawaiian and Other Pacific Islander Alone	5,472	22.16
Some Other Race Alone	1,586	6.42
Two or More Races	387	1.57
	3,689	14.94
2006 Est. Population Hispanic or Latino by Origin*		
Not Hispanic or Latino	24,695	
Hispanic or Latino	22,852	92.54
Mexican	1,843	7.46
Puerto Rican	724	39.28
Cuban	384	20.84
All Other Hispanic or Latino	30	1.63
	705	38.25
2006 Est. Hispanic or Latino by Single Race Class.		
White Alone	1,843	
Black or African American Alone	700	37.98
American Indian and Alaska Native Alone	7	0.38
Asian Alone	28	1.52
Native Hawaiian and Other Pacific Islander Alone	171	9.28
Some Other Race Alone	51	2.77
Two or More Races	329	17.85
	557	30.22



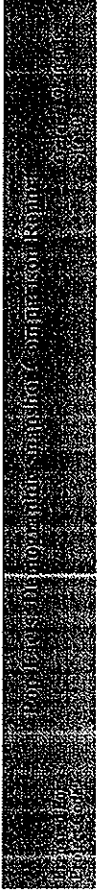
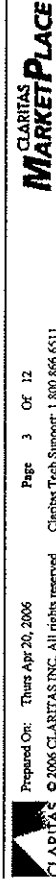
Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total	%
2006 Est. Pop. Asian Alone Race by Category*		
Chinese, except Taiwanese	177	3.23
Filipino	3,696	67.54
Japanese	954	17.43
Asian Indian	27	0.49
Korean	134	2.45
Vietnamese	61	1.11
Cambodian	4	0.07
Hmong	0	0.00
Laotian	12	0.22
Thai	19	0.35
Other Asian	59	1.08
Two or more Asian categories	329	6.01
	24,695	
2006 Est. Population by Ancestry		
Pop. Arab	46	0.19
Pop. Czech	13	0.05
Pop. Danish	140	0.57
Pop. Dutch	260	1.05
Pop. English	1,357	5.50
Pop. French (except Basque)	372	1.51
Pop. French Canadian	67	0.27
Pop. German	2,145	8.69
Pop. Greek	49	0.20
Pop. Hungarian	77	0.31
Pop. Irish	1,529	6.19
Pop. Italian	981	3.97
Pop. Lithuanian	34	0.14
Pop. United States or American	528	2.14
Pop. Norwegian	344	1.39
Pop. Polish	317	1.28
Pop. Portuguese	340	2.19
Pop. Russian	87	0.35
Pop. Scottish	348	1.41
Pop. Scotch-Irish	263	1.06
Pop. Slovak	8	0.03
Pop. Sub-Saharan African	34	0.14
Pop. Swedish	255	1.03
Pop. Swiss	65	0.26
Pop. Ukrainian	98	0.40
Pop. Welsh	44	0.18
Pop. West Indian (exc Hisp groups)	29	0.12



Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total ZIP	%
2006 Est. Population by Ancestry		
Pop, Other ancestries	11,194	45.33
Pop, Ancestry Unclassified	3,471	14.06
2006 Est. Pop Age 5+ by Language Spoken At Home		
Speak Only English at Home	17,974	77.58
Speak Asian/Pacific Islander Language at Home	3,842	16.58
Speak Indo-European Language at Home	525	2.27
Speak Spanish at Home	766	3.31
Speak Other Language at Home	60	0.26
2006 Est. Population by Sex		
Male	24,695	
Female	12,525	50.72
Male/Female Ratio	12,170	49.28
1.03		
2006 Est. Population by Age		
Age 0 - 4	1,528	6.19
Age 5 - 9	1,509	6.11
Age 10 - 14	1,580	6.40
Age 15 - 17	948	3.84
Age 18 - 20	765	3.10
Age 21 - 24	1,186	4.80
Age 25 - 34	3,087	12.50
Age 35 - 44	4,119	16.68
Age 45 - 49	2,220	8.99
Age 50 - 54	2,233	9.04
Age 55 - 59	1,840	7.45
Age 60 - 64	1,311	5.31
Age 65 - 74	1,392	5.64
Age 75 - 84	746	3.02
Age 85 and over	231	0.94
Age 16 and over	19,746	79.96
Age 18 and over	19,130	77.47
Age 21 and over	18,365	74.37
Age 65 and over	2,369	9.59
2006 Est. Median Age	39.24	
2006 Est. Average Age	37.99	



Trade Area: ZIP, (see appendix for geographies), aggregate

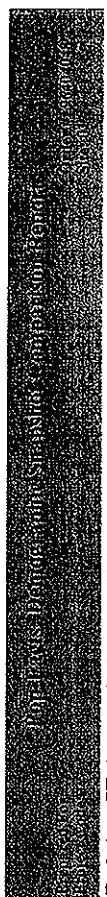
Description	Total ZIP	%
2006 Est. Male Population by Age		
Age 0 - 4	770	6.15
Age 5 - 9	756	6.04
Age 10 - 14	810	6.47
Age 15 - 17	485	3.87
Age 18 - 20	397	3.17
Age 21 - 24	599	4.78
Age 25 - 34	1,618	12.92
Age 35 - 44	2,134	17.04
Age 45 - 49	1,119	8.93
Age 50 - 54	1,126	8.99
Age 55 - 59	934	7.46
Age 60 - 64	691	5.52
Age 65 - 74	681	5.44
Age 75 - 84	316	2.52
Age 85 and over	89	0.71
2006 Est. Median Age, Male	38.88	
2006 Est. Average Age, Male	37.61	
2006 Est. Female Population by Age		
Age 0 - 4	12,170	
Age 5 - 9	758	6.23
Age 10 - 14	753	6.19
Age 15 - 17	770	6.33
Age 18 - 20	463	3.80
Age 21 - 24	368	3.02
Age 25 - 34	1,469	12.07
Age 35 - 44	1,985	16.31
Age 45 - 49	1,101	9.05
Age 50 - 54	1,107	9.10
Age 55 - 59	906	7.44
Age 60 - 64	620	5.09
Age 65 - 74	711	5.84
Age 75 - 84	430	3.53
Age 85 and over	142	1.17
2006 Est. Median Age, Female	39.62	
2006 Est. Average Age, Female	38.37	





Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total ZIP	%
2006 Est. Population Age 15+ by Marital Status*	20,078	
Total, Never Married	5,635	28.07
Married, Spouse present	9,599	47.81
Married, Spouse absent	923	4.60
Widowed	881	4.39
Divorced	3,040	15.14
Males, Never Married	3,139	15.63
Previously Married	1,790	8.92
Females, Never Married	2,496	12.43
Previously Married	2,419	12.05
2006 Est. Pop. Age 25+ by Educational Attainment*	17,179	
Less than 9th grade	569	3.31
Some High School, no diploma	1,225	7.13
High School Graduate (or GED)	4,401	25.62
Some College, no degree	5,135	29.89
Associate Degree	1,461	8.50
Bachelor's Degree	3,010	17.52
Master's Degree	797	4.64
Professional School Degree	404	2.35
Doctorate Degree	177	1.03



Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total ZIP	%
2006 Est. Households by Household Income	9,670	
Income Less than \$15,000	899	9.30
Income \$15,000 - \$24,999	903	9.34
Income \$25,000 - \$34,999	1,125	11.63
Income \$35,000 - \$49,999	1,508	15.59
Income \$50,000 - \$74,999	2,040	21.10
Income \$75,000 - \$99,999	1,188	12.29
Income \$100,000 - \$149,999	1,198	12.39
Income \$150,000 - \$249,999	595	6.15
Income \$250,000 - \$499,999	149	1.54
Income \$500,000 and more	65	0.67
2006 Est. Average Household Income	\$72,718	
2006 Est. Median Household Income	\$34,906	
2006 Est. Per Capita Income	\$28,556	
2006 Est. Household Type, Presence Own Children*	9,670	
Single Male Householder	1,394	14.42
Single Female Householder	1,213	12.54
Married-Couple Family, own children	1,968	20.35
Married-Couple Family, no own children	2,590	26.78
Male Householder, own children	282	2.92
Male Householder, no own children	195	2.02
Female Householder, own children	570	5.89
Female Householder, no own children	340	3.52
Nonfamily, Male Householder	684	7.07
Nonfamily, Female Householder	434	4.49
2006 Est. Households by Household Size*	9,670	
1-person household	2,607	26.96
2-person household	3,469	35.87
3-person household	1,486	15.37
4-person household	1,073	11.10
5-person household	502	5.19
6-person household	271	2.80
7 or more person household	262	2.71
2006 Est. Average Household Size	2.55	

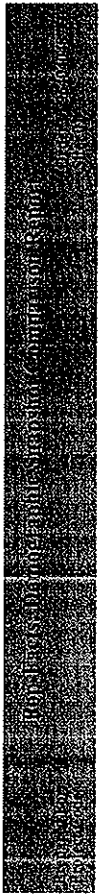
Description	Total ZIP	%
2006 Est. Population Age 15+ by Marital Status*	20,078	
Total, Never Married	5,635	28.07
Married, Spouse present	9,599	47.81
Married, Spouse absent	923	4.60
Widowed	881	4.39
Divorced	3,040	15.14
Males, Never Married	3,139	15.63
Previously Married	1,790	8.92
Females, Never Married	2,496	12.43
Previously Married	2,419	12.05
2006 Est. Pop. Age 25+ by Educational Attainment*	17,179	
Less than 9th grade	569	3.31
Some High School, no diploma	1,225	7.13
High School Graduate (or GED)	4,401	25.62
Some College, no degree	5,135	29.89
Associate Degree	1,461	8.50
Bachelor's Degree	3,010	17.52
Master's Degree	797	4.64
Professional School Degree	404	2.35
Doctorate Degree	177	1.03

Description	Total ZIP	%
Households	9,670	
2011 Projection	10,710	
2006 Estimate	9,670	
2000 Census	8,418	
1990 Census	5,483	
Growth 2006-2011	10.75%	
Growth 2000-2006	14.87%	
Growth 1990-2000	53.53%	
2006 Est. Households by Household Type	9,670	
Family Households	5,945	61.48
Nonfamily Households	3,725	38.52
2006 Est. Group Quarters Population	77	
2006 Households by Ethnicity, Hispanic/Latino	524	5.42



Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total ZIP	%
2006 Est. Households by Presence of People* Households with 1 or more People under Age 18:	9,670	
Married-Couple Family	2,134	22.07
Other Family, Male Householder	320	3.31
Other Family, Female Householder	651	6.73
Nonfamily, Male Householder	40	0.41
Nonfamily, Female Householder	15	0.16
Households no People under Age 18:		
Married-Couple Family	2,424	25.07
Other Family, Male Householder	157	1.62
Other Family, Female Householder	259	2.68
Nonfamily, Male Householder	2,038	21.08
Nonfamily, Female Householder	1,632	16.88
2006 Est. Households by Number of Vehicles*	9,670	
No Vehicles	347	3.59
1 Vehicle	3,848	39.79
2 Vehicles	3,992	41.28
3 Vehicles	950	9.82
4 Vehicles	320	3.31
5 or more Vehicles	213	2.20
2006 Est. Average Number of Vehicles*	1.78	
Family Households	6,587	
2011 Projection	5,945	
2006 Estimate	5,170	
2000 Census	3,482	
1990 Census	10.80%	
Growth 2006-2011	14.99%	
Growth 2000-2006	48.48%	
Growth 1990-2000		



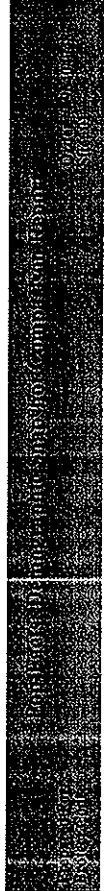
Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total ZIP	%
2006 Est. Family Households by Household Income	5,945	
Income Less than \$15,000	364	6.12
Income \$15,000 - \$24,999	426	7.17
Income \$25,000 - \$34,999	486	8.17
Income \$35,000 - \$49,999	836	14.06
Income \$50,000 - \$74,999	1,311	22.05
Income \$75,000 - \$99,999	910	15.31
Income \$100,000 - \$149,999	948	15.95
Income \$150,000 - \$249,999	500	8.41
Income \$250,000 - \$499,999	117	1.97
Income \$500,000 and more	47	0.79
2006 Est. Average Family Household Income	\$84,756	
2006 Est. Median Family Household Income	\$66,406	
2006 Est. Families by Poverty Status*	5,945	
Income At or Above Poverty Level:	2,022	34.01
Married-Couple Family, own children	2,318	38.99
Married-Couple Family, no own children	278	4.68
Male Householder, own children	136	2.29
Female Householder, own children	539	9.07
Female Householder, no own children	229	3.85
Income Below Poverty Level:	80	1.35
Married-Couple Family, own children	138	2.32
Married-Couple Family, no own children	40	0.67
Male Householder, own children	23	0.39
Female Householder, own children	125	2.10
Female Householder, no own children	17	0.29
2006 Est. Pop Age 16+ by Employment Status*	19,746	
In Armed Forces	30	0.15
Civilian - Employed	13,679	69.27
Civilian - Unemployed	677	3.43
Not in Labor Force	5,360	27.14



Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total ZIP	%
2006 Est. Civ Employed Pop 16+ Class of Worker*	13,679	
For-Profit Private Workers	10,095	73.80
Non-Profit Private Workers	502	3.67
Local Government Workers	318	2.32
State Government Workers	842	6.16
Federal Government Workers	160	1.17
Self-Emp Workers	1,719	12.57
Unpaid Family Workers	43	0.31
2006 Est. Civ Employed Pop 16+ by Occupation*	13,679	
Management, Business, and Financial Operations	1,658	12.12
Professional and Related Occupations	2,027	14.82
Service	3,987	29.15
Sales and Office	3,618	26.45
Farming, Fishing, and Forestry	117	0.86
Construction, Extraction and Maintenance	1,316	9.62
Production, Transportation and Material Moving	956	6.99
2006 Est. Pop 16+ by Occupation Classification*	13,679	
Blue Collar	2,272	16.61
White Collar	7,273	53.17
Service and Farm	4,134	30.22
2006 Est. Workers Age 16+, Transportation To Work*	13,315	
Drove Alone	9,890	74.28
Car Pooled	1,753	13.17
Public Transportation	70	0.53
Walked	379	2.85
Motorcycle	120	0.90
Bicycle	258	1.94
Other Means	113	0.85
Worked at Home	732	5.50
2006 Est. Workers Age 16+ by Travel Time to Work*	12,583	
Less than 15 Minutes	4,523	35.95
15 - 29 Minutes	4,838	38.45
30 - 44 Minutes	1,769	14.06
45 - 59 Minutes	966	7.68
60 or more Minutes	487	3.87
2006 Est. Average Travel Time to Work in Minutes*	23.52	



Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total ZIP	%
2006 Est. Tenure of Occupied Housing Units	9,670	
Owner Occupied	4,882	50.49
Renter Occupied	4,788	49.51
2006 Occ Housing Units, Avg Length of Residence	7	
2006 Est. All Owner-Occupied Housing Values	4,882	
Value Less than \$20,000	0	0.00
Value \$20,000 - \$39,999	14	0.29
Value \$40,000 - \$59,999	0	0.00
Value \$60,000 - \$79,999	3	0.06
Value \$80,000 - \$99,999	29	0.59
Value \$100,000 - \$149,999	338	6.92
Value \$150,000 - \$199,999	629	12.88
Value \$200,000 - \$299,999	743	15.22
Value \$300,000 - \$399,999	1,060	21.71
Value \$400,000 - \$499,999	690	14.13
Value \$500,000 - \$749,999	716	14.67
Value \$750,000 - \$999,999	231	4.73
Value \$1,000,000 or more	429	8.79
2006 Est. Median All Owner-Occupied Housing Value	\$364,609	
2006 Est. Housing Units by Units in Structure*	15,445	
1 Unit Attached	795	5.15
1 Unit Detached	5,062	32.77
2 Units	327	2.12
3 to 19 Units	3,892	25.20
20 to 49 Units	1,255	8.13
50 or More Units	4,107	26.59
Mobile Home or Trailer	7	0.05
Boat, RV, Van, etc.	0	0.00

Trade Area: ZIP, (see appendix for geographies), aggregate

Description	Total	ZIP	%
2006 Est. Housing Units by Year Structure Built	15,445		
Housing Units Built 1999 to 2006	2,348	15.20	
Housing Unit Built 1995 to 1998	848	5.49	
Housing Unit Built 1990 to 1994	3,013	19.51	
Housing Unit Built 1980 to 1989	4,207	27.24	
Housing Unit Built 1970 to 1979	4,287	27.76	
Housing Unit Built 1960 to 1969	450	2.91	
Housing Unit Built 1950 to 1959	139	0.90	
Housing Unit Built 1940 to 1949	114	0.74	
Housing Unit Built 1939 or Earlier	39	0.25	
2006 Est. Median Year Structure Built **	1986		

*In contrast to Claritas Demographic Estimates, "smoothed" data items are Census 2000 tables made consistent with current year estimated and 5 year projected base counts.
 **1939 will appear when at least half of the Housing Units in this reports area were built in 1939 or earlier.

Trade Area: ZIP, (see appendix for geographies), aggregate

Appendix: Area Listing

Area Name	Reporting Level	Area ZIP Codes	Aggregate	Reporting Detail	Area ZIP Codes
96753	1	96753			
Kilhe					

MIS #	Class	Dir	LT	Zone	Sec	Plat	Par	CPR	Building Name	Address	Unit	Land SQFT	Beds	Baths	Liv A SF	Original Price	List Price	DOM
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319794	CO	Kihai	FS				1	107	12 Kihai Bay Surf	715 S Kihai Road	112	123710	0	1.0	445	\$ 250,000	\$ 229,500	162
320172	CO	Kihai	FS				3	107	100 Kihai Bay Surf	715 S Kihai Road	241	123710	0	1.0	445	\$ 230,000	\$ 230,000	130
322356	CO	Kihai	FS				3	107	50 Kihai Bay Surf	715 S Kihai Rd.	150	123710	0	1.0	445	\$ 239,000	\$ 239,000	3
314783	CO	Kihai	FS				3	107	70 Kihai Bay Surf	715 S Kihai Rd.	219	123710	0	1.0	445	\$ 245,000	\$ 245,000	434
319923	CO	Kihai	FS				3	107	95 Kihai Bay Surf	715 S Kihai Road	236	123710	0	1.0	445	\$ 249,500	\$ 249,500	1
322277	CO	Kihai	FS				3	107	81 Kihai Bay Surf	715 S Kihai Road	222	123710	0	1.0	445	\$ 249,500	\$ 249,500	1
321933	CO	Kihai	FS				3	107	68 Kihai Bay Surf	715 S Kihai Rd.	209	123710	0	1.0	445	\$ 268,000	\$ 268,000	23
320277	CO	Kihai	FS				3	107	80 Kihai Bay Surf	715 S Kihai Road	221	123710	0	1.0	445	\$ 270,000	\$ 270,000	85
321530	CO	Kihai	FS				3	107	67 Kihai Bay Surf	715 S Kihai Rd.	208	123710	0	1.0	445	\$ 275,000	\$ 275,000	42
322350	CO	Kihai	FS				3	44	59 Haleakala Gardens	15 Kuaohaku St	7X	387031	0	1.0	528	\$ 285,000	\$ 285,000	3
321457	CO	Kihai	FS				3	75	169 Kahaole Makai	938 S Kihai Rd	120	601	0	1.0	602	\$ 908,000	\$ 599,000	52
321926	CO	Kihai	FS				3	16	4 Kihai Manor	2136 Konoa	104	11086	1	1.0	410	\$ 230,000	\$ 230,000	21
317378	CO	Kihai	FS				3	16	8 Waiola Apartments	52 Waiola Street	8	10005	1	1.0	431	\$ 269,000	\$ 231,999	307
315544	CO	Kihai	FS				3	16	4 85 Waiola Street	85 Waiola Street	5	9583	1	1.0	431	\$ 360,000	\$ 235,000	397
322300	CO	Kihai	FS				3	16	3 Kihai Parkshore	2037 S Kihai Road	3	978357600	1	1.0	478	\$ 540,000	\$ 540,000	36
320476	CO	Kihai	FS				3	28	22 Kihai Surfside	2936 S Kihai Road	208	65340	1	1.0	504	\$ 769,000	\$ 769,000	109
321944	CO	Kihai	FS				3	16	52 Kahauna Terrace	35 Waiola St.	P302	63162	1	1.0	514	\$ 259,000	\$ 259,000	49
321406	CO	Kihai	FS				3	1	18 Waipuhia	1002 S Kihai Road	204	53143	1	1.0	520	\$ 350,000	\$ 350,000	49
320857	CO	Kihai	FS				3	17	3 Kanoa Apts	2050 Kanoa Street	103	23229	1	1.0	523	\$ 315,000	\$ 315,000	79
317720	CO	Kihai	FS				3	16	24 Kahauna Terrace	35 Waiola St	L305	65162	1	1.0	535	\$ 319,000	\$ 285,000	339
319959	CO	Maaloa	FS				3	8	54 Maaloa Kai	70 Hauuli Street	315	125453	1	1.0	546	\$ 650,000	\$ 659,000	148
321741	CO	Kihai	FS				3	16	17 Kihai Villa	2135 S Kihai Rd	205	21088	1	1.0	556	\$ 249,900	\$ 255,000	33
321470	CO	Kihai	FS				3	16	9 Kihai Villa	2135 S Kihai Road	109	20909	1	1.0	556	\$ 255,000	\$ 255,000	71
322060	CO	Kihai	FS				3	16	11 Kihai Villa	2135 S Kihai Rd	111	188293280	1	1.0	556	\$ 265,900	\$ 265,900	384
320871	CO	Kihai	FS				3	20	6 Kihai Villa	2135 S Kihai Road	106	21088	1	1.0	556	\$ 299,000	\$ 299,000	78
317523	CO	Kihai	FS				3	21	14 Maui Gardens	A-206	17240	17240	1	1.0	560	\$ 319,000	\$ 269,000	298
320193	CO	Kihai	FS				3	21	50 Maui Gardens	A-106	17240	17240	1	1.0	560	\$ 299,000	\$ 299,000	62
320532	CO	Kihai	FS				3	21	82 Maui Gardens	F-204	159608	159608	1	1.0	560	\$ 319,000	\$ 319,000	104
320936	CO	Kihai	FS				3	21	84 Maui Gardens	G-102	159430	159430	1	1.0	560	\$ 329,000	\$ 329,000	82
320443	CO	Kihai	FS				3	128	8 Maui Gardens Kai	34 Waihana Place	87120	87120	1	1.0	576	\$ 379,000	\$ 364,900	125
321614	CO	Kihai	FS				3	128	9 Maui Gardens Kai	34 Waihana Place	204	14810	1	1.0	576	\$ 374,000	\$ 374,000	176
322213	CO	Kihai	FS				3	18	111 Maui Villa	2191 S Kihai Road	2114	384199	1	1.0	588	\$ 348,000	\$ 348,000	11
319511	CO	Kihai	FS				3	18	325 Maui Villa	2191 S Kihai Road	3319	384199	1	1.0	588	\$ 389,000	\$ 379,000	176
320535	CO	Kihai	FS				3	18	102 Maui Villa	2191 S Kihai Road	2104	384199	1	1.0	588	\$ 379,000	\$ 379,000	97
318803	CO	Kihai	FS				3	18	38 Maui Villa	2191 S Kihai Road	1-215	384199	1	1.0	588	\$ 425,000	\$ 395,000	221
322301	CO	Kihai	FS				3	18	15 Maui Villa	2191 S Kihai Road	1116	384199	1	1.0	588	\$ 399,000	\$ 399,000	8
320018	CO	Kihai	FS				3	18	63 Maui Villa	2191 S Kihai Road	1-315	384199	1	1.0	588	\$ 409,000	\$ 409,000	144
321458	CO	Kihai	FS				3	18	241 Maui Villa	2191 S Kihai Road	3305	384199	1	1.0	588	\$ 429,000	\$ 429,000	46
322180	CO	Kihai	FS				3	9	31 Waihanui Beach Hale	49 W Upoa Street	205	90880	1	1.0	592	\$ 450,000	\$ 450,000	13
318097	CO	Kihai	FS				3	9	20 Waihanui Beach Hale	49 W Upoa Street	121	90880	1	1.0	592	\$ 488,000	\$ 490,000	269

EXHIBIT B
Active Listings and Sold Properties-South Maui
Vacant Land, Single-Family and Condominiums

Table with columns for address, unit, floor, area, and price. Includes entries like 321000 RS, 320979 RS, 320894 RS, etc.

median

Table with columns for address, unit, floor, area, and price. Includes entries like 321000 RS, 320979 RS, 320894 RS, etc.

Table with columns for address, unit, floor, area, and price. Includes entries like 319465 LO, 319314 LO, 322169 LO, etc.

median

Table with columns for address, unit, floor, area, and price. Includes entries like 319465 LO, 319314 LO, 322169 LO, etc.

316588	CO	Kihai	FS	3	9	4	134	159	\$	410,000	4/18/2006	160	Keonekai Road
316586	CO	Kihai	FS	3	9	4	134	0246	\$	395,000	4/14/2006	160	Keonekai Road
316585	CO	Kihai	FS	3	9	4	134	81	\$	380,000	3/17/2006	160	Keonekai Rd
316584	CO	Kihai	FS	3	9	4	8	48	\$	405,000	3/7/2006	160	ULUNU RD
316583	CO	Kihai	FS	3	9	4	134	146	\$	410,000	1/22/2006	160	Keonekai Rd.
316582	CO	Kihai	FS	3	9	4	134	69	\$	405,000	6/1/2006	160	Keonekai Road
316581	CO	Kihai	FS	3	9	4	134	197	\$	400,900	1/31/2006	160	Keonekai Rd.
316580	CO	Kihai	FS	3	9	4	134	70	\$	392,000	2/1/2006	160	Keonekai Rd
316579	CO	Kihai	FS	3	9	4	134	186	\$	380,000	1/23/2006	160	Keonekai Road
316578	CO	Kihai	FS	3	9	4	134	4	\$	375,000	7/7/2006	160	Keonekai Road
316577	CO	Kihai	FS	3	9	4	134	195	\$	375,000	10/27/2006	160	Keonekai Road
316576	CO	Kihai	FS	3	9	4	134	44	\$	375,000	7/10/2006	160	Keonekai Road
316575	CO	Kihai	FS	3	9	4	134	143	\$	375,000	12/18/2006	160	Keonekai Road
316574	CO	Kihai	FS	3	9	4	134	156	\$	375,000	9/29/2006	160	Keonekai Rd
316573	CO	Kihai	FS	3	8	7	14	4	\$	354,500	1/12/2007	140	Uwapa Road
316572	CO	Kihai	FS	3	8	7	3	15	\$	354,000	5/1/2006	140	Uwapa Rd
316571	CO	Kihai	FS	3	9	1	153	85	\$	350,000	8/4/2006	480	Kenolio Road
316570	CO	Kihai	FS	3	9	1	001	0013	\$	350,000	4/3/2006	480	Kenolio Road
316569	CO	Kihai	FS	3	8	7	3	79	\$	350,000	3/17/2006	140	Uwapa Road
316568	CO	Kihai	FS	3	8	7	14	38	\$	345,000	7/20/2006	140	Uwapa Rd.
316567	CO	Kihai	FS	3	9	4	134	169	\$	345,000	1/17/2007	160	Keonekai Road
316566	CO	Kihai	FS	3	8	7	12	45	\$	345,000	3/27/2006	140	Uwapa Road
316565	CO	Kihai	FS	3	9	1	153	86	\$	340,000	4/7/2006	480	Kenolio Road
316564	CO	Kihai	FS	3	9	1	134	63	\$	340,000	10/20/2006	160	Keonekai Road
316563	CO	Kihai	FS	3	9	1	153	84	\$	339,000	4/28/2006	480	Kenolio Road
316562	CO	Kihai	FS	3	8	9	99	12	\$	335,000	3/23/2006	480	Kenolio Road
316561	CO	Kihai	FS	3	8	7	7	47	\$	335,750	3/30/2006	140	Uwapa Rd. #6-103
316560	CO	Kihai	FS	3	8	7	1	72	\$	330,900	4/17/2006	140	Uwapa Road
316559	CO	Kihai	FS	3	8	7	7	77	\$	330,000	3/22/2006	140	Uwapa Road
316558	CO	Kihai	FS	3	9	1	153	0018	\$	330,000	2/17/2006	480	Kenolio Road
316557	CO	Kihai	FS	3	8	7	2	66	\$	327,500	3/8/2006	140	Uwapa Rd
316556	CO	Kihai	FS	3	9	1	64	63	\$	326,500	10/31/2006	480	Kenolio Road
316555	CO	Kihai	FS	3	9	1	153	17	\$	325,000	11/28/2006	480	Kenolio Road
316554	CO	Kihai	FS	3	9	1	153	57	\$	325,000	3/16/2006	480	Kenolio Road
316553	CO	Kihai	FS	3	8	7	7	65	\$	320,000	4/19/2006	140	Uwapa Rd
316552	CO	Kihai	FS	3	9	1	153	101	\$	320,000	6/30/2006	480	Kenolio Rd.
316551	CO	Kihai	FS	3	8	7	7	42	\$	320,000	8/25/2006	140	Uwapa Road
316550	CO	Kihai	FS	3	9	1	153	40	\$	320,000	5/12/2006	480	Kenolio Road
316549	CO	Kihai	FS	3	9	1	153	99	\$	320,000	3/31/2006	480	Kenolio Road
316548	CO	Kihai	FS	3	8	7	13	67	\$	315,500	3/22/2006	140	Uwapa Rd
316547	CO	Kihai	FS	3	9	1	64	14	\$	312,000	3/24/2006	480	Kenolio Road
316546	CO	Kihai	FS	3	9	1	99	18	\$	310,000	12/29/2006	480	Kenolio Rd.
316545	CO	Kihai	FS	3	8	7	13	17	\$	309,000	3/24/2006	140	Uwapa Road
316544	CO	Kihai	FS	3	8	7	7	80	\$	306,000	10/6/2006	140	Uwapa Road #26-204
316543	CO	Kihai	FS	3	9	1	99	21	\$	306,000	7/28/2006	480	Kenolio Road
316542	CO	Kihai	FS	3	9	1	99	86	\$	305,000	7/7/2006	480	Kenolio Rd

316541	CO	Kihai	FS	3	9	1	153	65	\$	305,000	10/11/2006	480	Kenolio Road
316540	CO	Kihai	FS	3	8	7	7	106	\$	305,000	5/2/2006	140	Uwapa Road
316539	CO	Kihai	FS	3	8	7	1	26	\$	300,000	8/8/2006	140	Uwapa Road
316538	CO	Kihai	FS	3	8	7	7	128	\$	300,000	8/11/2006	140	Uwapa Road
316537	CO	Kihai	FS	3	8	7	14	56	\$	300,000	12/4/2006	140	Uwapa Road
316536	CO	Kihai	FS	3	8	7	1	12	\$	300,000	12/22/2006	140	Uwapa Road
316535	CO	Kihai	FS	3	8	7	3	26	\$	299,900	4/10/2006	140	Uwapa Road
316534	CO	Kihai	FS	3	8	7	2	93	\$	296,000	6/22/2006	140	Uwapa Road
316533	CO	Kihai	FS	3	9	1	153	3	\$	292,500	8/29/2006	480	Kenolio
316532	CO	Kihai	FS	3	8	7	3	24	\$	292,500	11/8/2006	140	Uwapa Road
316531	CO	Kihai	FS	3	8	7	7	18	\$	292,500	9/22/2006	140	Uwapa Road
316530	CO	Kihai	FS	3	9	1	64	74	\$	292,500	10/20/2006	480	Kenolio Road
316529	CO	Kihai	FS	3	9	1	64	74	\$	292,500	12/28/2006	480	Kenolio Road
316528	CO	Kihai	FS	3	8	7	7	62	\$	292,500	8/31/2006	140	Uwapa Road
316527	CO	Kihai	FS	3	9	1	153	16	\$	292,500	8/8/2006	480	Kenolio Road
316526	CO	Kihai	FS	3	9	1	001	0073	\$	292,000	11/16/2006	480	Kenolio Road
316525	CO	Kihai	FS	3	9	1	153	58	\$	290,000	1/4/2007	480	Kenolio Road
316524	CO	Kihai	FS	3	8	7	14	76	\$	289,900	10/25/2006	140	Uwapa Road
316523	CO	Kihai	FS	3	9	1	153	60	\$	287,500	9/13/2006	480	Kenolio Road
316522	CO	Kihai	FS	3	9	1	64	20	\$	285,000	12/29/2006	480	Kenolio Road
316521	CO	Kihai	FS	3	9	1	153	24	\$	280,000	12/1/2006	480	Kenolio Road
316520	CO	Kihai	FS	3	8	7	7	26	\$	280,000	7/27/2006	140	Uwapa Road
316519	CO	Kihai	FS	3	8	7	7	110	\$	280,000	12/1/2006	140	Uwapa Rd
316518	CO	Kihai	FS	3	8	7	7	71	\$	270,000	11/8/2006	140	Uwapa Road
316517	CO	Kihai	FS	3	8	7	7	49	\$	270,000	12/8/2006	140	Uwapa Road
316516	CO	Kihai	FS	3	9	1	1306	1	\$	390,000	1/30/2006	21	Voltaire Place
316515	CO	Kihai	FS	3	9	1	18	51	\$	440,000	5/9/2006	2219	S. Kihai Road
316514	CO	Kihai	FS	3	9	1	18	48	\$	417,000	4/10/2006	2219	S. Kihai Road
316513	CO	Kihai	FS	3	9	1	113	113	\$	410,000	11/3/2006	2219	S. Kihai Road
316512	CO	Kihai	FS	3	9	1	18	70	\$	395,000	2/23/2006	2219	S. Kihai Rd
316511	CO	Kihai	FS	3	9	1	18	125	\$	393,000	4/17/2006	2219	S. Kihai Road
316510	CO	Kihai	FS	3	9	1	18	49	\$	390,000	4/21/2006	2219	S. Kihai Road
316509	CO	Kihai	FS	3	9	1	18	114	\$	370,000	4/1/2006	2219	S. Kihai Rd
316508	CO	Kihai	FS	3	9	1	018	0042	\$	370,000	12/1/2006	2219	S. Kihai Road
316507	CO	Kihai	FS	3	9	1	18	2	\$	350,000	10/19/2006	2219	S. Kihai Road
316506	CO	Kihai	FS	3	8	7	2	4	\$	350,000	3/22/2006	140	Uwapa Road
316505	CO	Kihai	FS	3	8	7	2	54	\$	310,000	6/5/2006	140	Uwapa Road
316504	CO	Kihai	FS	3	8	7	2	92	\$	310,000	7/21/2006	280	Hauuli Road
316503	CO	Malden	FS	3	8	7	14	2	\$	599,000	7/21/2006	280	Hauuli Road
316502	CO	Kihai	FS	3	9	1	20	3	\$	390,000	6/30/2006	50	Volahill Street
316501	CO	Kihai	FS	3	9	4	135	200	\$	295,000	4/28/2006	2747	S. Kihai Road
316500	CO	Kihai	FS	3	9	4	135	181	\$	260,000	8/30/2006	2747	S. Kihai Road
316499	CO	Kihai	FS	3	9	4	135	197	\$	372,900	4/28/2006	2747	S. Kihai Road
316498	CO	Kihai	FS	3	9	4	135	156	\$	372,900	7/13/2006	2747	Kihai Rd
316497	CO	Kihai	FS	3	9	4	135	194	\$	260,000	10/12/2006	2747	S. Kihai Road
316496	CO	Kihai	FS	3	9	4	135	29	\$	325,000	4/21/2006	2747	S. Kihai Rd.
316495	CO	Kihai	FS	3	9	4	135	76	\$	305,000	7/25/2006	2747	S. Kihai Rd.

320090 LD	Kihai	Fee 3	9	035	101	\$	336,000	11/30/2006	Lot 25 Hanawa St.	7502	83
316743 LD	Kihai	Fee 3	9	35	2	\$	340,000	12/13/2006	Honua Street Lot 2, Phase 1	7507	295
315019 LD	Kihai	Fee 3	9	35	TBD	\$	349,000	11/9/2006	Honu Aholehi Place	7510	344
315274 LD	Kihai	Fee 3	9	30	37	\$	375,000	7/24/2006	lot 37 Kaehole	8354	203
318313 LD	Kihai	Fee 3	9	35	6	\$	400,000	7/18/2006	38 Hanawa Place	7500	333
316271 LD	Kihai	Fee 3	9	10	21	\$	715,000	3/15/2006	1615 Hanawa Street	9148	47
318092 LD	Kihai	Fee 2	1	24	74	\$	1,500,000	7/6/2006	211 E Ikae Kala Street	10890	63
311705 LD	Kihai	Fee 3	9	45	16	\$	1,630,000	4/10/2006	00 Mono o Kalo Street	4012	340
311922 LD	Kihai	Fee 3	9	009	007	\$	2,250,000	10/10/2006	83 Kapu Place	8391	503
216224 LD	Kihai	Fee 3	9	20	32	\$	2,450,000	4/18/2006	2505 S KIHEI RD	63726	1817
319029 LD	Kihai	Fee 3	9	9	4	\$	2,500,000	12/11/2006	65 Kapu Pl.	7508	161
314600 LD	Kihai	Fee 3	9	17	34	\$	6,000,000	9/14/2006	0 Aliohalo Place	609840	313
318505 LD	Mauai Md	Fee 2	1	14	42	\$	805,000	12/15/2006	533 Mikhai Place	22128	198
316012 LD	Mauai Md	Fee 2	1	14	65	\$	800,000	4/21/2006	490 Hooholohola	21780	98
312126 LD	Mauai Md	Fee 2	1	15	1	\$	830,000	2/24/2006	3210 Akela Drive	22651	276
313833 LD	Mauai Md	Fee 2	1	19	94	\$	1,800,000	11/30/2006	195 Kaimanu Place	97574	457

320090 LD	Moolooa	LH	3	8	14	22	\$	345,000	6/20/2006	50 Hanuli St.	557	207
311051 CO	Kihai	LH	3	9	5	8	\$	640,000	2/15/2006	2450 S Kihai Road	33976	355
310509 CO	Kihai	LH	3	9	5	8	\$	600,000	2/15/2006	2450 S Kihai Road	33976	134
320811 CO	Moolooa	LH	3	8	14	16	\$	545,000	10/31/2006	100 Hanuli Road	78190	60
319990 CO	Kihai	LH	3	8	5	8	\$	29	6/6/2006	2450 S Kihai Road	774	32
319690 CO	Moolooa	LH	3	8	14	16	\$	550,000	9/25/2006	100 Hanuli Road	78190	153
319401 CO	Moolooa	LH	3	8	14	14	\$	670,000	9/15/2006	100 Hanuli Road	78190	314
315105 CO	Moolooa	LH	3	8	14	14	\$	670,000	9/15/2006	100 Hanuli Road	78190	54
316922 CO	Moolooa	LH	3	8	14	14	\$	620,000	6/9/2006	250 HAUOLI STREET	111908	100
314892 CO	Kihai	LH	3	8	81	4	\$	890,000	5/10/2006	2881 S Kihai Road	533479	99
315858 CO	Moolooa	LH	3	8	014	022	\$	890,000	3/7/2006	50 HAUOLI RD.	53014	170
320524 CO	Kihai	LH	3	8	81	4	\$	275,000	12/15/2006	2881 S Kihai Road	533479	66
315593 CO	Moolooa	LH	3	8	14	26	\$	390,000	7/11/2006	20 Hanuli Road	38040	196
317668 CO	Moolooa	LH	3	8	14	21	\$	390,000	3/24/2006	70 Hanuli Road	99655	57

319241 CO	Kihai	FS	3	9	1	160	\$	535,000	3/30/2006	20 Halihi Lane	906	205
316460 CO	Kihai	FS	3	9	001	160	\$	455,000	2/7/2006	10 Halihi Lane	22125	236
318923 CO	Kihai	FS	3	9	4	82	\$	1,100,000	6/14/2006	2777 S Kihai Rd.	1014948	0
315428 CO	Kihai	FS	3	9	4	82	\$	1,200,000	6/2/2006	2777 S Kihai Road	1015819	168
316582 CO	Kihai	FS	3	9	4	82	\$	1,000,000	6/2/2006	2777 S Kihai Rd.	1001880	112
319040 CO	Kihai	FS	3	9	4	84	\$	575,000	11/8/2006	2695 S Kihai Road	359332	128
313096 CO	Kihai	FS	3	9	4	4	\$	760,000	3/1/2006	2695 S Kihai Road	639300	197
313621 CO	Kihai	FS	3	9	4	4	\$	760,000	7/1/2006	2695 S Kihai Road	653400	219
318527 CO	Kihai	FS	3	9	4	4	\$	760,000	7/1/2006	2695 S Kihai Road	653400	127
313440 CO	Kihai	FS	3	9	4	4	\$	730,000	3/14/2006	2695 S KIHEI ROAD	45360	194
313960 CO	Kihai	FS	3	9	4	4	\$	655,000	4/13/2006	2695 S Kihai Road	653400	90
320386 CO	Kihai	FS	3	9	4	4	\$	665,000	9/29/2006	2695 S Kihai Road	653400	0
312625 CO	Kihai	FS	3	9	4	4	\$	640,000	3/31/2006	2695 South Kihai Road	653400	236
314911 CO	Kihai	FS	3	9	001	160	\$	475,000	7/14/2006	40 Halihi Lane	383328	234
314660 CO	Kihai	FS	3	9	4	4	\$	680,000	4/7/2006	2695 S Kihai Road	675180	162
314744 CO	Kihai	FS	3	8	13	6	\$	1,150,000	5/31/2006	12 S Kihai Road	225249	254
314544 CO	Kihai	FS	3	8	13	10	\$	995,000	3/7/2006	73 N Kihai Road	40033	126
314731 CO	Kihai	FS	3	9	4	143	\$	990,000	3/24/2006	2777 S Kihai Road	1015819	134
319941 CO	Kihai	FS	3	9	4	82	\$	1,000,000	10/25/2006	2777 S Kihai Road	1015819	107
320332 CO	Moolooa	LH	3	8	14	22	\$	323,000	12/22/2006	50 Hanuli St.	54014	87
314392 CO	Kihai	LH	3	8	13	18	\$	390,000	10/17/2006	191 N Kihai Road	38842	358
314583 CO	Kihai	FS	3	8	13	18	\$	180,000	7/11/2006	191 N Kihai Road	33845	251
318197 CO	Kihai	FS	3	9	1	134	\$	600,000	9/15/2006	811 S Kihai Road	249376	85
318498 CO	Kihai	FS	3	9	4	4	\$	700,000	8/22/2006	2695 S Kihai Rd.	653400	83
318743 CO	Kihai	FS	3	9	4	4	\$	760,000	12/6/2006	2695 S Kihai Road	652400	173
315529 CO	Kihai	FS	3	9	1	134	\$	370,000	3/3/2006	811 S Kihai Road	245373	71
321941 CO	Kihai	FS	3	9	1	160	\$	482,000	12/29/2006	10 Halihi Lane Street	381150	36
313515 CO	Kihai	FS	3	9	1	16	\$	599,000	1/26/2006	44 Kanani Road	174240	147
314799 CO	Kihai	FS	3	9	44	42	\$	492,000	4/7/2006	15 Kuanhikoi St	387031	168
318127 CO	Kihai	FS	3	9	1	85	\$	59	10/9/2006	760 S Kihai Road	166181	154
318635 CO	Kihai	FS	3	9	16	2	\$	450,000	9/29/2006	44 Kanani Road	172440	113
318435 CO	Kihai	FS	3	9	4	135	\$	515,000	7/28/2006	2747 S Kihai Road	130871	63
318527 CO	Kihai	FS	3	9	4	135	\$	405,000	8/2/2006	2747 S Kihai Road	301871	61
316010 CO	Kihai	FS	3	9	4	135	\$	370,000	7/26/2006	2747 S Kihai Road	301871	191
316299 CO	Kihai	FS	3	9	4	135	\$	370,000	7/26/2006	2747 S Kihai Road	301871	93
314377 CO	Kihai	FS	3	9	1	160	\$	590,000	3/1/2006	20 Halihi Lane #2A	381150	128
316519 CO	Kihai	FS	3	9	41	41	\$	490,000	4/6/2006	15 Kuanhikoi St	387031	50
314458 CO	Kihai	FS	3	9	44	41	\$	442,500	2/7/2006	15 Kuanhikoi Street	387248	97
315081 CO	Kihai	FS	3	9	44	41	\$	419,000	6/1/2006	15 Kuanhikoi St	387031	93
313049 CO	Kihai	FS	3	9	44	41	\$	395,000	1/30/2006	15 Kuanhikoi Street #12-A	670824	171
314824 CO	Kihai	FS	3	9	44	42	\$	389,900	4/7/2006	15 Kuanhikoi St	387031	144
315209 CO	Kihai	FS	3	9	44	41	\$	375,000	4/25/2006	15 Kuanhikoi Street	387031	141
318732 CO	Kihai	FS	3	9	44	42	\$	340,000	8/1/2006	15 Kuanhikoi St	387031	57
316530 CO	Kihai	FS	3	9	18	2	\$	450,000	5/5/2006	2219 S Kihai Rd.	206910	79
316821 CO	Kihai	FS	3	9	1	160	\$	529,000	9/29/2006	20 Halihi Lane	381150	217
313512 CO	Kihai	FS	3	9	1	160	\$	490,000	2/21/2006	60 Halihi Lane	381150	168
313499 CO	Kihai	FS	3	9	1	160	\$	535,000	3/30/2006	20 Halihi Lane	381150	205
313460 CO	Kihai	FS	3	9	001	160	\$	455,000	2/7/2006	10 Halihi Lane	22125	236

EXHIBIT C
2003 Hawaii Housing Study
Select Tables

316470 RS	Modl Mtd	Fee 2	1	18	72	\$ 1,875,000	5/5/2006	1136	Kaipuu Dr.	23348	4	3.0	2,600	88	\$ 1,975,000
315957 RS	Modl Mtd	Fee 2	1	18	45/46	\$ 2,795,000	8/10/2006	747	Kamohani Drive	51269	4	3.5	4,998	29	\$ 1,995,000
316014 RS	Modl Mtd	Fee 2	1	13	72	\$ 1,895,000	4/21/2006	3530	Kaohi Place	22651	4	3.0	2,479	98	\$ 1,995,000
317002 RS	Kihei	Fee 3	9	23	68	\$ 568,000	6/9/2006	302	Kamama Place	10220	5	3.0	2,060	94	\$ 650,000
316796 RS	Kihei	Fee 3	9	23	14	\$ 649,000	6/9/2006	302	Kamama Place	8933	5	3.0	1,930	185	\$ 649,900
318884 RS	Kihei	Fee 3	9	54	80	\$ 689,000	12/15/2006	71	Lanemokani Loop	4450	5	3.0	1,930	185	\$ 719,000
313586 RS	Kihei	Fee 3	9	048	132	\$ 692,000	5/31/2006	565	Kaohi Street	6011	5	3.0	1,976	263	\$ 675,000
315615 RS	Kihei	Fee 3	9	39	12	\$ 755,000	3/30/2006	472	Kaohi Place	7329	5	3.0	2,011	90	\$ 779,000
319753 RS	Kihei	Fee 3	9	48	13	\$ 760,000	8/11/2006	185	Ahihike Street	9097	5	3.0	2,010	22	\$ 750,000
317111 RS	Kihei	Fee 3	9	48	49	\$ 795,000	10/3/2006	138	E Ahihike Street	7634	5	3.0	2,040	203	\$ 798,000
315737 RS	Kihei	Fee 3	9	42	73	\$ 839,900	10/31/2006	2736	Pu'u Ho'ohai St	8125	5	3.0	2,011	300	\$ 839,900
316855 RS	Kihei	Fee 3	9	47	109	\$ 850,000	5/22/2006	275	Palaeha St	7610	5	3.0	2,492	83	\$ 870,000
319228 RS	Kihei	Fee 3	9	18	184	\$ 925,000	6/1/2006	286	Kaipuu Place	8927	5	4.0	2,219	202	\$ 995,000
319228 RS	Kihei	Fee 3	9	19	004	\$ 1,029,210	12/28/2006	108	Moana Avenue	7910	5	3.0	2,384	139	\$ 992,000
320041 RS	Kihei	Fee 3	9	19	54	\$ 1,110,000	12/21/2006	72	Moana Avenue	9100	5	4.0	2,543	107	\$ 1,150,000
314380 RS	Kihei	Fee 3	9	56	6	\$ 1,309,000	9/22/2006	80	Ahihike Street	7718	5	4.0	2,660	0	\$ 1,300,000
314380 RS	Kihei	Fee 3	9	56	6	\$ 1,770,000	7/7/2006	97	HOKAI PLACE	8331	5	3.5	3,000	256	\$ 1,795,000
315895 RS	Modl Mtd	Fee 2	1	15	11	\$ 930,000	2/28/2006	3090	Ahihike Drive	31363	5	4.0	2,849	49	\$ 899,000
314147 RS	Modl Mtd	Fee 2	1	19	35	\$ 950,000	7/12/2006	792	KUPULAU DRIVE	24959	5	3.5	2,832	275	\$ 1,050,000
314167 RS	Kihei	Fee 2	2	23	10	\$ 1,550,000	1/31/2006	452	Kupulau Drive	21780	5	4.0	3,300	61	\$ 1,550,000
314167 RS	Kihei	Fee 2	2	23	10	\$ 799,000	8/7/2006	302	HALE KAI STREET	7070	6	4.5	2,080	304	\$ 899,000
317584 RS	Kihei	Fee 3	9	22	21	\$ 995,000	6/2/2006	983	S Kihei Road	13756	6	5.0	3,959	59	\$ 995,000
312070 RS	Modl Mtd	Fee 2	1	17	16	\$ 1,798,000	2/2/2006	3523	Madina Place	22651	6	4.0	2,792	247	\$ 1,798,000
314448 RS	Kihei	Fee 3	9	054	064	\$ 727,000	7/12/2006	146	Ku'aha Street	3906	7	3.0	2,174	258	\$ 739,000
313401 RS	Kihei	Fee 3	9	24	33	\$ 745,000	3/28/2006	310	HUMUPEA PLACE	9006	7	4.0	2,740	211	\$ 775,000
312802 RS	Modl Mtd	Fee 2	1	19	92	\$ 6,000,000	7/10/2006	160	Kulamau Place	97138	7	6.0	6,854	350	\$ 7,000,000
316462 RS	Kihei	Fee 3	9	28	71	\$ 775,000	9/15/2006	129	Palaeha Place	7609	8	3.5	2,601	220	\$ 799,000
316968 RS	Kihei	Fee 3	9	76	66	\$ 784,000	8/28/2006	462	Kaloloa Street	6599	8	4.0	3,040	178	\$ 825,000

Year	Area	Value	Change	Percent	Category
1992	Maui	1,000	0	0%	Own now
1993	Maui	1,000	0	0%	Own now
1994	Maui	1,000	0	0%	Own now
1995	Maui	1,000	0	0%	Own now
1996	Maui	1,000	0	0%	Own now
1997	Maui	1,000	0	0%	Own now
1998	Maui	1,000	0	0%	Own now
1999	Maui	1,000	0	0%	Own now
2000	Maui	1,000	0	0%	Own now
2001	Maui	1,000	0	0%	Own now
2002	Maui	1,000	0	0%	Own now
2003	Maui	1,000	0	0%	Own now
1992	Honolulu	1,000	0	0%	Own now
1993	Honolulu	1,000	0	0%	Own now
1994	Honolulu	1,000	0	0%	Own now
1995	Honolulu	1,000	0	0%	Own now
1996	Honolulu	1,000	0	0%	Own now
1997	Honolulu	1,000	0	0%	Own now
1998	Honolulu	1,000	0	0%	Own now
1999	Honolulu	1,000	0	0%	Own now
2000	Honolulu	1,000	0	0%	Own now
2001	Honolulu	1,000	0	0%	Own now
2002	Honolulu	1,000	0	0%	Own now
2003	Honolulu	1,000	0	0%	Own now

Table IV-A-13. Financial Profile of Potential Buyers and Renters by County, 1992, 1997 and 2003

Location	Type	1992	1997	2003	Category
Honolulu	Potential Owners	48%	53%	47%	Own now
		38%	34%	55%	Make over \$25,000/year
		22%	23%	25%	Have HH incomes of \$75,000 or more
		91%	96%	96%	Currently employed
		21%	31%	10%	Have more than \$40,000 for down payment
	Potential Renters	5%	9%	11%	Own now
		22%	20%	39%	Make over \$25,000/year
		8%	7%	12%	Have HH incomes of \$75,000 or more
		74%	88%	87%	Currently employed
		9%	8%	16%	Have more than \$40,000 for down payment
Maui	Potential Owners	23%	30%	55%	Own now
		10%	18%	30%	Make over \$25,000/year
		89%	95%	97%	Have HH incomes of \$75,000 or more
		32%	22%	18%	Currently employed
		12%	14%	8%	Have more than \$40,000 for down payment
	Potential Renters	21%	7%	43%	Own now
		5%	7%	7%	Make over \$25,000/year
		87%	92%	88%	Have HH incomes of \$75,000 or more
		6%	6%	8%	Currently employed
		54%	62%	56%	Have more than \$40,000 for down payment
Hawaii	Potential Owners	17%	19%	47%	Own now
		9%	12%	28%	Make over \$25,000/year
		75%	80%	93%	Have HH incomes of \$75,000 or more
		25%	22%	20%	Currently employed
		13%	15%	20%	Have more than \$40,000 for down payment
	Potential Renters	13%	6%	21%	Own now
		5%	3%	2%	Make over \$25,000/year
		55%	78%	75%	Have HH incomes of \$75,000 or more
		3%	4%	7%	Currently employed
		46%	48%	55%	Have more than \$40,000 for down payment
Kauai	Potential Owners	43%	13%	58%	Own now
		16%	8%	33%	Make over \$25,000/year
		95%	94%	93%	Have HH incomes of \$75,000 or more
		9%	6%	28%	Currently employed
		9%	6%	10%	Have more than \$40,000 for down payment
	Potential Renters	11%	1%	26%	Own now
		80%	89%	78%	Make over \$25,000/year
		8%	8%	7%	Have HH incomes of \$75,000 or more
		8%	8%	8%	Currently employed
		8%	8%	8%	Have more than \$40,000 for down payment

Note: The 1992 and 1997 figures for "Currently Employed" are not directly comparable. In 1992 the question was "Is the respondent employed?" In 1997 the question was "How many adults in this household are currently employed?" The 2003 question was formatted to match the 1997 version of the question.

DEFINITIONS

The purpose of this Glossary is to assist the reader in understanding specific terminology used in this report.

Appraisal

(noun) the act or process of estimating value; an estimate of value. (adjective) of or pertaining to appraising and related functions, e.g. appraisal practice, appraisal services.

Complete Appraisal: The act or process of estimating value or an estimate of value performed without invoking the Departure Provision.

Limited Appraisal: The act or process of estimating value or an estimate of value performed under and resulting from invoking the Departure Provision.

Binding Requirement

All or part of a standards rule of the Uniform Standards of Professional Appraisal Practice (USPAP) from which departure is not permitted (See Departure Provision).

Cash Equivalent

A price expressed in terms of cash, as distinguished from a price expressed totally or partly in terms of the face amounts of notes or other securities that cannot be sold at their face amounts.

Counseling

Providing competent, disinterested, and unbiased advice and guidance on diverse problems in the broad field of real estate; may involve any or all aspects of the business such as merchandising, leasing, management, acquisition/disposition planning, financing, development, cost-benefit studies, feasibility analysis, and similar services. Counseling services are often associated with evaluation, but they are beyond the scope of appraisal.

Departure Provision

This provision permits limited exceptions to sections of the Uniform Standards of Professional Appraisal Practice that are classified as specific guidelines rather than binding requirements. The burden of proof is on the appraiser to decide before accepting a limited assignment that the result will not confuse or mislead. The burden of disclosure is also on the appraiser to report any limitations.

Discounting

The procedure used to convert periodic income and reversions into present value; based on the assumption that benefits received in the future are worth less than the same benefits received now.

Fair Value

The cash price that might reasonably be anticipated in a current sale under all conditions requisite to a fair sale. A fair sale means that buyer and seller are each acting prudently, knowledgeably, and under no necessity to buy or sell—, i.e., other than in a forced or liquidation sale. The appraiser should estimate the cash price that might be received upon exposure to the open market for a reasonable time, considering the property type and local market conditions. *When a current sale is unlikely—, i.e., when it is unlikely that the sale can be completed within 12 months—the appraiser must discount all cash flows generated by the property to obtain the estimate of fair value.* These cash flows include, but are not limited to, those arising from ownership, development, operating, and sale of the property. The discount applied

ADDENDA

- each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:
1. buyer and seller are typically motivated.
 2. both parties are well informed or well advised, and acting in what they consider their best interests;
 3. a reasonable time is allowed for exposure in the open market;
 4. payment is made in terms of cash in United States dollars or in terms of financial arrangements comparable thereto; and
 5. the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.*

Prospective Market Value Upon Completion of Construction
 The prospective future value of a property on the date that construction is completed, based upon market conditions forecast to exist as of the completion date.

Prospective Value Estimate
 A forecast of the value expected at a specified future date. A prospective value estimate is most frequently sought in connection with real estate projects that are proposed, under construction, or under conversion to a new use, or those that have not achieved sellout or a stabilized level of long-term occupancy at the time the appraisal report is written.

Report
 Any communication, written or oral, of an appraisal, review, or consulting service that is transmitted to the client upon completion of an assignment. The types of written reports listed below apply to real property appraisals:

- Self-Contained Appraisal Report:** A written report prepared under Standards Rule 2-2(a) of a Complete or Limited Appraisal performed under Standard 1.
- Summary Appraisal Report:** A written report prepared under Standards Rule 2-2(b) of a Complete or Limited Appraisal performed under Standard 1.
- Restricted Appraisal Report:** A written report prepared under Standards Rule 2-2(c) of a Complete or Limited Appraisal performed under Standard 1.

Specific Guideline
 All or part of a standards rule of the Uniform Standards of Professional Appraisal Practice (USPAP) from which departure is permitted under certain conditions (See Departure Provision).

shall reflect the appraiser's judgment of what a prudent, knowledgeable purchase under a necessity to buy would be willing to pay to purchase the property in a current sale.

Fee Simple Estate
 Absolute ownership encumbered by any other interest or restate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat.

Hawaiian Terms
 The Hawaiian words "mouka" and "maka" are commonly used in the islands as indicators of direction. The word "mouka" means toward the mountain, and "maka" means toward the ocean.

Highest and Best Use
 The reasonably probable and legal use of vacant land or an improved property, which is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum profitability.

Highest and Best Use of Land or a Site as Though Vacant
 The use of a property based on the assumption that a parcel of land is vacant or can be made vacant through demolition of any improvements.

Highest and Best Use of Property as Improved
 The use that should be made of a property as it exists.

Leased Fee Estate
 An ownership interest held by a landlord with the right of use and occupancy conveyed by lease to a tenant; the rights of lessor or the leased fee owner and leased fee are specified by contract terms contained within the lease.

Leasehold Estate
 The right to use and occupy real estate for a stated term and under certain conditions; conveyed by a lease.

Market Rent
 The rental income that a property would most probably command in the open market.

Market Value
 Market value is the major focus of most real property appraisal assignments. Both economic and legal definitions of market value have been developed and refined. Continual refinement is essential to the growth of the appraisal profession. The current economic definition of market value can be stated as follows:

"The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress."

The current economic definition of "market value" as stated in the Uniform Standards of Professional Practice, published by The Appraisal Foundation in 1990, is as follows:

"The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller

Current standards of the appraisal profession, developed for appraisers and the users of appraisal services; the USPAP deal with the procedures to be followed in developing an appraisal, analysis, or opinion and the manner in which an appraisal, analysis, or opinion is communicated. The USPAP are endorsed by the Appraisal Institute and other professional appraisal organizations.

LIMITING AND CONTINGENT CONDITIONS ACM Consultants, Inc.

LIMITING AND CONTINGENT CONDITIONS: The certification of the Appraiser appearing in the appraisal report is subject to the following conditions and to such other specific and limiting conditions as are set forth by the Appraiser in the report. By his notice, all persons and firms reviewing, utilizing or relying on the report in any manner, bind themselves to accept these assumptions and limiting conditions. Do not use this report if you do not so accept. These conditions are a part of the appraisal report; they are a preface to any certification, definition, fact or analysis, and are intended to establish as a matter of record that the Appraiser's function is to provide a present market value indication for the subject property based upon the Appraiser's observation of the subject property and real estate market. This appraisal report is an economic study to estimate value as defined in U. I. It is not an engineering, construction, legal or architectural study nor survey and expertise in these areas, among others, is not implied.

1. **CONFIDENTIALITY:** The contents of the appraisal are confidential. Release of this appraisal by ACM Consultants, Inc. to you is limited to and solely for the business purpose for which it was prepared. Any further release of this appraisal for use or any other purpose is strictly prohibited and you shall accept the risk and liability for any release other than the intended use of the appraisal by ACM Consultants, Inc. Further, you shall indemnify and defend ACM Consultants, Inc. from any claims arising out of any such unauthorized disclosure.

2. **LIMIT OF LIABILITY:** The liability of ACM Consultants, Inc. and employees and affiliated independent contractors is limited to the fee actually received by Appraiser (total per appraisal). Further, there is no accountability, obligation, or liability to any third party. If this report is placed in the hands of anyone other than client, the client shall make such party aware of all limiting conditions and assumptions of the assignment and related disclaimers. The Appraiser is in no way to be responsible for any loss incurred by client or any other party as a result of any type present in the property; physically, financially, and/or legally. In the case of limited partnerships or syndicated offerings or stock offerings in real estate, client agrees that in case of lawsuit brought by lender, partner or part owner in any form of ownership, tenant, or any other party, any and all awards, settlements of any type in such suit, regardless of outcome, client will hold Appraiser harmless in any such action.

3. **INFORMATION USED:** No responsibility is assumed for accuracy of information furnished by work of or work by others, the client, his designers, or public records. We are not liable for such information or the work of possible subcontractors. The comparable data relied upon in this report has been confirmed with one or more parties familiar with the transaction or from affidavit or other source though responsibility all are considered appropriate for inclusion to the best of our factual judgment and knowledge. An impractical and uneconomic expenditure of time would be required in attempting to furnished unimpeachable verification in all instances, particularly as to engineering and maintenance information. It is suggested that the client consider independent verification as a prerequisite to any transaction involving sale, lease, or other significant commitment of funds of subject property.

4. **TESTIMONY, CONSULTATION, COMPLETION OF CONTRACT FOR APPRAISAL SERVICES:** The contract for appraisal, consultation or analytical services is fulfilled, and the total fee is payable upon completion of the report.

The Appraiser(s) or those existing in preparation of the report will not be asked or required to give testimony in court or hearing because of having made the appraisal, in full or in part, nor engage in post appraisal consultation with client or third parties except under separate and special arrangement and at additional fee. If testimony or deposition is required because of subpoena, the client shall be responsible for any additional time, fees, and charges regardless of faulting party.

5. **LEGALITY OF USE:** The appraisal is based on the premise that, there is full compliance with all applicable federal, state and local environmental regulations and laws unless otherwise stated in the report; further, that all applicable zoning, building, use regulations and restrictions of all types have been complied with unless otherwise stated in the report; further, it is assumed that all required licenses, permits, or other legislative or administrative authority, local, state, federal and/or private entity or organization have been or can be obtained or renewed for any use considered in the value estimate.

6. **COMPONENT VALUES:** The distribution of the total valuation in this report between land and improvements applies only under the existing program of utilization. The separate valuation for land and building must not be used in conjunction with any other appraisal and are invalid if to used.

7. **AUXILIARY AND RELATED STUDIES:** No environmental or impact studies, special market study or analysis, highest and best use analysis or feasibility study has been requested or made unless otherwise specifically noted in an agreement for services or in the report.

8. **DOLLAR VALUES, PURCHASING POWER:** The market value estimated, and the cost used, are as of the date of the estimate of value. All dollar amounts are based on the purchasing power and price of the dollar as of the date of the value estimate.

9. **INCLUSIONS:** Furnishings and equipment or personal property or business operations except as specifically indicated and typically considered as a part of real estate, have been disregarded with only the real estate being considered in the value estimate unless otherwise stated.

10. **ENVIRONMENTAL DISCLAIMER:** The value estimated in this report is based on the assumption that the property is not negatively affected by the existence of hazardous substances or detrimental environmental conditions. The Appraiser is not an expert in the identification of hazardous substances or detrimental environmental conditions. The Appraiser's routine inspection of and inquiry about the subject property did not disclose any information that indicated any apparent significant hazardous substance or detrimental environmental conditions which would affect the property negatively. It is possible that tests and inspections made by a qualified hazardous substance and environmental expert would reveal the existence of hazardous material and environmental conditions on or around the property that would negatively affect its value.

11. **LEGAL ENGINEERING, FINANCIAL, STRUCTURAL, OR MECHANICAL NATURE, HIDDEN COMPONENTS, SOIL:** The Appraiser and/or firm has no responsibility for matters legal in character or nature, nor of any architectural, structural, mechanical, or engineering nature. No opinions

APPRAISAL QUALIFICATIONS

Glenn K. Kunihsa, MAI



STATE LICENSING

State Certified General Appraiser,
State of Hawaii, License No. CGA 39, July 17, 1991
Expiration: December 31, 2007

PROFESSIONAL AFFILIATIONS

Member, Appraisal Institute, MAI Designation, Hawaii Chapter No. 67
Member, International Right of Way Association
Appraiser-Realtor, National Association of Realtors, Maui Board of Realtors

PROFESSIONAL INVOLVEMENT

Education Chairperson - Hawaii Chapter of the Appraisal Institute - 2004 and 2005
Former Island of Maui Representative - Hawaii Chapter of the Appraisal Institute
Former Multiple Listing Service (MLS) Committee Member - Realtors Association of Maui

COMMUNITY AFFILIATIONS

St. Anthony Parish School Board
Board Member 1995 to Present
Board President 1997 and 1998
Aili Community Care, Inc. - A non-profit corporation
Board Member 2004 to Present

EMPLOYMENT

President
ACM Consultants, Inc.
May, 1997 to present
Previously associated with the following:
ACM, Real Estate Appraisers, Inc. - 1986 to 1997
A&B Commercial Company; a division of Alexander & Baldwin, Inc. - 1979 to 1985
Bank of Hawaii - 1976 to 1979

GENERAL EDUCATION

University of Hawaii at Manoa
Master of Business Administration (MBA) - Executive MBA Program V, 1988
Bachelor of Business Administration (BBA), 1976
Iolani School, 1971

LEGAL

Qualified as an expert witness in the Second Circuit Court of the State of Hawaii

APPRAISAL EDUCATION

Appraisal Institute
Seminar
Uniform Standards for Federal Land Acquisitions
Honolulu, Hawaii - December 2006
Seminar
California Conservation Easements
Sacramento, California - November 2005
Course 400
7-Hour National USPAP Update Course
Honolulu, Hawaii - October 2005

rendered on the title, which is presumed to be good and merchantable. The property is appraised on as free and clear, unless otherwise stated in particular parts of the report.

The legal description is assumed to be correct as used in this report as furnished by the client, its designee, or as derived by the Appraiser.

Note that no advice is given regarding mechanical equipment or structural integrity or adequacy, no soils and potential for settlement, drainage, and such (seek assistance from qualified architect and/or engineer) nor matters concerning liens, title status, and legal responsibility (legal-legal assistance), and such. The lender and owner should inspect the property before any disbursement of funds; further, it is likely that the lender or owner may wish to require mechanical or structural inspection by a qualified and licensed contractor, civil or structural engineer, architect, or other expert.

The Appraiser has inspected as far as possible, by observation, the land and the improvements; however, it was not possible to personally observe conditions beneath the soil or hidden structurally or by other components. We have identified structural components within the improvements and no representations are made hereon as to these matters unless specifically stated and indicated in the report. The value estimate considers there being no such conditions that would cause a loss of value. The land or the soil of the area being appraised appears firm, however, subsidence in the area is unknown. The Appraiser(s) do not warrant against this condition or occurrence of problems arising from soil conditions.

The appraisal is based on there being no hidden, unreported, or apparent conditions of the property site, subsoil, or structures or toxic materials which would render it more or less valuable. The Appraiser and firm have no responsibility for any such conditions or for any expertise or engineering to discover them. All mechanical components are assumed to be in operable condition and status standard for properties of the subject type. Conditions of heating, cooling, ventilation, electrical and plumbing equipment is considered to be commensurate with the conditions of the balance of the improvements unless otherwise stated. No judgment may be made by us as to adequacy of insulation, type of insulation, or energy efficiency of the improvements or equipment which is assumed standard for subject and type.

If the Appraiser has not been supplied with a termite inspection, survey or occupancy permit, no responsibility or representation is assumed or made for costs associated with obtaining same or for any deficiencies discovered before or after they are obtained. No representation or warranty is made concerning obtaining the above mentioned items.

The Appraiser has no responsibility for any costs or consequences arising due to the need, or the lack of need for flood hazard insurance. An Agent for the Federal Flood Insurance Program should be contacted to determine the actual need for Flood Hazard Insurance.

12. PROPOSED IMPROVEMENTS, CONDITIONED VALUE. Improvements proposed, if any, on or off-site, as well as any repairs required are indicated on the sketch and map. The value estimate is based on the information submitted and is subject to change if any other construction is completed. This estimate of market value is as of the date shown, as presented, as if completed and occupying at that time and projected. On all appraisals, subject to satisfactory completion, repairs, or alterations, the appraisal report and value condition are contingent upon completion of the improvements in a workmanlike manner.

13. VALUE CHANGE DYNAMIC MARKET INFLUENCES ALTERATION OF ESTIMATE BY APPRAISER. The estimated market value, which is defined in the report, is subject to change with market changes over time, value is highly related to economic, time, promotional effort, terms, motivation, and conditions surrounding the offerings. The value estimate considers the productivity and relative attractiveness of the property physically and economically in the marketplace.

14. EXHIBITS. The sketches and maps in this report are included to assist the reader in visualizing the property and are not necessarily to scale. Various photos, if any, are included for the same purpose as of the date of the photos. Site plans are not surveys unless shown from separate surveyor. All documents, materials, photographs, negatives, and other items provided to or obtained by the Appraiser become the property of the Appraiser unless other arrangements have been previously made therefore.

15. CHANGES, MODIFICATION. The Appraiser(s) and/or officers of ACM Consultants, Inc., reserve the right to alter statements, analysis, conclusion or any value estimate in the appraisal if it becomes known to us facts pertinent to the appraisal process which were unknown to us when the report was completed.

16. DISCLOSURE. Disclosure of the contents of the appraisal report is governed by the Bylaws and Regulations of the professional appraisal organizations with which the Appraiser is affiliated. Neither all, nor any part of the content of the report, or copy thereof (including conditions as to the property value, the identity of the Appraiser, professional designations, reference to any professional appraisal report, without the previous written consent of the Appraiser, nor shall it be conveyed by anyone to the public through advertising, public relations, news sales or other media, without the written approval of the Appraiser. The Appraiser may not divulge the material (evaluation) contents of the report, analytical facilities or conclusions, or give a copy of the report to anyone other than the client or his designee as specified in writing, except as may be required by the Appraiser's firm or they may request in confidence for ethics enforcement, or by a court of law or body with the power of subpoena.

17. CONTINUING EDUCATION. The Appraiser Institute conducts a voluntary program of continuing education for its designated members. As of the date of this report, Glenn Kunihsa has completed the requirements of the continuing education program of the Appraisal Institute.

ACCEPTANCE OF AND/OR USE OF THIS APPRAISAL REPORT BY CLIENT OR ANY THIRD PARTY CONSTITUTES ACCEPTANCE OF THE ACM CONSULTANTS, INC., CERTIFICATION, LIMITING AND CONTINGENT CONDITIONS. APPRAISER LIABILITY EXTENDS ONLY TO STATED CLIENT, NOT SUBSEQUENT PARTIES OR USERS OF ANY TYPE, and the total liability of Appraiser(s) and firm is limited to the amount of fee received by Appraiser.

Seminar	Case Studies in Limited Partnership and Partial Interest Valuation Honolulu, Hawaii - May 2005
Seminar	Appraisal Consulting: A Solutions Approach for Professionals Honolulu, Hawaii - February 2005
Seminar	Real Estate Finance, Value and Investment Performance Honolulu, Hawaii - February 2005
Seminar	Fannie Mae Residential Presentation Honolulu, Hawaii - July 2004
Seminar	Subdivision Analysis Chicago, Illinois - August 2003
Seminar	Supporting Capitalization Rates Chicago, Illinois - August 2003
Seminar	The Technology Assisted Appraiser Chicago, Illinois - August 2003
Seminar	Scope of Work: Expanding Your Range of Services Chicago, Illinois - August 2003
Course 400	National Uniform Standards of Professional Practice Honolulu, Hawaii - May 2003
Course 420	Business Practices and Ethics Honolulu, Hawaii - May 2003
Seminar	The Private Conservation Market Honolulu, Hawaii - July 2002
Seminar	Finance Reporting Valuations Parts I and II Honolulu, Hawaii - July 2002
Seminar	Future of Appraised Profession from a Global Perspective Honolulu, Hawaii - July 2002
Seminar	Appraisal Office Management Honolulu, Hawaii - July 2002
Course 540	Report Writing Denver, Colorado - December 2000
Seminar	Partial Interests: Theory and Case Law Las Vegas, Nevada - July 2000
Seminar	Easement Valuation Las Vegas, Nevada - July 2000
Seminar	Bridging the Gap: Marketability Discounts for Real Estate Interests Las Vegas, Nevada - July 2000
Course 430	Standards of Professional Practice, Part C Honolulu, Hawaii - September 1999
Seminar	Litigation Skills for the Appraiser: An Overview Honolulu, Hawaii - May 1998
Seminar	Special Purpose Properties Honolulu, Hawaii - September 1997
Seminar	Highest and Best Use Applications Honolulu, Hawaii - September 1997
Seminar	Detrimental Conditions Honolulu, Hawaii - July 1997
Seminar	The Appraiser As Expert Witness Honolulu, Hawaii - August 1995
Seminar	How to Appraise FHA-Insured Property Los Angeles, California - January, 1995

Seminar	Understanding Limited Appraisals and Reporting Options Honolulu, Hawaii - August, 1994
Seminar	Valuation of Leasehold Interests Honolulu, Hawaii - May, 1993
Seminar	Valuation of Leased Fee Interests Honolulu, Hawaii - May, 1993
Seminar	Valuation Considerations: Appraising Non-Profits Boston, Massachusetts - July, 1992
Seminar	Americans With Disabilities Act Boston, Massachusetts - July, 1992
Seminar	Valuation in Today's Capital and Financing Markets Honolulu, Hawaii - June 1992
Seminar	Arbitration Principles, Procedures and Pitfalls Honolulu, Hawaii - June, 1992
Seminar	Insitutional Real Estate in the 1990's Honolulu, Hawaii - June, 1992
Seminar	FIRREA and its Impact on Appraisers Honolulu, Hawaii - June, 1992
Course 410/420	Standards of Professional Practice, Parts A & B Honolulu, Hawaii - April, 1991
<u>The American Society of Farm, Managers and Rural Appraisers, Inc.</u>	
Seminar	Agricultural Lease Valuation Honolulu, Hawaii - March 2006
<u>Society of Real Estate Appraisers</u>	
Course 101	Introduction to Appraising Real Property Dallas, Texas - 1987
Course 102	Applied Residential Property Valuation Honolulu, Hawaii - July 1990
Course 201	Principles of Income Property Appraising Chicago, Illinois, 1987
Course 202	Applied Income Property Valuation San Diego, California - 1988
Seminar	Professional Practice and the Society of Real Estate Appraisers Honolulu, Hawaii - 1988
Seminar	Appraisal Standards Seminar - Federal Home Loan Bank Board Guidelines, Regulations and Policies Honolulu, Hawaii - April, 1988
<u>American Institute of Real Estate Appraisers</u>	
Seminar	Rates, Ratios and Reasonableness Honolulu, Hawaii - 1989
Seminar	Discounted Cash Flow Analysis Honolulu, Hawaii - 1989
Seminar	Highest and Best Use Honolulu, Hawaii - 1989
Seminar	Capitalization Overview - Part A Honolulu, Hawaii - 1990

Seminar *Capitalization Overview - Part B*
Honolulu, Hawaii - 1990

Seminar *Accrued Depreciation*
Honolulu, Hawaii - 1990

International Right of Way Association
Course 101 *Appraisal*
Las Vegas, Nevada - October, 1998

Course 101 *Negotiation*
Las Vegas, Nevada - October 1998

National Business Institute, Inc.
Seminar *Commercial Real Estate Leasing in Hawaii*
Honolulu, Hawaii - 1989

American Arbitration Association
Seminar *Real Estate Dispute Resolution - Mediation and Arbitration*
Kahului, Maui, Hawaii - October, 1990

APPRAISAL QUALIFICATIONS
Shane S. Nishimoto

STATE LICENSING

State Certified General Appraiser,
State of Hawaii, License No. CGA-696
Expiration: December 31, 2007

PROFESSIONAL AFFILIATIONS

General Associate Member - Appraisal Institute

EMPLOYMENT

Staff Appraiser
ACM Consultants, Inc.
July 2000 to Present

Previously associated with the following:

Saint Francis Healthcare Systems
2000

Pflueger Acura
1993 to 1999

Successories of Hawaii
1998 to 1999

GENERAL EDUCATION

University of Hawaii at Manoa
Bachelor of Arts (BA), 2000
Punahou School, 1993

APPRAISAL EDUCATION

Appraisal Institute

Course 110 *Appraisal Principles*
Las Vegas, Nevada - November 2001

Course 120 *Appraisal Procedures*
Denver, Colorado - August 2002

Course 310 *Basic Income Capitalization*
Dublin, California - May 2003

Course 320 *General Applications*
Pasadena, California - June 2004

Course 520 *Advanced Income Capitalization*
Sacramento, California - May 2006

Seminar *Price Indexing Real Estate Markets*
Honolulu, Hawaii - July 2002

Seminar	<i>USPAP-The Changing Role of the Appraiser and USPAP</i> Honolulu, Hawaii - July 2002
Seminar	<i>The Aftermath: Our World Post September 11</i> Honolulu, Hawaii - July 2002
Seminar	<i>The Aftermath: Our World Post September 11: A General/Commercial View</i> Honolulu, Hawaii - July 2002
Seminar	<i>Statistical Modeling and GIS: Statistical Applications for Income Properties</i> Honolulu, Hawaii - July 2002
Seminar	<i>National 7-Hour USPAP Update</i> Honolulu, Hawaii - May 2003
Seminar	<i>Fannie Mae Seminar</i> Honolulu, Hawaii - July 2004
Seminar	<i>Real Estate Finance, Value, and Investment Performance</i> Honolulu, Hawaii - February 2005
Seminar	<i>Case studies in Limited Partnerships and Common Tenancy/Valuation</i> Honolulu, Hawaii - May 2005
Online Seminar	<i>Introduction to GIS Applications for Real Estate Appraisal</i> Honolulu, Hawaii - December 2005
<u>Lincoln Graduate Center</u>	
Course 527	<i>Principles of Real Estate Appraisal</i> Honolulu, Hawaii - February 2001
Course 672	<i>Uniform Standards of Professional Appraisal Practice</i> Honolulu, Hawaii - February 2001
Course 536	<i>Practice of Real Estate Appraisal</i> Honolulu, Hawaii - March 2001
Course 512	<i>Appraisal of Residential Property</i> Honolulu, Hawaii - March 2001
Course 660	<i>Writing the Narrative Report</i> Honolulu, Hawaii - April 2001
Course 772	<i>National USPAP Course</i> Honolulu, Hawaii - September 2004
MISC. EDUCATION	
REALM Business Solutions	Argus 10.0
Honolulu, Hawaii - February 2003	

APPENDIX B.

Flood Insurance Rate Map, Letter of Map Revision



Federal Emergency Management Agency

Washington, D.C. 20472

MAR 05 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Alan M. Arawaka
Mayor, Maui County
200 South High Street
Wailuku, HI 96793-2155

IN REPLY REFER TO:

Case No.: 03-09-0438P
Community Name: Maui County, HI
Community No.: 150003
Effective Date of **JUL 01 2004**
This Revision:

Dear Mayor Arawaka:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Chief, National Flood Insurance Program Branch, Federal Insurance and Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7184, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Sincerely,

MHC 10 LYM


Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: Mr. Francis Cerizo
Planner
Planning Department
Maui County


President
Sato & Associates, Inc.



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	Maui County Hawaii	BRIDGE OTHER	HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 150003		
IDENTIFIER	Maui Nui Park	APPROXIMATE LATITUDE & LONGITUDE: 20.788, -156.465 SOURCE: USGS QUADRANGLE DATUM: NAD 27	

**FLOODING SOURCE(S) &
REVISED REACH(ES)**

Waiakoa Gulch – from the limit of tsunami inundation to approximately 2,400 feet upstream of Pili Highway
Keahuaiwai Gulch – from approximately 600 feet upstream of the limit of tsunami inundation to approximately 3,800 feet upstream of Mokulele Highway
Waiakoa/Keahuaiwai Split Flow – from the convergence with Keahuaiwai Gulch to the divergence from Waiakoa Gulch

SUMMARY OF REVISIONS

	Waiakoa Gulch		Keahuaiwai Gulch		Waiakoa/Keahuaiwai Split Flow	
Effective Flooding:	Zone AO	BFEs*	Zone AO	BFEs*	Zone AO	BFEs*
Revised Flooding:	Zone A2	BFEs*	Zone A2	BFEs*	Zone A2	BFEs*
Increases:	NONE	YES	NONE	YES	NONE	YES
Decreases:	YES	NONE	YES	YES	YES	NONE

* BFEs – Base Flood Elevations

ANNOTATED MAPPING ENCLOSURES

TYPE: FIRM* NO: 150003 0255 B Date: June 1, 1981

ANNOTATED STUDY ENCLOSURES

DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: May 15, 2002
PROFILES: 71P, 72P, 73P, 74P, and 75P
SUMMARY OF DISCHARGES TABLE: 1

* FIRM – Flood Insurance Rate Map; ** FBFM – Flood Boundary and Floodway Map; *** FHBM – Flood Hazard Boundary Map

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

100803 01.DA03090438E 1021AC



Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. The effective hydrologic analysis for Waiakoa and Keahunaiwai Gulches combined the discharges for these flooding sources into a single model. The effective discharges were divided and redistributed for this LOMR to more accurately reflect the flow patterns within the revised reaches. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

100803 01.DA03090438E 102IAC



Federal Emergency Management Agency
Washington, D.C. 20472

**LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)**

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Federal Insurance and Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7103

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised BFEs presented in this LOMR may be changed.

This information will be published in the *Federal Register* and your local newspaper as detailed below.

LOCAL NEWSPAPER

Name: *Maui News*

Dates: 03/25/2004

04/01/2004

PUBLIC NOTIFICATION

FLOODING SOURCE	LOCATION OF REFERENCED ELEVATION	BFE (FEET)		MAP PANEL NUMBER(S)
		EFFECTIVE#	REVISED*	
Keahuaiwai Gulch	Approximately 60 feet downstream of Mokulele Highway	1	13	0255 B
	Approximately 1,000 feet upstream of Mokulele Highway	1	34	0255 B
Waiakoa Gulch	Approximately 70 feet downstream of Piilani Highway	1	21	0255 B
	Approximately 1,400 feet upstream of Piilani Highway	1	50	0255 B
Waiakoa/Keahuaiwai Split Flow	Approximately 380 feet upstream of convergence with Keahuaiwai Gulch	1	17	0255 B
	Approximately 780 feet upstream of convergence with Keahuaiwai Gulch	1	23	0255 B

#Depth of flow, rounded to the nearest whole foot

*National Geodetic Vertical Datum, rounded to the nearest whole foot

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division

Emergency Preparedness and Response Directorate

100803 01.DA03090438E 102IAC

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR MAUI COUNTY, HAWAII, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On June 1, 1981, the Department of Homeland Security's Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in Maui County, Hawaii, through issuance of a Flood Insurance Rate Map (FIRM). The Mitigation Division has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in this community is appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the community.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A hydraulic analysis was performed to incorporate updated topographic information, updated hydrologic information, and the construction of Piilani Highway and associated bridge and culvert structures along Waiakoa Gulch from the limit of tsunami inundation to approximately 2,400 feet upstream of Piilani Highway and along Keahuaiwai Gulch from approximately 600 feet upstream of the limit of tsunami inundation to approximately 3,800 feet upstream of Mokulele Highway. This has resulted in a decrease in SFHA width and increased BFEs for Waiakoa Gulch and a decrease in SFHA width and increased and decreased BFEs for Keahuaiwai Gulch. In addition, the Waiakoa/Keahuaiwai Split Flow was added to the FIRM. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet) [#]	Modified BFE (feet) [*]
Keahuaiwai Gulch:		
Approximately 60 feet downstream of Mokulele Highway	1	13
Approximately 1,000 feet upstream of Mokulele Highway	1	34
Waiakoa Gulch:		
Approximately 70 feet downstream of Piilani Highway	1	21
Approximately 1,400 feet upstream of Piilani Highway	1	50
Waiakoa/Keahuaiwai Split Flow:		
Approximately 380 feet upstream of convergence with Keahuaiwai Gulch	1	17
Approximately 780 feet upstream of convergence with Keahuaiwai Gulch	1	23

*National Geodetic Vertical Datum, rounded to nearest whole foot

[#]Depth of flow, rounded to nearest whole foot

Under the above-mentioned Acts of 1968 and 1973, the Mitigation Division must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Mitigation Division reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Mitigation Division's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Alan M. Arawaka
Mayor, Maui County
200 South High Street
Wailuku, HI 96793-2155

MAP LEGEND

- Revised 100-Year Floodplain
- Revised 500-Year Floodplain



APPROXIMATE SCALE



FOR LIBRARY USE ONLY
NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

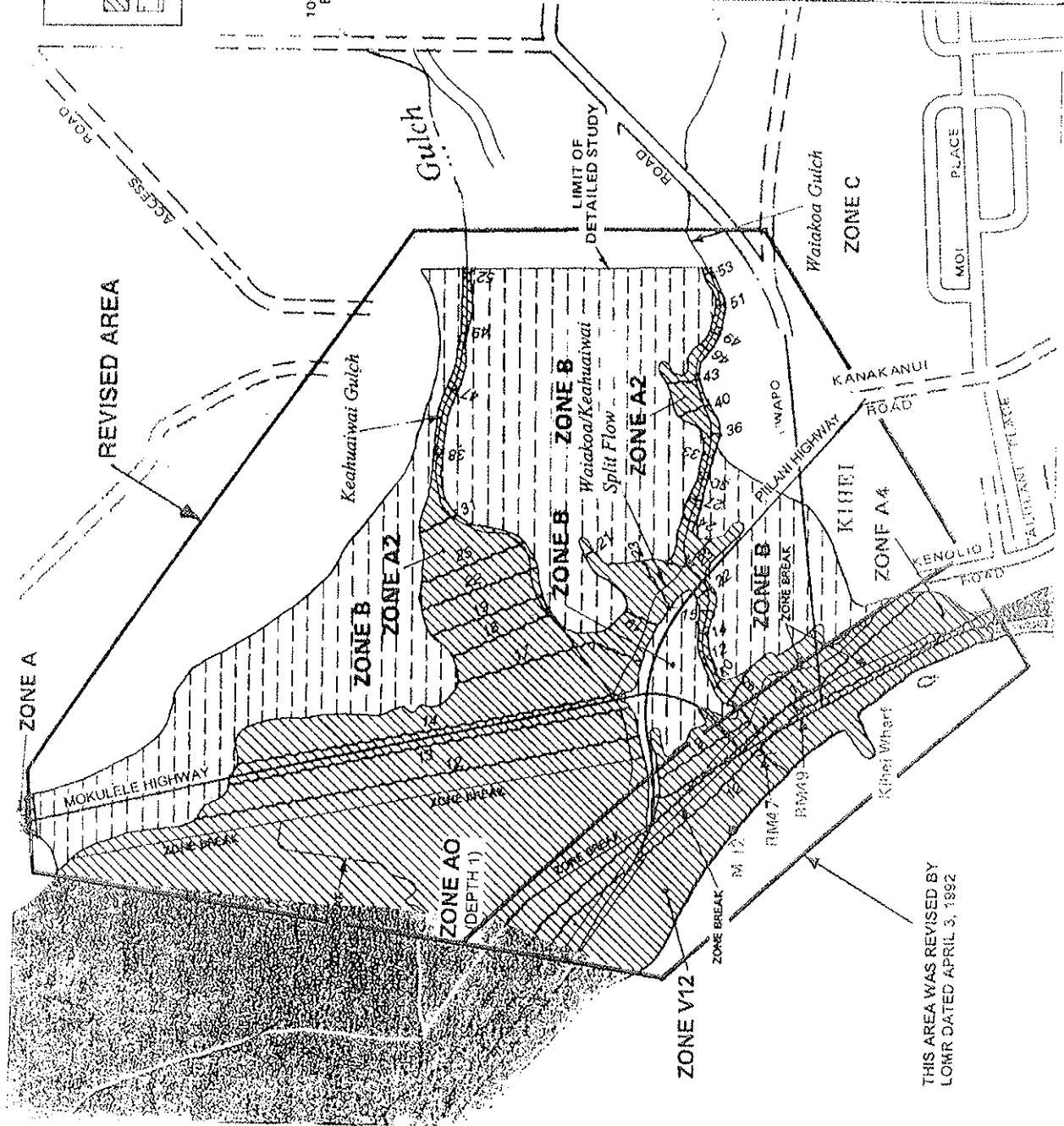
MAUI COUNTY, HAWAII

PANEL 255 OF 400
REVISIONS (PRINTED)

REVISED
DATE
1992

COMMUNITY-PANEL NUMBER
158003 0255 B
EFFECTIVE DATE:
JUNE 1, 1981

federal emergency management agency
federal insurance administration



THIS AREA WAS REVISED BY
LOWR DATED APRIL 3, 1992

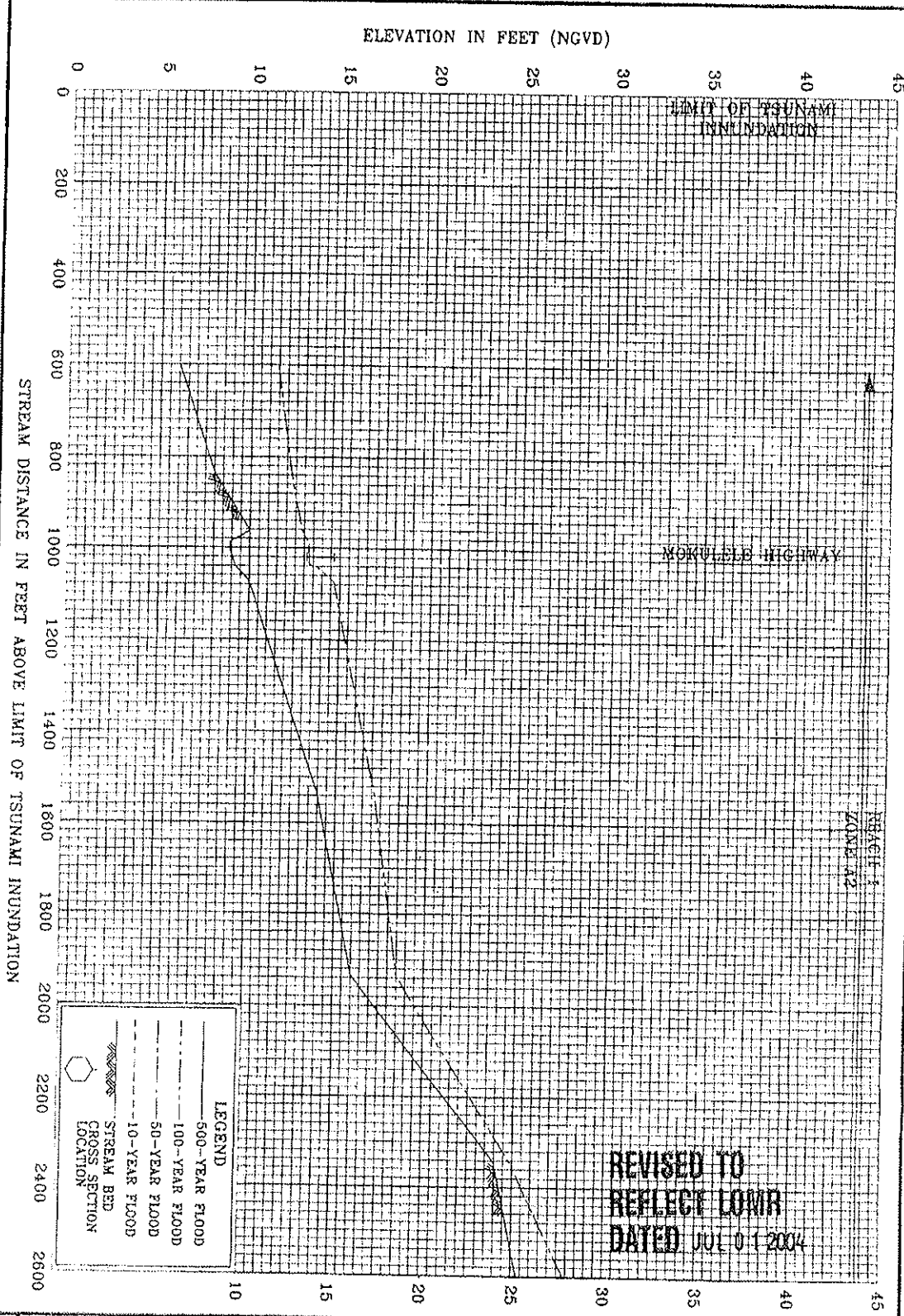
Table 1. Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Year	50-Year	100-Year	500-Year
ISLAND OF MAUI					
Waipuilani Gulch (Cont'd)					
At Mouth		28	58	78	141
Subarea 13	0.08				
Subarea 14	0.16	26	71	102	209
Subarea 15	0.25	38	106	152	313
Kulanihakoi Gulch					
At Mouth		3,017	7,362	10,061	18,830
Subarea 7	14.62	79	197	271	516
Subarea 8	0.35				
<div style="border: 1px solid black; padding: 5px;"> Waiakoa Gulch At Mouth At Piilani Highway Keahaiwai Gulch At Mouth Approximately 400 feet upstream of Mokulele Highway Olowalu Stream At Mouth </div>					
	N/A	--	--	5,450	--
	N/A	--	--	6,800	--
	N/A	--	--	8,950	--
	N/A	--	--	7,600	--
	5.1	1,600	3,600	4,700	8,100

REVISED DATA

1 Data Not Computed

REVISION TO
 REPORT FOR
 DATE JUL 01 2004

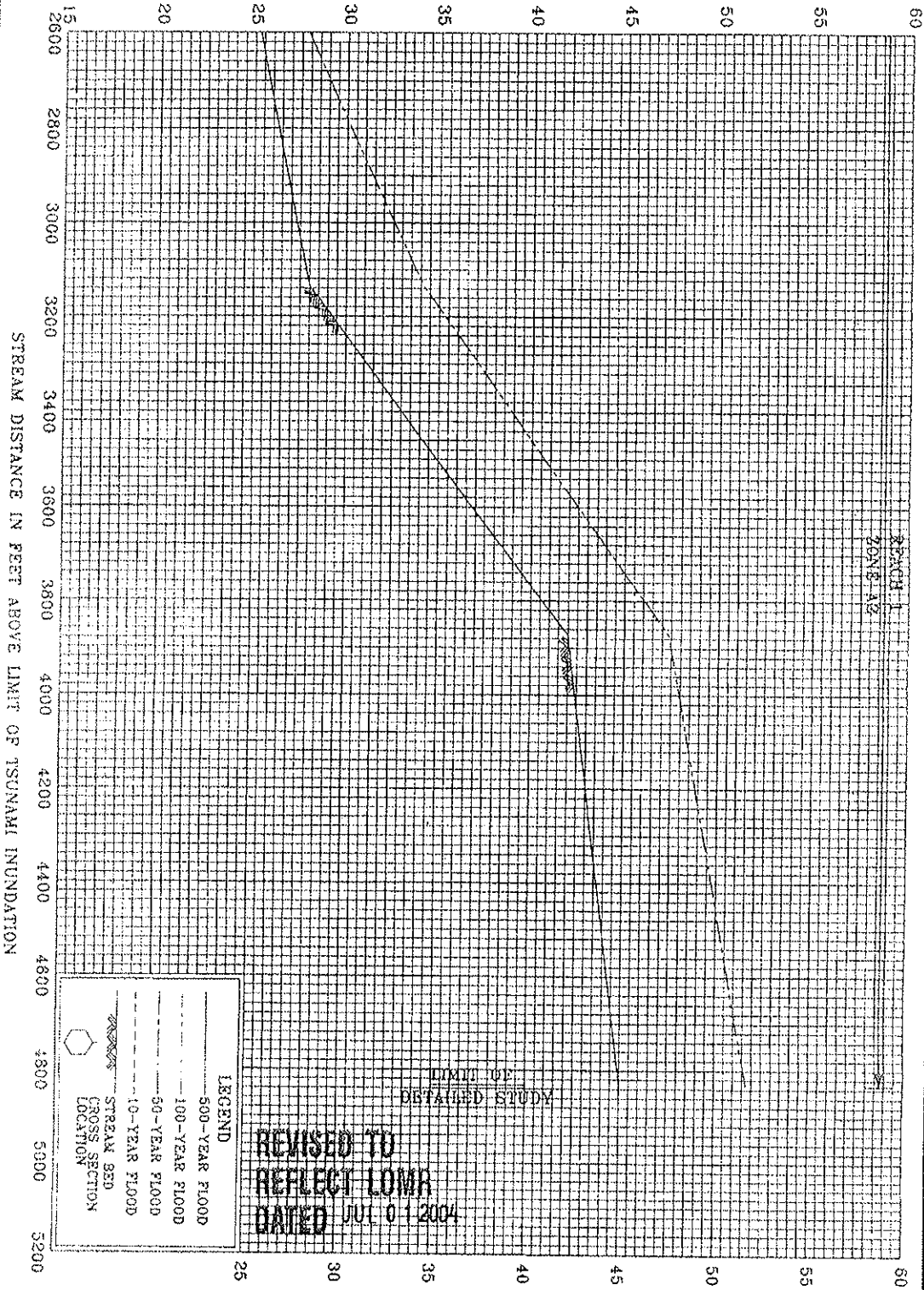


FEDERAL EMERGENCY MANAGEMENT AGENCY
 MAUI COUNTY, HI

FLOOD PROFILES
 KEAHUAIWAI GULCH

71P

ELEVATION IN FEET (NGVD)



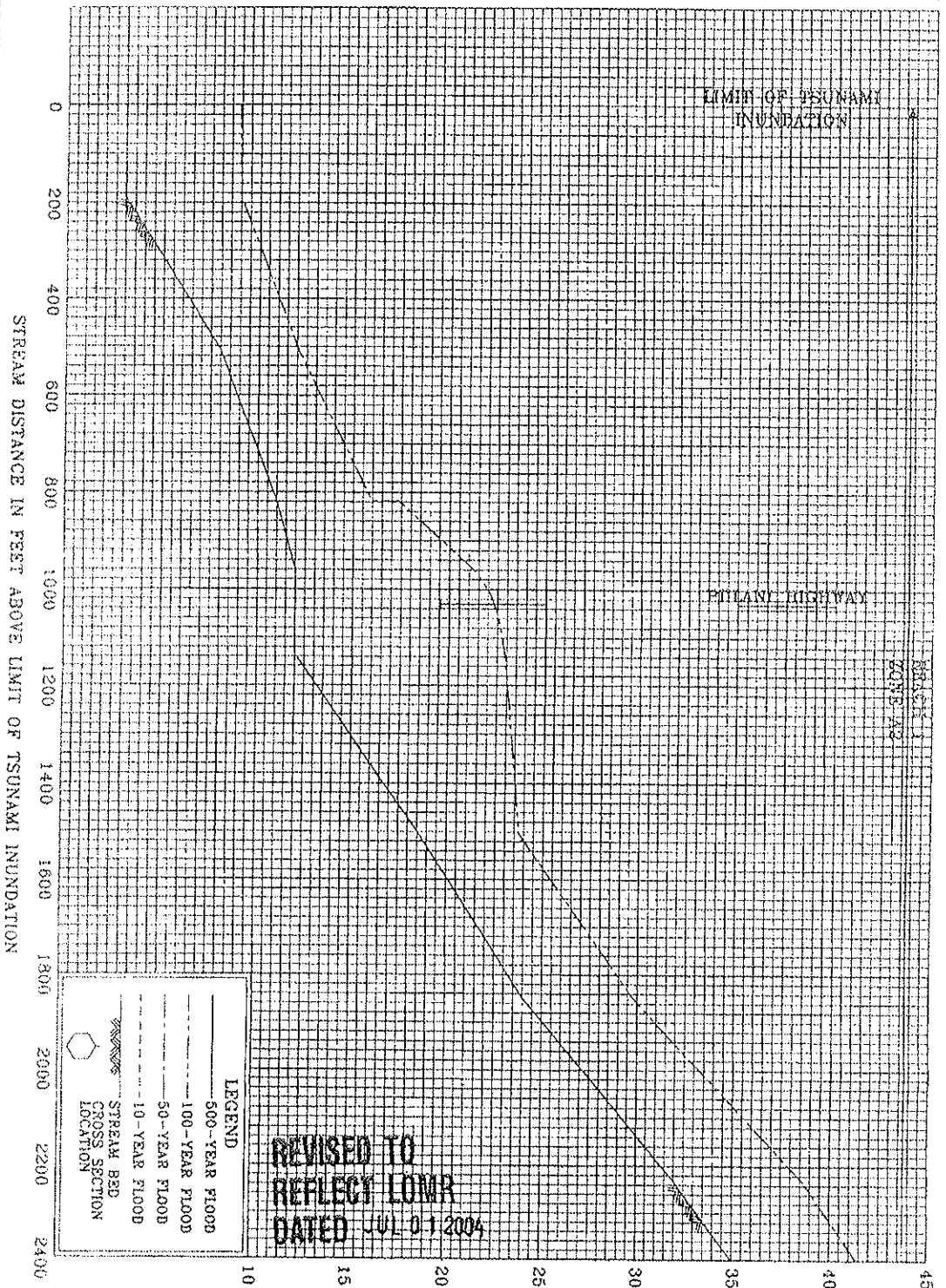
FEDERAL EMERGENCY MANAGEMENT AGENCY
MAUI COUNTY, HI

FLOOD PROFILES
KEAHUAIWAI GULCH

72P

ELEVATION IN FEET (NGVD)

5 10 15 20 25 30 35 40 45



LEGEND

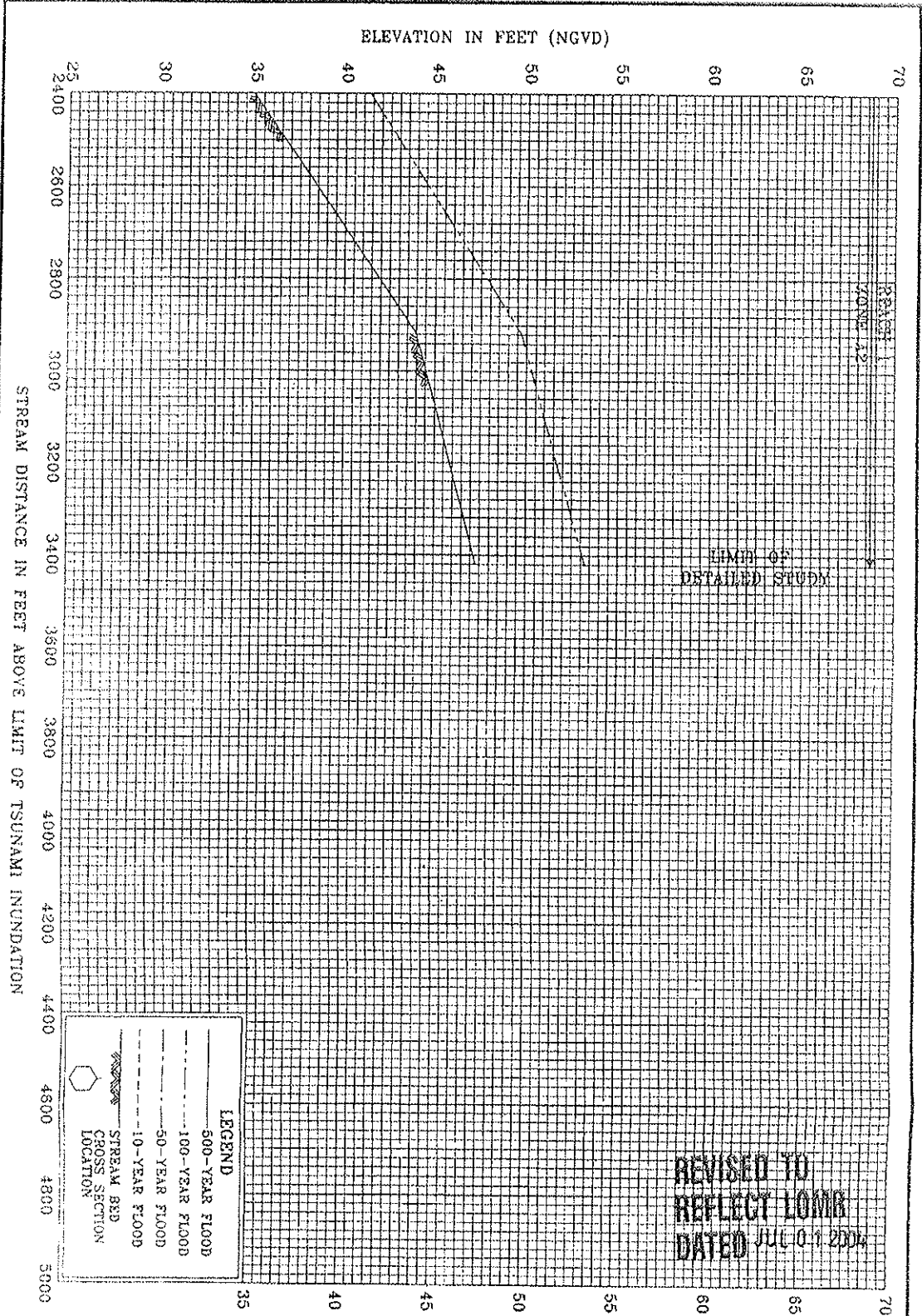
- 500-YEAR FLOOD
- - - 100-YEAR FLOOD
- · · 10-YEAR FLOOD
- ▨ STREAM BED CROSS SECTION LOCATION

REVISED TO REFLECT LOMR DATED JUL 01 2004

FEDERAL EMERGENCY MANAGEMENT AGENCY
 MAUI COUNTY, HI

FLOOD PROFILES
 WAIAKOA GULCH

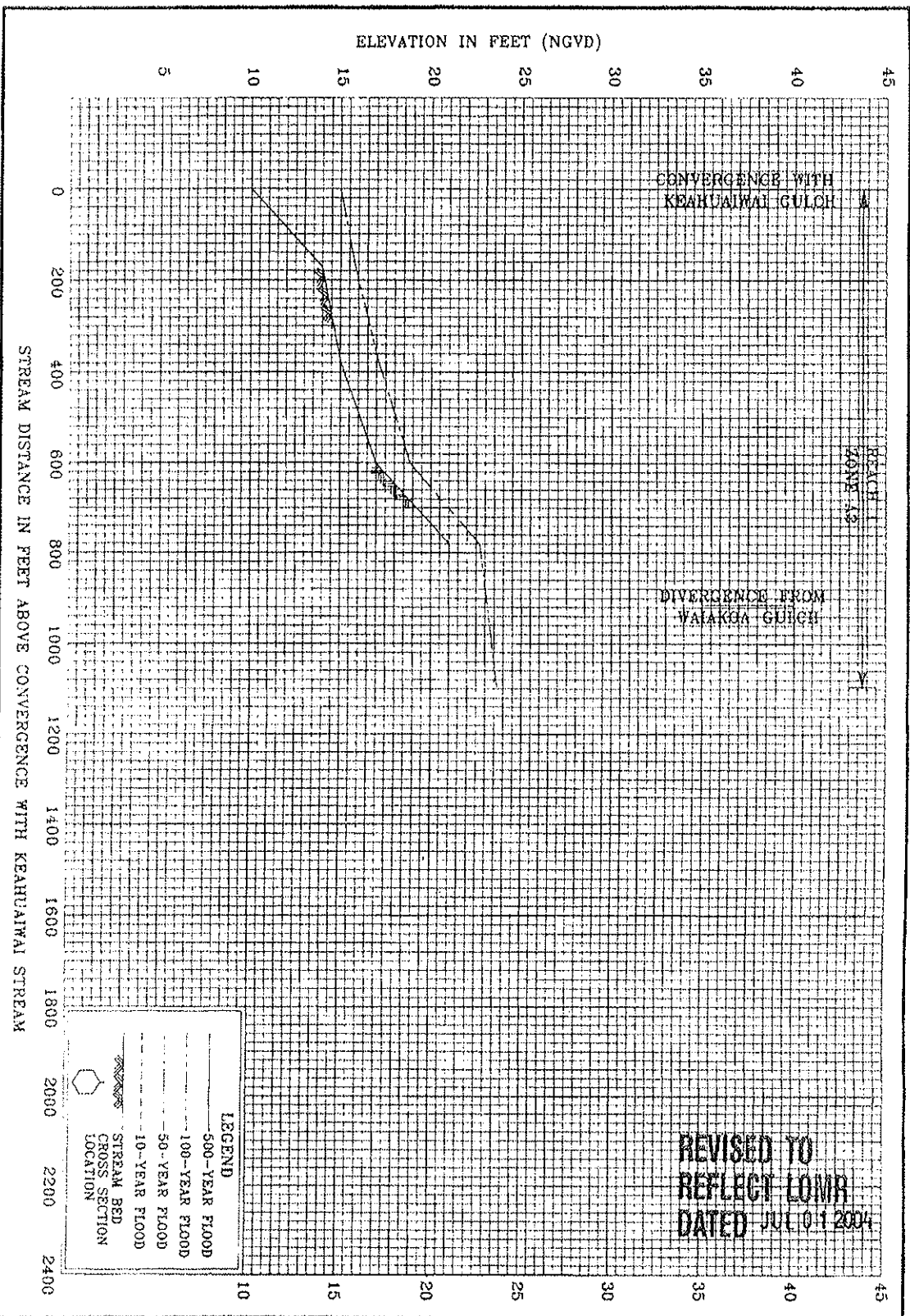
73P



74P

FEDERAL EMERGENCY MANAGEMENT AGENCY
 MAUI COUNTY, HI

FLOOD PROFILES
 WAIAKOA GULCH



FEDERAL EMERGENCY MANAGEMENT AGENCY
 MAUI COUNTY, HI

FLOOD PROFILES
 WAIAKOA/KEAHUAIWAI SPLIT FLOW

75P

APPENDIX BC.

Botanical and Fauna Surveys

BOTANICAL AND FAUNA SURVEYS

for the

KIHEI RESIDENTIAL PROJECT

KIHEI, MAUI, HAWAII

by

**ROBERT W. HOB DY
ENVIRONMENTAL CONSULTANT
Kokomo, Maui
August 2005**

Prepared for: A & B Properties, Inc.

**BOTANICAL AND FAUNA SURVEY
KIHEI RESIDENTIAL PROJECT
KIHEI, MAUI**

INTRODUCTION

The Kihei Residential Project lies on approximately 100 acres of agricultural lands in north Kihei within the large ahupua'a of Pulehunui. The property is a long narrow strip of land running mauka from Pi'ilani Highway. It is bounded on the north by Waiakoa Stream channel and along the south by single family residences in the lower part and by pasture lands above.

SITE DESCRIPTION

The terrain within the project area is gently sloping with an elevation of 15 feet at the highway and extending inland for 1.5 miles to an elevation of 210 feet. The project area lies in the driest part of Maui and has an annual rainfall of only 10 inches most of which occurs in a few winter storms between November and April (Armstrong, 1983). Soils are light silty loams or sandy loams of the Alae, Pulehu and Waiakoa series with abundant cobble and are well drained and deep (Foote et al, 1972). The lower part of the property is used for agricultural farming, the middle part has small scale truck farming and the upper part is undeveloped Kiawe-buffelgrass savannah.

BIOLOGICAL HISTORY

The project area was once a dry native savannah with an abundance of grasses and scattered trees and shrubs such as wiliwili (*Erythrina sanwicensis*), 'ohe (*Reynoldsia sandwicensis*) and 'a'ali'i (*Dodonaea viscosa*). Over a century of cattle grazing and more recently browsing by axis deer (*Axis axis*) and periodic burning have reduced the non-farmed land to an alien dominated grassland with an abundance of trees along the dry streamcourse.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed Kihei Residential Project which was conducted in August, 2005.

The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.
5. Note which aspects of the proposed development pose significant concerns for plants or for wildlife and recommend measures that would mitigate or avoid these problems.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following a route to ensure complete coverage of the area. Areas most likely to harbor native or rare plants such as gulches or rocky outcroppings were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

DESCRIPTION OF THE VEGETATION

The lower half of the property was plowed at the time of the survey and was bare soil except for along the field margins and roads. The middle portion of the property has a diverse array of vegetable crops being grown for local markets. The upper portion of the property is a near-monotypic buffelgrass (*Cenchrus ciliaris*) savannah with scattered kiawe (*Prosopis pallida*) trees and koa haole (*Leucaena leucocephala*) shrubs. The entire northern boundary along the dry Waiakoa Stream course is a dense belt of forest consisting of kiawe, koa haole and the occasional pride of India (*Melia azedarach*).

A total of 62 plant species were recorded during the course of the survey. Buffelgrass was the only species listed as abundant and it defines the character of the property. Other common species include kiawe, koa haole, spiny amaranth (*Amaranthus spinosus*), 'ilima (*Sida fallax*) and 'uhaloa (*Waltheria indica*). Most of the rest are agricultural and other dryland weeds. Only three native plant species were found on the property: 'ilima, 'uhaloa and koali awahia (*Ipomoea indica*). These are all common indigenous plants that are widespread in the tropics.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area is dominated by non-native plant species. No Federally listed Endangered or Threatened plants (USFWS, 1999) were found on the property, nor do any plants proposed for such status occur here.

No wetlands occur on the property. Nothing remotely approaching the three essential criteria that define a Federally recognized wetland, namely 1) hydrophytic vegetation 2) hydric soils and 3) wetland hydrology occur within this dry project area.

Because the vegetation on the site is dominated primarily by non-native plants and because there are no rare or protected native species within the project area, there is

little botanical concern and the proposed project is not expected to have a significant negative impact on the botanical resource in this part of Maui.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within two groups: Monocots and Dicots. Taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:
 - endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
 - indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
 - non-native = all those plants brought to the islands intentionally or accidentally after western contact.
4. Abundance of each species within the project area:
 - abundant = forming a major part of the vegetation within the project area.
 - common = widely scattered throughout the area or locally abundant within a portion of it.
 - uncommon = scattered sparsely throughout the area or occurring in a few small patches.
 - rare = only a few isolated individuals within the project area.

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
MONOCOTS			
AGAVACEAE (Agave Family)			
<i>Furcraea foetida</i> (L.) Haw.	Mauritius hemp	non-native	rare
ARECACEAE (Palm Family)			
<i>Cocos nucifera</i> L.	<i>níu</i>	Polynesian	rare
<i>Thrinax parviflora</i> O. Swartz	peaberry palm	non-native	rare
<i>Washingtonia robusta</i> H. Wendl.	desert palm	non-native	rare
POACEAE (Grass Family)			
<i>Cenchrus ciliaris</i> L.	buffelgrass	non-native	abundant
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass	non-native	common
<i>Cynodon dactylon</i> (L.) Pers.	<i>manienie</i>	non-native	rare
<i>Digitaria insularis</i> (L.) Mez ex Ekman	sourgrass	non-native	rare
<i>Digitaria violascens</i> Link	<i>kukaepua'a</i>	non-native	rare
<i>Eleusine indica</i> (L.) Gaertn.	wiregrass	non-native	rare
<i>Eragrostis amabilis</i> (L.) Wight & Arnott	Japanese lovegrass	non-native	uncommon
<i>Panicum maximum</i> Jacq.	Guinea grass	non-native	uncommon
<i>Setaria verticillata</i> (L.) P. Beauv.	bristly foxtail	non-native	uncommon
DICOTS			
AMARANTHACEAE (Amaranth Family)			
<i>Amaranthus spinosus</i> L.	spiny amaranth	non-native	common
<i>Amaranthus viridis</i> L.	slender amaranth	non-native	rare
ANACARDIACEAE (Mango Family)			
<i>Schinus terebinthifolius</i> Raddi	Christmas berry	non-native	rare
ARALIACEAE (Ginseng Family)			

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
<i>Schefflera actinophylla</i> (Endl.) Harms	octopus tree	non-native	rare
ASTERACEAE (Sunflower Family)			
<i>Conyza bonariensis</i> (L.) Cronq.	hairy horseweed	non-native	rare
<i>Lactuca serriola</i> L.	prickly lettuce	non-native	rare
<i>Pluchea carolinensis</i> (Jacq.) G.Don	sourbush	non-native	uncommon
<i>Pluchea indica</i> (L.) Less.	Indian fleabane	non-native	rare
<i>Tridax procumbens</i> L.	coat buttons	non-native	rare
<i>Verbesina encelioides</i> (Can) Benth. & Hook.	golden crown-beard	non-native	uncommon
BIGNONIACEAE (Bignonia Family)			
<i>Spathodea campanulata</i> P. Beauv.	African tulip tree	non-native	rare
BORAGINACEAE (Borage Family)			
<i>Heliotropium procumbens</i> Mill.	-----	non-native	uncommon
CHENOPODIACEAE (Goosefoot Family)			
<i>Atriplex suberecta</i> Verd.	-----	non-native	rare
<i>Chenopodium carinatum</i> R.Br.	keeled goosefoot	non-native	rare
<i>Chenopodium murale</i> L.	'aheahea	non-native	uncommon
CONVOLVULACEAE (Morning Glory Family)			
<i>Ipomoea indica</i> (J.Burm.) Merr.	<i>koali awahia</i>	indigenous	rare
<i>Merremia aegyptia</i> (L.) Urb.	hairy merremia	non-native	rare
CUCURBITACEAE (Gourd Family)			
<i>Momordica charantia</i> L.	balsam pear	non-native	uncommon
EUPHORBIACEAE (Spurge Family)			
<i>Chamaesyce hirta</i> (L.) Millsp.	hairy spurge	non-native	rare
<i>Chamaesyce hyssoifolia</i> (L.) Small	-----	non-native	rare
<i>Ricinus communis</i> L.	Castor bean	non-native	uncommon
FABACEAE (Pea Family)			

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
<i>Acacia farnesiana</i> (L.) Willd.	klu	non-native	rare
<i>Crotalaria incana</i> L.	fuzzy rattlepod	non-native	uncommon
<i>Crotalaria pallida</i> Aiton	smooth rattlepod	non-native	rare
<i>Desmanthus pernambucanus</i> (L.) Thellung	slender mimosa	non-native	uncommon
<i>Desmodium tortuosum</i> (SW.) DC	Florida beggarweed	non-native	uncommon
<i>Erythrina variegata</i> L.	<i>wil'wili</i>	non-native	uncommon
<i>Indigofera hendecaphylla</i> Jacq.	creeping indigo	non-native	rare
<i>Indigofera suffruticosa</i> Mill.	<i>iniko</i>	non-native	rare
<i>Leucaena leucocephala</i> (Lam.) deWit	<i>koa haole</i>	non-native	common
<i>Macroptilium atropurpureum</i> (DC) Urb.	-----	non-native	uncommon
<i>Neonotonia wightii</i> (Wight & Arnott) Lackey	tineroo	non-native	uncommon
<i>Prosopis pallida</i> (Humb.&Bonpl.Ex.Willd.) Kunth	<i>kiawe</i>	non-native	common
LAMIACEAE (Mint Family)			
<i>Leonotis nepetifolia</i> (L.) R.Br.	lion's ear	non-native	uncommon
MALVACEAE (Mallow Family)			
<i>Abutilon grandifolium</i> (Willd.) Sweet	hairy abutilon	non-native	uncommon
<i>Gossypium hirsutum</i> L.	upland cotton	non-native	uncommon
<i>Malva parviflora</i> L.	cheeseweed	non-native	rare
<i>Malvastrum coromandelianum</i> (L.) Garcke	false mallow	non-native	uncommon
<i>Sida fallax</i> Walp.	<i>'ilima</i>	indigenous	common
<i>Sida rhombifolia</i> L.	Cuban jute	non-native	rare
MELIACEAE (Mahogany Family)			
<i>Melia azedarach</i> L.	pride of India	non-native	rare
NYCTAGINACEAE (Four - o'clock Family)			
<i>Boerhavia coccinea</i> Mill.	-----	non-native	rare

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
PORTULACACEAE (Purslane Family) <i>Portulaca oleracea</i> L.	pigweed	non-native	rare
SOLANACEAE (Nightshade Family)			
<i>Datura stramonium</i> L.	jimson weed	non-native	rare
<i>Nicandra physalodes</i> (L.) Gaertn.	apple of Peru	non-native	rare
<i>Nicotiana glauca</i> R.C. Graham	tree tobacco	non-native	uncommon
STERCULIACEAE (Cacao Family)			
<i>Waltheria indica</i> L.	'uhaloa	indigenous	uncommon
VERBENACEAE (Verbena Family)			
<i>Citharexylum spinosum</i> L.	fiddlewood	non-native	rare
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	Jamaica vervain	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species abundance, activities and location as well as observations of trails, tracks scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Four species of mammals were recorded from the project area during the course of the survey. Taxonomy and nomenclature follow Tomich (1976).

Axis deer (*Axis axis*) - No deer were seen during the survey but tracks were common in the upper part of the property. These wary animals take to cover and rest during the day, then come out at dusk to move about in small herds to feed. They stay clear of people and dogs except when drought conditions draw them in to irrigated landscapes.

Dog (*Canis familiaris*) – Dog tracks were seen throughout the property but were more plentiful in the upper portion. Dogs like to roam and explore from their residential homes and often track and chase deer, sometimes with human companions.

Domestic Cat (*Felis catus*) – Cats also are prone to roam from their residential homes, especially at night. They hunt for birds and rodents. One cat was seen near the vegetable farm.

Mongoose (*Herpestes auropunctatus*) Though not sighted during the survey, farm personnel report seeing mongoose along the margins of the fields.

Other mammals likely to inhabit the property include Rats (*Rattus rattus*) and mice (*Mus musculus*). These rodents feed on seeds and herbaceous vegetation and are likely to frequent irrigated farm land.

A special effort was made to look for the native Hawaiian hoary bat which is listed as an Endangered species. These have been observed in the past around the Waiakoa Stream estuary 0.3 miles west of the lower end of the property across Pi'ilani Highway and South Kihei Road. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. This extremely dry habitat is poor habitat for these bats.

BIRDS

There was good birdlife diversity in this normally dry area. An ample supply of grass and herbaceous plant seeds were available and nearby seed corn fields are a major attraction for a number of seed eating bird species. Fourteen species of non-native birds were seen, most taking advantage of this seasonal food supply. Taxonomy and nomenclature follow American Ornithologists' Union (2005).

Spotted dove (*Streptopelia chinensis*) – These large doves were abundant on the property where they were seen in the agricultural fields and traveling to and from seed corn fields.

Zebra dove (*Geopelia striata*) – These small doves were also abundant in the agricultural fields and adjacent seed corn fields.

House finch (*Carpodacus mexicanus*) – Several of these finches were seen feeding on insects in the kiawe trees and flying across the property.

Japanese white-eye (*Zosterops japonica*) - White-eyes were active in the kiawe trees where they were observed eating caterpillars. They were very vocal with their high-pitched calls.

Common myna (*Acridotheres tristis*) – Several mynas, mostly in pairs, were seen in the fields and trees feeding and socializing.

Gray francolin (*Francolinus pondicerianus*) – A few families of these Francolins were seen in field margins and their calls were heard especially during the evening.

Orange-cheeked waxbill (*Estrilda melpoda*) – One flock of these small birds were seen around the vegetable farm area where they were feeding on seeds.

Black francolin (*Francolinus francolinus*) – A few individuals were flushed from the grassy margins of the vegetable farm area.

Chicken (*Gallus gallus*) – A few chickens were seen around the vegetable farm area and some could be heard from the adjacent residential area where the wild ones no doubt originated.

House sparrow (*Passer domesticus*) – A few pairs of sparrow were seen in the kiawe trees where they feed and nest.

Rock dove (*Columba livia*) – Two probably domestic pigeons were seen feeding in the plowed fields.

Cattle egret (*Bubulcus ibis*) – Two individuals were seen foraging for insects and lizards in the field margins.

Northern cardinal (*Cardinalis cardinalis*) – One cardinal was seen in the dense kiawe forest along Waiakoa Stream.

Northern mockingbird (*Mimus polyglottos*) – One mockingbird was seen flying across the property during the late afternoon.

INSECTS

While insects in general were not tallied, they were abundant throughout the area and fueled the elevated bird activity observed. One native Sphingid moth, Blackburn's sphinx moth (*Manduca blackburni*) has been put on the Federal Endangered species list and this designation requires special focus (USFWS 2000). Blackburn's sphinx moth occurs on Maui although it has not been found in this area. Its native host plants are species of 'Aiea (*Nothocestrum*) and a non-native alternative host plant is tree tobacco (*Nicotiana glauca*). There are no 'aiea on or near the project area. A number of tree tobacco plants were seen within the upper portion of the property. Each of these trees were carefully examined. No Blackburn's sphinx moth or their larvae were observed.

CONCLUSIONS AND RECOMMENDATIONS

Fauna surveys are seldom comprehensive due to the short window of observation, the seasonal nature of animal activities and the usually unpredictable nature of their daily movements. This survey, however, should be considered fairly representative due to the abundance of food resources present throughout the area and the resulting level of animal use. While ideal for many types of non-native animals the habitat is not suitable in its present state for most native animals, and is far removed from remnant populations. No endangered mammal, bird or insect species were observed in the project area during the course of the survey. No unique or special habitats were identified on the property. The proposed changes in land use should have no significant negative impact on the native fauna in this part of Maui.

No recommendations are deemed necessary or appropriate regarding the fauna resources on this property.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within two groups: Mammals and Birds. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:
 - endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
 - indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
 - non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.
 - migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.
4. Abundance of each species within the project area:
 - abundant = many flocks or individuals seen throughout the area at all times of day.
 - common = a few flocks or well scattered individuals throughout the area.
 - uncommon = only one flock or several individuals seen within the project area.
 - rare = only one or two seen within the project area.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
<u>MAMMALS</u>			
Axis deer	<i>Axis axis</i>	non-native	uncommon
Dog	<i>Canis familiaris</i>	non-native	uncommon
Domestic cat	<i>Felis catus</i>	non-native	rare
Mongoose	<i>Herpestes auropunctatus</i>	non-native	rare
<u>BIRDS</u>			
Spotted dove	<i>Streptopelia chinensis</i>	non-native	abundant
Zebra dove	<i>geopelia striata</i>	non-native	abundant
House finch	<i>Carpodacus mexicanus</i>	non-native	uncommon
Japanese white-eye	<i>Zosterops japonica</i>	non-native	uncommon
Common myna	<i>Acridotheres tristis</i>	non-native	uncommon
Gray francolin	<i>Francolinus pondicerianus</i>	non-native	uncommon
Orange-cheeked waxbill	<i>Estrilda melpoda</i>	non-native	rare
Black francolin	<i>Francolinus francolinus</i>	non-native	rare
Chicken	<i>Gallus gallus</i>	non-native	rare
House sparrow	<i>Passer domesticus</i>	non-native	rare
Rock dove	<i>Columba livia</i>	non-native	rare
Cattle egret	<i>Bubulcus ibis</i>	non-native	rare
Northern cardinal	<i>Cardinalis cardinalis</i>	non-native	rare
Northern mockingbird	<i>Mimus polyglottos</i>	non-native	rare

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APPENDIX CD.

Archaeological Inventory Survey

An Archaeological Inventory Survey Report for
an Approximately 100-Acre Parcel
Pūlehu Nui Ahupua'a, Wailuku District, Maui Island
TMK: (2) 3-8-004:002 por., 022 por., and 030

Prepared for
A & B Properties, Inc.

Prepared by
Tanya L. Lee-Greig, M.A.,
Robert Hill, B.A.,
and
Hallett H. Hammatt, Ph.D.

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Management Summary

Reference	An Archaeological Inventory Survey Report for an Approximately 100-Acre Parcel Pūlehu Nui Ahupua'a, Waituku District, Maui Island (Lee-Greig et al 2005)
Date	February 2006 DRAFT
Project Number	Cultural Surveys Hawai'i Inc. (CSH) Job Code: PULE 1
Investigation Permit Number	CSH completed the inventory survey fieldwork under state archaeological permit No. 0508 issued by State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR), per Hawai'i Administrative Rules (HAR) Chapter 13-13-282
Project Location	North of Pi'ilani Highway and east of Mokuilele Highway, Pūlehu Nui Ahupua'a, Waituku District, Maui Island TMK: (2) 3-8-004:002 por., 022 por., and 030. This area is depicted on the 1998 Puu o Kali and Maalaea 7.5-minute USGS topographic quadrangles
Land Jurisdiction	Private: A & B Properties
Agencies	SHPD/DLNR
Project Description	A & B Properties is contemplating the possibility of future land use applications that would allow residential expansion into the project area. At a minimum, this would include the grading, dwelling construction, and street and utility installation activity commonly associated with residential development.
Project Acreage	Approximately 93-Acres
Area of Potential Effect (APE) and Survey Acreage	The project APE included an approximate seven acre section of Waiakoa Gulch located outside and adjacent to the 93-acre project area. The entire approximate 100-acre APE was surveyed as a part of this investigation
Historic Preservation Regulatory Context	At the request of A & B Properties, CSH undertook this archaeological inventory survey to comply with the historic preservation review process (Hawai'i Revised Statutes [HRS] Chapter 6E-42 and HAR Chapter 13-284) for the project under consideration. This inventory survey investigation was designed to fulfill the state requirements for archaeological inventory survey per HAR Chapter 13-13-276.

Fieldwork Effort	Fieldwork was accomplished on September 6 th and 12 th , 2005 by Robert Hill, B.A. and Tanya L. Lee-Greig, M.A. The field effort included a systematic pedestrian inspection and limited subsurface testing. The total time required to complete the fieldwork consisted of four person days.
Number of Historic Properties Identified	Two
Historic Properties Recommended Eligible to the Hawai'i Register of Historic Places (Hawai'i Register)	50-50-09-5744, historic flume and bridge, recommended eligible under Criterion D. 50-50-09-5745, historic hand-dug well, recommended eligible under Criterion D.
Historic Properties Recommended Ineligible to the Hawai'i Register	None
Effect Recommendation	Under Hawai'i state historic preservation legislation, the only two possible effect determinations for a given project under historic preservation review are "no historic properties affected" and "effect, with proposed mitigation commitments" (HAR Chapter 13-284-7). In the circumstance of the current project area, two historic properties have been documented that cannot be avoided by the proposed residential development. These historic properties are significant for their information content. The current inventory survey investigation has adequately recorded the information available from these properties, through location documentation, written descriptions, photographs, plan view maps to scale, and cross sections. Because their significant information has already been recorded, and additional historic preservation mitigation would not add to the body of information concerning these historic properties, CSH recommends a project specific effect determination of "no historic properties affected." This is believed to be appropriate, despite the potential removal of these features by the proposed development project, because the information that gives these historic properties their significance has been adequately recorded.
Mitigation Recommendation	No further historic preservation work is recommended for future development of this parcel.

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Section 1 Introduction

1.1 Project Background

At the request of Mr. Daniel Yasui of A&B Properties (A&B), Cultural Surveys Hawaii'i, Inc. (CSH) conducted an archaeological inventory survey with limited subsurface testing of an approximate 100-acre area in Pulehu Nui Ahupua'a, Wailuku District, Maui Island (TMK: [2] 3-8-004:002 por., 022 por., and 030), (Figure 1 and Figure 2). The project area is bound by corn and sugar cane fields to the north and east, P'iilani Highway to the west, and the Hale P'iilani Residential Subdivision to the south. A&B is contemplating the possibility of filing future land use applications that would allow residential expansion into the project area. At a minimum, residential expansion would include the grading, dwelling construction, and street and utility installation that is commonly associated with residential development. CSH undertook this archaeological inventory survey to comply with the historic preservation review process (Hawaii'i Revised Statutes [HRS] Chapter 6E-42 and HAR Chapter 13-284) for the project under consideration. This inventory survey investigation was designed to fulfill the state requirements for archaeological inventory survey per HAR Chapter 13-13-276

The area under consideration for future residential expansion consists of approximately 93-acres. However, the area of potential effect (APE) for the project under consideration included an approximate seven acre section of Waiakoa Gulch located outside and adjacent to the 93-acre project area (Figure 3). The entire approximate 100-acre APE, hereafter referred to as the "project area", was surveyed as a part of this investigation

1.2 Scope of Work

The following scope of work served as the guidelines for this archaeological investigation:

1. A complete ground survey of the entire project area for the purpose of site inventory. All sites would be located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation will include photographs and scale drawings of selected sites and complexes. All sites will be assigned State site numbers.
2. Limited subsurface testing to determine if subsurface deposits are located in the project area, and, if so, evaluate their significance. If appropriate samples from these excavations are found, they will be analyzed for chronological and paleoenvironmental information.
3. Research on historic and archaeological background, including search of historic maps, written records, and Land Commission Award documents. This research will focus on the specific area with general background on the *ahupua'a* and district and will emphasize settlement patterns.

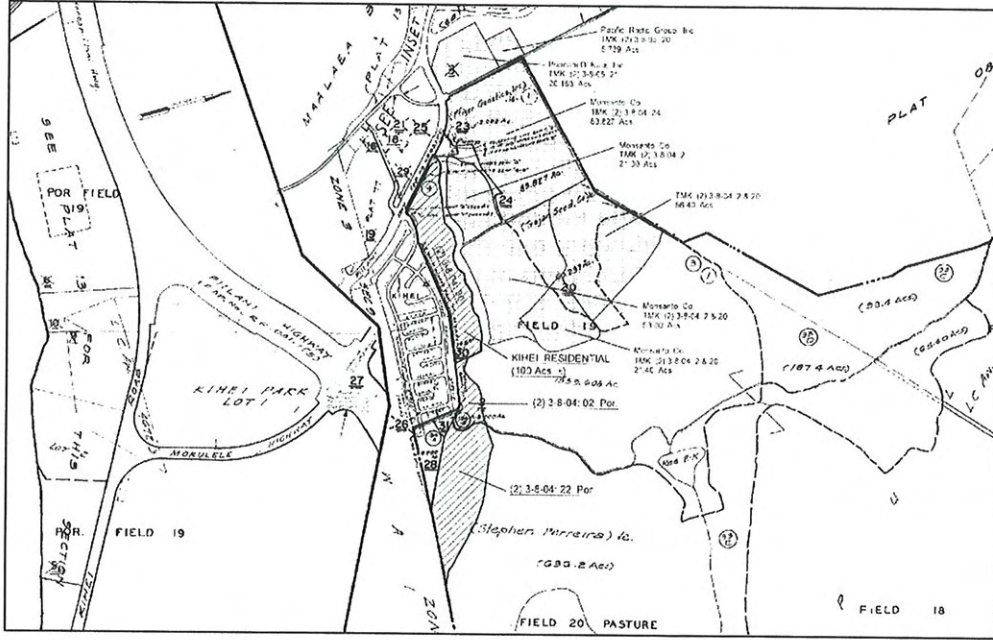


Figure 2. Portion of TMK (2) 3-8-004 showing project area in cross hatch (project area map courtesy of Mr. Daniel Yasui – A & B Properties)

An Archaeological Inventory Survey Report for an Approximately 100-Acre Parcel

TMK: (2) 3-8-004-002 por., 022 por., and 030

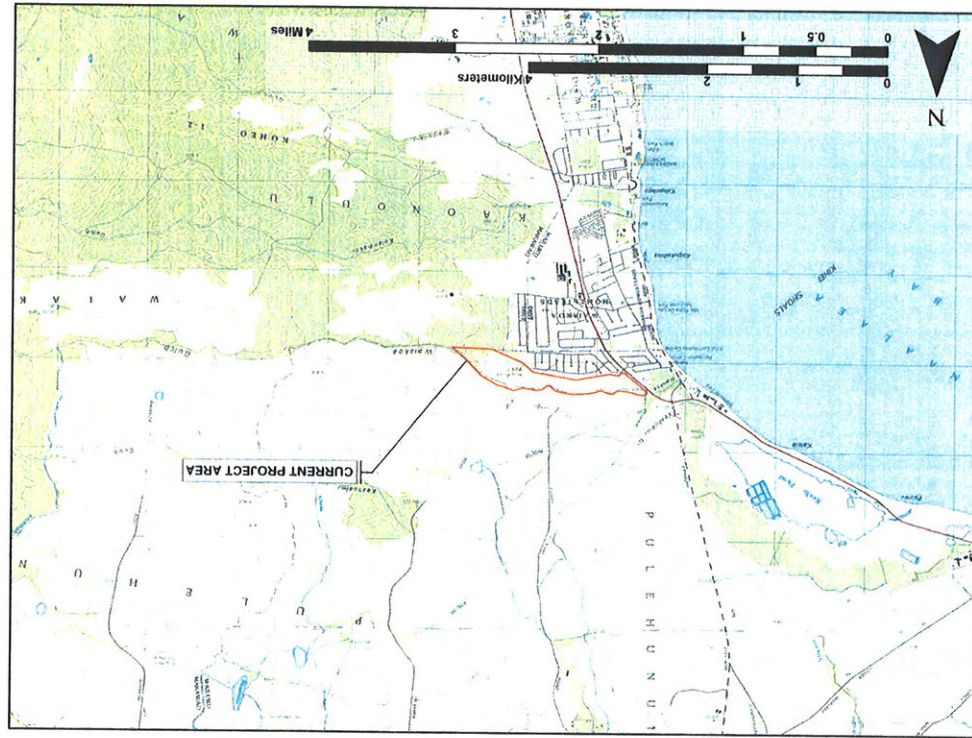


Figure 1. A portion of the 1998 Puu o Kali and Maalaea 7.5-minute USGS topographic quadrangles, project area in red

An Archaeological Inventory Survey Report for an Approximately 100-Acre Parcel

TMK: (2) 3-8-004-002 por., 022 por., and 030

4. Consultation with knowledgeable community members. State historic preservation rules have recently been established which require consultation with community members as part of the inventory survey process. This consultation requires contacting knowledgeable members of the community and requesting information on historic and cultural issues related to the property.
5. Preparation of a survey report which will include the following:
 - a. A topographic map of the survey area showing all archaeological sites and site areas;
 - b. Results of consultation with knowledgeable community members about the property and its historical and cultural issues.
 - c. Description of all archaeological sites with selected photographs, scale drawings, and discussions of function;
 - d. Historical and archaeological background sections summarizing prehistoric and historic land use as they relate to the archaeological features;
 - e. A summary of site categories and their significance in an archaeological and historic context;
 - f. Recommendations based on all information generated that will specify what steps should be taken to mitigate impact of development on archaeological resources - such as data recovery (excavation) and preservation of specific areas. These recommendations will be developed in consultation with the client and the State agencies.

This scope of work also includes full coordination with the State Historic Preservation Division (SHPD), and County relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

1.3 Environmental Setting

1.3.1 Natural Environment

The general soils within the project area are of the Waiakoa-Keahua-Molokai association. This soil association is found on low uplands and consists of deep to nearly level well-drained soils (Foote et al 1972:12). More specifically, the soils within the project area are of the Alae Series, Waiakoa Series, and Pulehu Series (Figure 4).

The Alae Series consists of excessively drained soils on alluvial fans. Alae sandy loam (AaB), found in the northwestern corner of the project area, occurs on smooth alluvial fans where permeability is rapid, runoff is slow and the erosion hazard is slight (Foote et al. 26). At the time of the US Department of Agriculture (USDA) soil survey, AaB type soils were commonly used for sugarcane and pasture with small acreages used for truck crops.



Figure 3. Aerial photograph depicting project APE (photo courtesy of Mr. Daniel Yasui - A & B Properties)

The Waiakoa Soil Series consists of well drained, gently sloping to moderately steep soils located on the upland areas. The upper part of the Waiakoa Series is influenced by volcanic ash and developed from material weathered from basic igneous rock. Waiakoa very stony silty clay loam (WgB), found in the central portion of the project area, is generally smooth and found on low uplands. The permeability of WgB soil is moderate with slow runoff and a slight erosion hazard (Foote et al. 1972:126). Waiakoa extremely stony silty clay loam (WID2), found along the southern boundary and eastern most portion of the project area, is like WgB soils except that it is eroded and stones cover three to 15 percent of the surface. Runoff of WID2 soils is medium and the erosion hazard is severe (Foote et al. 1972:127). At the time of the USDA soil survey, WgB soils were commonly used for sugarcane, pasture, and wildlife habitat and WID2 soil was used for pasture and wildlife habitat.

The Pulehu Soil Series consists of well-drained soils on alluvial fans, stream terraces, and basins and are developed in alluvium washed from basic igneous rock (Foote et al 1997: 115). Pulehu cobbly silt loam (PrB), found along the northern boundary of the project area, is similar to Pulehu clay loam (PsA) where run off is slow with a slight erosion hazard. The available water capacity is approximately 1.4 inches per foot in the surface layer and subsoil. The only difference between PrB soils and PsA soil is that the texture is silt loam and the surface layer is cobbly. (Foote et al. 1972:116). At the time of the USDA soil survey, PrB soil was used for sugarcane with small acreages used for pasture.

Rainfall accumulation within the project area averages around 15 inches per year with the heaviest rainfall occurring during the winter months (December through February) and little to no rainfall during the summer months (June through August) (Giambelluca and Schroeder 1998). This pattern of rainfall and low annual precipitation rate once sustained a lowland, dry shrubland and grassland native ecosystem (Pratt and Gon III 1998). The landscape of the project area, however, has been heavily modified by historic sugar cultivation, as well as, modern corn and truck crop cultivation (Figure 5, Figure 6, and Figure 7). The vegetation along the sides of Waiakoa Gulch currently consists of moderately dense *kianwe* (*Prosopis pallida*) and *koa haole* (*Leucaena leucocephala*) with knee to waist high grasses in the gulch bottom. Thin stands of *kianwe* and *koa haole* trees, knee to waist-high buffelgrass (*Cenchrus ciliaris*) and other alien grass species, interspersed with sparse occurrences of *'iima* (*Sida fallax*) and *'uhaloa* (*Waltheria indica*), could be found throughout the un-cultivated eastern portion of the project area.

1.3.2 Built Environment

The built environment within the project area consisted of farm sheds and a single post and pier structure in the truck farms section. The surrounding vicinity consisted of the Hale Pi'ilani residential subdivision to the south and the four-lane Pi'ilani Highway and Waiakoa Bridge to the west (see Figure 3).

Figure 4. A portion of the 1998 Pun o Kali and Maalaea 7.5-minute USGS topographic quadrangles, showing the project area relative to the local soil series (U.S. Department of Agriculture, Natural Resources Conservation Service 2001)

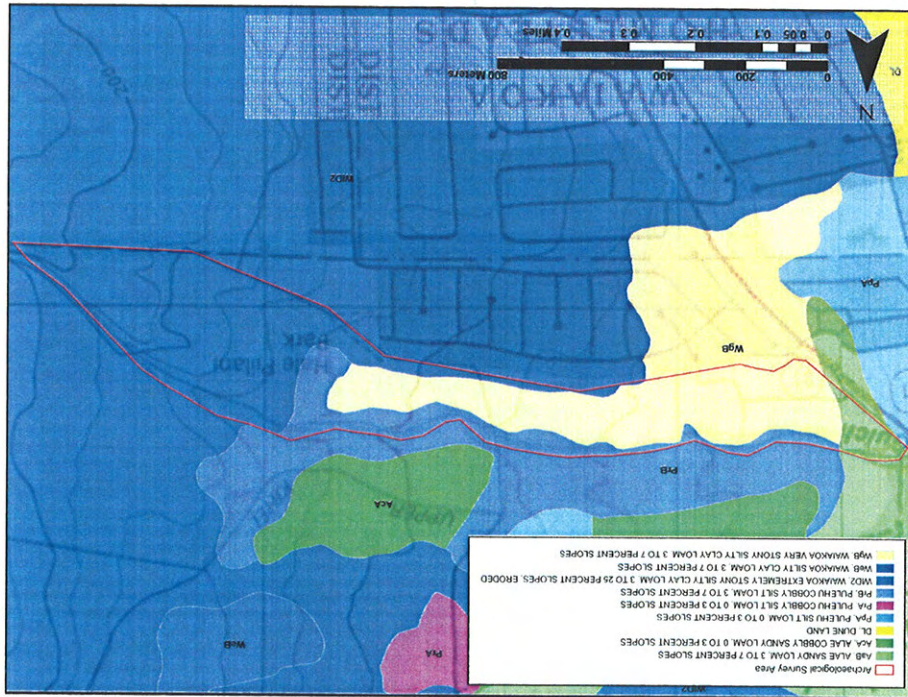


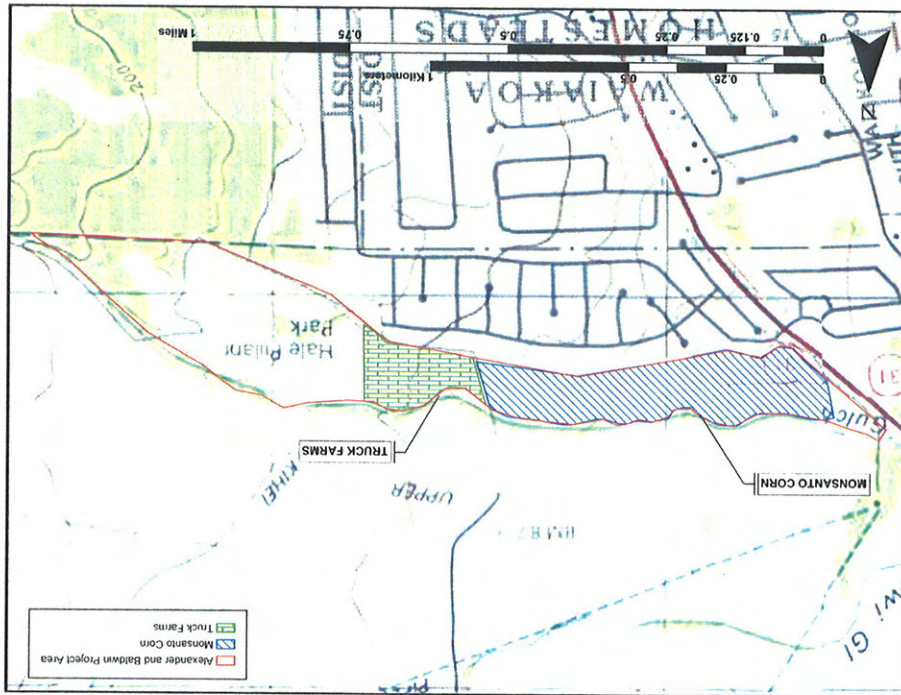


Figure 6. Overall view of uncultivated portion of project area, view to east



Figure 7. Truck farming area, Hale Pi'ilani Residential Subdivision in the background, view to east

Figure 5. A portion of the 1998 Pun o Kali and Maalaea 7.5-minute USGS topographic quadrangles, showing the proposed residential expansion area and approximate areas currently under cultivation



Section 2 Methods

2.1 Field Methods

The project area consisted of three distinct landscape types (see Figure 3 and Figure 5):

1. Uncultivated and fallow fields;
2. Gulch and streambed; and
3. Fields currently under cultivation (Monsanto Corn and Truck Crops).

The field survey methods were adjusted according to the type of landscape. The eastern portion and northwestern corner of the project area consisted of uncultivated and fallow fields and were systematically surveyed by two archaeologists at 15 to 20 meter intervals oriented in an east-west direction. In the moderately dense vegetated gulch, the survey intervals were spaced closer together at five to ten meters. Where there were fields under cultivation, the survey consisted of spot checks and walk-through inspections along field access roads.

Documentation methods included plan views of historic properties within the project area drawn to scale using a meter-tape and compass and digital photographs. Locations of each historic property were recorded with the Trimble Pathfinder ProXR GPS Unit using the UTM coordinate system and NAD 1983 datum.

Limited sub-surface testing was conducted by hand in 10 cm levels. All sediments were screened through 1/8th inch mesh screen and cultural materials bagged and labeled according to provenience.

2.2 Laboratory Methods

This phase of work effort involved the following specific procedures.

1. Identification and cataloging of cultural material, including both historic and prehistoric artifact forms and material type. Artifacts were measured, weighed and, if appropriate, representative samples were drawn and/or photographed.
2. Faunal remains were identified to genus and species when possible, and weighed. Data was tabulated by depth and stratum.

2.3 Document Review

As part of the inventory survey, a review of all previous archaeological work conducted in the surrounding area was performed. In addition, a variety of resources devoted to historical perspectives of the region and traditional stories and accounts were reviewed. Research venues included the State Historic Preservation Division of the Department of Land and Natural Resources and the Survey Office of the Department of Accounting and General Services. All relevant Land Claim Awards (LCA) and Royal Patents were researched using resources associated with the Waihoana Aina online database (Waihoana Aina Corp. 2002).

2.4 Consultation

A separate document representing a cultural impact assessment is being conducted as part of the necessary studies for the potential development of the project area. Hawaiian organizations, government agencies, community members, and cultural and lineal descendants with ties to Pūlehu Nui and the north Kīhei area will be contacted to identify potentially knowledgeable individuals with cultural expertise and knowledge of the project area and surrounding vicinity, as well as, any cultural concerns and potential impacts that may be associated with potential residential expansion.

Section 3 Background Research

The division of Maui's lands into political districts occurred during the rule of Kaka'alaneo, under the direction of his *kahuna*, Kalaiha'ōhi'a (Beckwith 1970:383). This division resulted in twelve districts or *moku* during traditional times: Honua'ula, Kahikimui, Kaupō, Kīpahulu, Hana, Ko'olau, Hāmākua Loa, Hāmākua Piko, Ka'anapali, Lahaina, and Kula. The current project area is located on the leeward flank of Haleakala in the *moku* of Kula and *ahupua'a* of Pūlehu Nui (Figure 8) at a place commonly known as Kīhei.

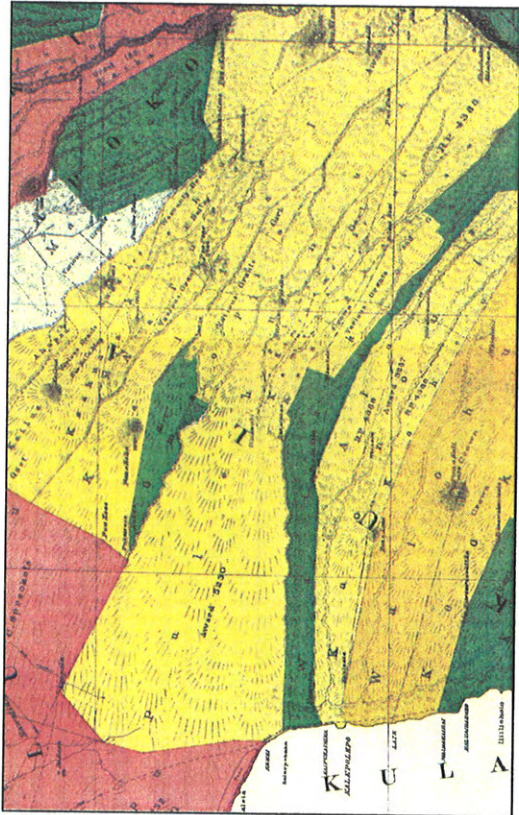


Figure 8. A portion of the F.S Dodge map (1885) showing Pūlehu Nui Ahupua'a in relation to the traditional *moku* of Kula (crown lands in yellow, government lands in green)

3.1 Traditional and Historical Background

3.1.1 Mythological Accounts

While the mythological and traditional accounts of the Kīhei area are relatively scarce, an analysis of the place name meanings for the region surrounding the project area may yield some insight into the patterns of life in an area. Literal translations of several of the place names for land areas and divisions near to the project area are listed below. Unless otherwise noted, the translations are taken from Pukui et al. (1974):

Kula (*moku*)
literally translated as "plain"; always an arid region (Handy in Sterling 1995:242)

Pūlehu Nui (*ahupua'a*)

Kīhei

large *pūlehu* where *pūlehu* is literally translated as "broiled" literally "cape or cloak"; sandy point and boundary marker between Pūlehu Nui and Waikapu (Sterling 1998:255); commonly used place name for the South Maui area

Kīheipūko'a

kīhei literally translates as "cape or cloak" and *pūko'a* literally translates as "coral head"; Kīheipūko'a was a place near Keālia between Kalepolepo and Mā'alaea (Sterling 1998:257)

Keālia

literally "salt encrustation"; a pond near Kīhei and major salt pan location (Sterling 1998:95)

Kalē'ia

literally "the abundance", possibly in reference to the resources available from the fishponds and offshore fishing grounds

Kalepolepo

literally "the dirt"

Ka'ie'ie

"a plaything for floating in the rapids", ancient name of Kalepolepo (Sterling 1998:252)

Kaopala

literally "the rubbish"; dividing line between Pūlehu Nui and Waikapu

Waiakoa

literally "water (used) by warrior"; the name of the gulch that serves as the northern boundary of the project area

Keāhuaiwi

literally "the bone pile"; the name of a gulch immediately adjacent to and north of Waiakoa Gulch

Kalaepohaku

"the stony promontory"

Pohaku Kī'i

"tilted stone"; a resting place for travelers

Alakoa

"soldiers street"

Kohemalalama

"the vagina"; also the ancient name for Kaho'olawe

The above place names, together with the environmental data, suggest that the lands of and surrounding coastal Pūlehu Nui were fairly dry and barren in an agricultural sense but rich in marine resources. Previous research on pre-contact occupation in Kula District (Kolb et al. 1997) has suggested that most permanent habitations were in the uplands with a smaller permanent population located along the coastline. While a reconstruction of the coastal and archaeological landscape of Kula Moku underscores the importance of the uplands as a focus of agriculture and habitation, Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine exploitation. The relative scarcity of recorded coastal place names, however, may be an indication of a smaller population that was widely spread out across the leeward coastal line. The vicinity surrounding the current project area was also a site of conflict between the Hawai'i Island chief Kalaniopu'u and Maui Island chief Kahekili and is perhaps the origins for such place names as "Waiakoa" and "Keāhuaiwi".

3.1.2 Traditional Accounts

The earliest account concerning Kīhei and Hawaiian politics is given by Kamakau (1961) during the time of Alapa'i and Kekaulike:

Alapa'i sailed from Kohala on Hawai'i...But when he landed at Mokuau in Kaupō (Maui) and heard that Ke-kau-like was dying, he gave up all thought of war and wished only to meet Ke-kau-like and his (half) sister Ke-ku'i-ipo-iwa-nui...He landed at Kiheipukoa with all his chiefs and fighting men...While he was at Kihei, Alapa'i heard that the ruling chief of Oahu was making war upon Molokai. Most of the chiefs of Molokai...were of Hawai'i...Alapa'i's sympathy was aroused, for these were his own brothers and children (relatives), and he made ready to go to their help on Molokai. [1961:70]

Other accounts involve the continuing conflict between Kahekili of Maui Island and Kalani'opu'u of Hawai'i Island during the late 18th century. Following a losing battle at Kaupō in 1775, Kalani'opu'u dedicated several war *heiau* on Hawai'i Island to aid in the defeat of Kahekili. Upon hearing this news Kahekili sent for the *kahuna* (priest) Kaleopu'upu'u who directed construction of the *heiau* of Kaluli and Pu'uohala on the north side of Wailuku. When Kaluli Heiau was completed Kaleopu'upu' said to Kahekili:

This is the house of your god; open the sluice gate that the fish may enter. [Kamakau 1961: 85].

In the year 1776, the army of Kalani'opu'u landed at Keoneo'o'io with their war canoes extending to Makena at Honua'ula and proceeded to ravage the countryside. Kalani'opu'u landed with additional forces at Kiheipuko'a at Kealia to Kapa'ahu, 800 strong and eager to drink the waters of Wailuku.

Across the plains of Pu'u'aimako (Can-trash-hill) and Kama'oma'o shone the feather cloaks of the soldiers ... Ka-hekili was at Kalamihale just below Kihahale and above the plateau of Ka'ilipoe at Pohakuokahi ... Kaleopu'upu'u [said] to Ka-hekili, "The fish have entered the sluice; draw in the net." [Kamakau 1961:85]

The forces of Kahekili descended on and destroyed the soldiers of Kalani'opu'u, slaying the Alapa (elite soldiers of Kalani'opu'u) on the sandhills at the southeast of Kalua. Only two men escaped to Kiheipuko'a to tell Kalani'opu'u the news of their defeat. After a second day of warfare, Kalani'opu'u sued for peace and was granted such by Kahekili and his messengers at Kiheipuko'a (Kamakau 1961:88-89).

3.1.3 Early Historic Period

Kihei was one of the locations visited by Captain George Vancouver. A monument at Mai Poina 'Oe la'u Beach Park in Kihei commemorates Vancouver's on-shore expedition in 1792, when he first met the ruling chief Kahekili. With its sheltered coastline and easy access to upcountry resources over a vast slope, Kihei would continue to be a common stop for visiting ships.

During the early and middle 1800s, the Hawaiian demography was affected by two dramatic factors: radical depopulation resulting from Western disease; and nucleation around the developing port towns. The traditionally Hawaiian population was largely dispersed and, although there were royal centers and areas of more concentrated population, these areas never came close to rivaling the populations of the historic port towns that developed on Hawai'i's

shores during the 1800s. In this regard, Kuykendall (1938:313) notes that in the period from 1830 to 1854:

The commercial development during this period, by magnifying the importance of a few ports, gave momentum and direction to a townward drift of population; the population of the kingdom as a whole was steadily going down, but the population of Honolulu, Lahaina and Hilo was growing.

We believe that Kuykendall's observation was most likely the demographic pattern at the Kalepolepo entreat, a hub of early historic activity for Kihei and eventually all of Kula Moku (Kolb et al. 1997:69), located approximately one mile to the south of the current project area. The development of Kalepolepo as an entreat and a focus of Christian life in the 1840s and 1850s most likely increased the population in the immediate vicinity above the pre-contact population figures, contrary to the island-wide trend of depopulation. That the population and areal extent of the Kalepolepo community reached its zenith during the mid 1800's appears to be supported by Kolb (*et al.* 1997:68):

The ancient village of Kalepolepo was relatively small, and was built around an economy primarily based upon the exploitation of ocean resources--primarily an excellent fishing grounds as well as three large fishponds. However, as the number of visiting ships increased, Kalepolepo soon became an important provisioning area. By 1850 we know that the economic opportunities were attracting a number of European entrepreneurs.

In 1820, the whaling industry was introduced in Hawai'i. Although the whaling trade centered on Lahaina, mainly affecting the Kula/Kihei area through agricultural demands, Clark (1980:47) notes that "From the 1840s to the 1860s a small whaling station was maintained at Kalepolepo [Kihei]. The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and in particular the long-lasting Irish potato. After 1830, dryland agriculture in the old Kula District expanded with a focus on Irish potato cultivation. The California Gold Rush of 1849 further intensified the demand as a California-Hawai'i potato trade began to flourish. Kula became the area of highest potato production and was known as "the potato district" (the area between 2000 and 5000 ft. amsl). During this time period sugar cultivation and ranching were established in the Kula region. Sugar was present prior to 1846, with six sugar producers operating on the slopes of Haleakalā (Wong Smith in Brown and Haun 1989:C-7). As Wong Smith points out (Brown and Haun 1989: C-6), ranching was present in the area prior to the 1840s. Much of the produce, sugar and livestock moved down the Kalepolepo and Kekuawaha'ula'ula Trails to the landing at Kalepolepo, just south and east of the project area. Donham (1992:5) notes that the inundation of land clearing and cultivation associated with the Gold Rush resulted in "deforestation [which] adversely affect[ed] the amount of rainfall in the district, and periods of drought became more common."

Around 1849 John Halstead built the Koa House at Kalepolepo in Kihei. The building, part store and part residence, thrived on both the trade of the whaling industry and the then thriving potato industry. During the Gold Rush years, the store became "an emporium for Irish potatoes" and served as a gathering place for the whaling sailors. David Malo created a balance for the boisterous whaling crowd by constructing the Kilolani Church at Kalepolepo around 1852.

Potato production thrived in Kula from 1830-1850 until successful potato cultivation and production in California and Oregon resulted in a decline in the Hawai'i trade (Burgett and Spear 1995:6-7). Halstead ran his store until 1876, closing shop when the potato industry diminished and moved to Ulupalakua (Janion 1977:25-31).

3.1.4 Mid- to late-1800s

The most significant change in land-use patterns and allocation came with The Great Mahele of 1848 and the privatization of land in Hawai'i. This action hastened the shift of the Hawaiian economy from that of a subsistence-based economy to that of a market-based economy. During the Mahele, all of the lands in the Kingdom of Hawai'i were divided between *mō'i* (king), *ali'i* and *konohiki* (overseer of an *ahupua'a*), and *maka'ainana* (tenants of the land) and passed into the Western land tenure model of private ownership. On March 8, 1848, Kauhikoaoli (Kamehameha III) further divided his personal holdings into lands he would retain as private holdings and parcels he would give to the government. This act paved the way for government land sales to foreigners, and in 1850 the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995: 41-51).

Native Hawaiians who desired to claim the lands on which they resided were required to present testimony before the Board of Commissioners to Quiet Land Titles. Upon acceptance of a claim the Board granted a Land Commission Award (LCA) to the individual. The awardee was then required to pay in cash an amount equal to one-third of the total land value or to pay in unused land. Following this payment, a Royal Patent was issued that gave full title of ownership to the tenant. But by 1850, the government of Hawai'i was offering land for sale to both Native Hawaiians and foreigners. Such lands were referred to as Royal Patent Grants or as Grants.

A total of 13 land commission claims were made in Pulehuni and nine were awarded (Table 1). A portion of the 1889 Monsarrat and Dodge map of Kula shows that the area in which the current project area lies was awarded to Keaweamahi as a part of LCA 5230 and supporting testimony given to the land commissioners indicate that the land of Pulehu (Pulehuni) was given to Keaweamahi by the King in 1843 and never disputed (Waihona 'Aina 2000). The testimony given by Kaauwai and Kaiakelau additionally maintained that there were a great many natives that lived within the *ahupua'a* of Pulehuni (Waihona 'Aina 2000). As indicated in Table 1, the majority of the lands that were awarded were *kula* lands used for potato (both sweet potato and Irish potato) cultivation and primarily located along the upper elevations of Kula Moku. Only one land claim, made by Kapono (LCA 9018), made mention of fishing rights and access to a *loko*. Land commission claim # 9018 was not awarded.

Table 1. Land Commission Awards Within Pulehu Nui Ahupua'a

LCA	Royal Patent Number	Claimant	Award Type	Acreage
0327B	7691	Preveer, John	Apana	6.03
9671	2202	Kekahuna	2 kula, 1 Irish potato	5.78

LCA	Royal Patent Number	Claimant	Award Type	Acreage
9019	6330	Helehua	3 kula	9.08
4672	6560	Poonui	6 kula, 3 sweet potato plots, 1 Irish potato	4.09
9672	5190	Napoko	2 kula, 3 Irish potato	12.56
9673	6329	Lonoaea	2 kula	4.06
8866	5168	Kaniho and Pakeau	2 kula, 1 house lot, 1 mala of Irish potatoes	14.9
4567	7484, 7896	Waihue	11 kula, 10 sweet potato	7896
5230	8140	Keaweamahi	ahupua'a	1668.78

By the time John Halstead closed shop in 1876, the boom years of Kalepolepo had passed. By 1880 the government survey of the Kula area showed the demarcation of only a few Land Commission Awards and who had received awards had replaced them with grants. Lower Kula consisted primarily of pastureland for ranching (Wong Smith in Dorham 1990b:B-6). Kennedy (1992:7) notes that at this point *kīawe* was imported to feed cattle and provide wood.

Regarding the settlement at Kalepolepo and the impact of the changes associated with the change to ranching on the general area known as Kīhei, Clark comments:

Halstead finally closed his store in 1876, as demands for his goods had steadily decreased, and moved to Ulupalakua . . . By this time the once thriving Hawaiian village at Kalepolepo had been almost totally abandoned as well. The slopes of Haleakala had gradually become denuded of their forests and torrential rains had caused heavy soil runoffs into the Kalepolepo shoreline. Cattle had trampled down the brush and grassy fields, causing sand dunes to drift and fill up the pond. Clouds of dust filled the air instead of cooling winds. Except for a handful of fishing families, Kalepolepo (and likely the Kīhei area in general) was deserted. (Clark 1980:48).

Sugar would soon fill the void and in 1898 the Kīhei Plantation Company (KPC) was founded. The KPC began sugar operations in Kīhei and the plain above.

3.1.5 Early to Mid-1900s

The Kīhei Plantation Company, Ltd. was organized late in 1898 with a capitalization of 60,000 shares at \$50 per share. Water was the most critical component in the decision to locate sugar cultivation along the leeward shores of Maui's arid coastline. The discovery of an ample

supply of irrigation water early in 1898 led to the drilling of a large, successful well, but the supply of water was limited (Stearns 1942). Over the next four years, two ditches were developed to supplement the water needs of the 4,873 acres of sugar under cultivation at Kīhei (Gilmore 1936).

The history of the Kīhei Plantation Company begins with the annexation of the Hawaiian Islands by the United States in 1898. With annexation came political stability for Hawai'i. Sugar prices were rising due to the outbreak of war between the United States and Spain over the colonies in Cuba, Puerto Rico and the Philippines. Henry P. Baldwin, of the Maui plantation of HC&S, entered into a partnership with O'ahu businessman Benjamin F. Dillingham to convert Lorrin A. Thurston's landholdings in Kīhei into a sugar enterprise.

Up to that time, sugar cultivation within the central isthmus of Maui was centered around the main towns of Wailuku and Kahului. Water tunneled from springs in the West Maui Mountains flowed through ditches in Wailuku to irrigate fields as far away as Mā'alaea. Water from the windward rain belt of Kailua ran through a network of ditches from East Maui to Pā'ia, to irrigate fields in Pu'unēne.

The McCandless Brothers drilled a successful Maui-Type well (U.S. Geological Survey Well 14 / Hawaiian Commercial & Sugar Well K1) in 1899. It was located just inland from the coast in North Kīhei, between Keālia Pond and the Waiakoa Homestead Lands. This well was drilled vertically to approximately 60 feet through the Honomāni basalts, and tunneled laterally over 1,500 feet in order to skim 10 million gallons of fresh irrigation water per day from sources beneath the Kīhei plains (McCandless 1936).

The Kīhei Plantation Company had the McCandless Brothers drill two or three additional Maui-Type wells on the north side of reservoir K2 at the discharge end of the existing pipeline of Well 14. The plantation in Kīhei failed in 1908 before the well site was able to be developed. It would have been named the HC&S K2 well, and would have included a large pumping station (Stearns 1942).

The plantation company in Kīhei built bridges to span streams and gulches flowing through the company fields. The plantation had planned the construction of a mill in North Kīhei, and ordered a plant to be built. It was decided that the new HC&S mill under construction at Pu'unēne would have more than enough capacity to mill all the cane from the Kīhei fields. The order for the mill was transferred to the 'Ōla'a Sugar Company in Hawai'i, in exchange for a supply of steel rails for new railway requirements at Pu'unēne. A large scale Kona storm hit the plantation on November 15th, 1900, and caused immense damage to both Kīhei and the HC&S fields in Pu'unēne (Dean 1950). Bridges were knocked out, buildings were flattened, and washouts filled irrigation ditches with silt. Repairs were effected immediately, with the new HC&S mill at Pu'unēne commencing operations January 29, 1902.

3.1.5.1 Railway Operations

The Kīhei Plantation Company planned to construct a railway to move their cane. The sugar agency of William Dimond & Company placed an order for a locomotive from the Baldwin Locomotive Works in Philadelphia. The order was placed April 1899, and the plantation locomotive "Haleakala" was built and sent on to Maui (Conde 1973).

By March of 1900, the first annual report of the Kīhei Sugar Company stated, "It was our intention to complete the main [rail]road only as far as Camp #2, or for about 2 miles, but as the development of Camp #3 required pushing on of the road one and a half miles further, this has been done, having been completed the 15th of February." An additional six miles of track connected the Kīhei wharf to the various well pumping stations, and north to meet up with HC&S track (Conde 1973). Establishing the railroad at Kīhei made it possible to harvest and transport over two thousand tons of sugar in a single year (Dean 1950).

The laying of the railroad and the cultivation of the sugar cane was performed primarily by Japanese field labor (Figure 9). Kīhei's plantation Camp #1 was set up inland of the Kīhei wharf and mooring pier. Two stables and a plantation store were located at Camp #1. Hospital services were provided by HC&S in Pu'unēne. Kīhei Camp #3 was located 2 ½ miles north of Kīhei Camp 1 at Kōlaloa Gulch, along the North Kīhei line of the HC&S railroad and south of the current project area (Figure 10).

The 3-foot gauge track for the Kīhei Plantation Company railroad was built to the same specifications as the railway linking the HC&S mill at Spreckelsville to its fields; and to the sugar warehouses at the Kahului wharf. By 1902, with the new Pu'unēne mill completed, a new milling contract with HC&S provided that all cane loaded by the Kīhei Plantation Company was to be ground and manufactured into sugar by HC&S.

3.1.5.2 Water Source Development

The Lowrie Ditch project, named for former HC&S manager William J. Lowrie, brought an additional source of water to the Kīhei plains. His plan was to begin the ditch at the Pāpa'a Reservoir, at the 1,000 ft. elevation, and maintain a four-foot drop per mile following the ditch's initial plunge from the Kailua reservoir. Steep mountain gulches were traversed using the force of the constant weight of water flowing in a series of siphons. The Halehaku Gulch, at 250 feet deep, and the Māiko Gulch, at over 350 feet deep, were both crossed by giant siphons fabricated of three-eighths-inch iron, and set in place by Japanese laborers. At a weir located above Pā'ia, the allocation of water began. The first tenth of the water flow in the Lowrie Ditch was divided out to the Pā'ia Plantation (an 11/20ths share) and the Haikū Plantation (a 9/20ths share). The distance traveled, from Kailua to the plantation's Kīhei boundary, was 21.9 miles (Thrum 1900).

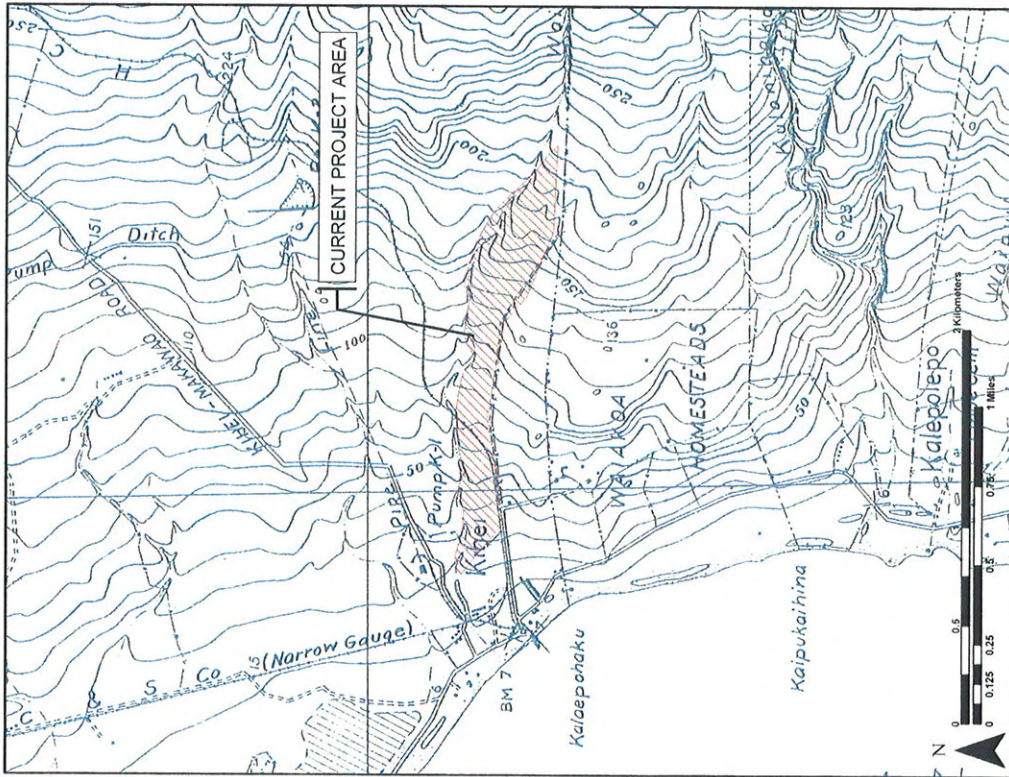


Figure 9. A portion of the 1922 USGS Map, Kīhei Quadrangle showing location of current project area in relation to the railroad to Kīhei

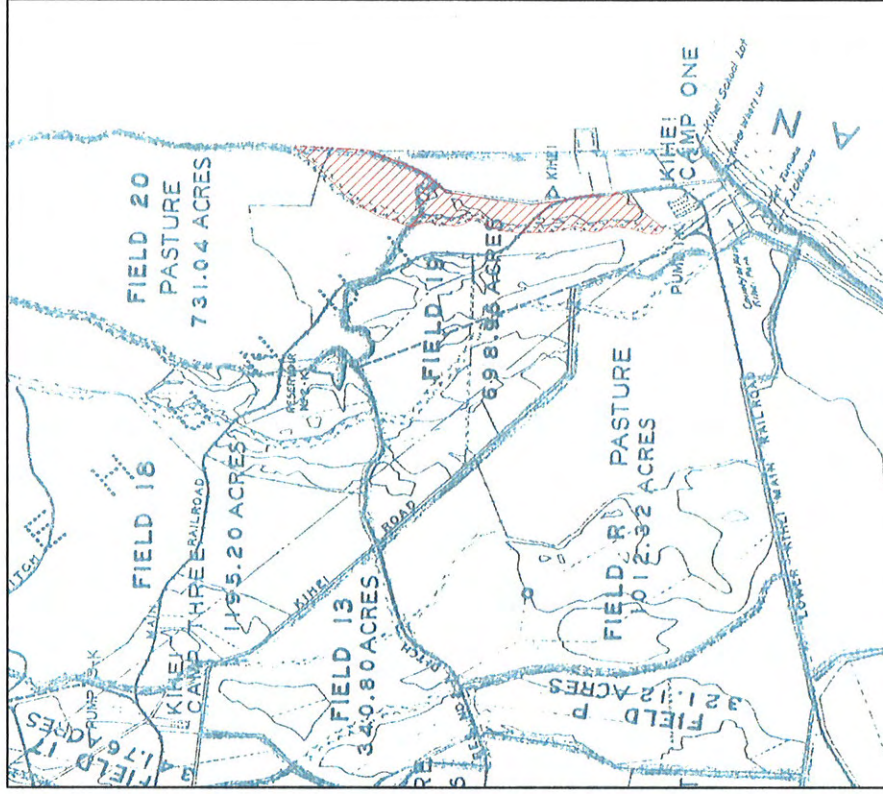


Figure 10. Portion of H.I. Shoemaker map (1910) showing Kīhei sugar cane field and employee camp distribution in relation to the project area (shown in red cross hatch)¹

More water was required, both from wells and from the East Maui water shed. The manager for the Kihei Plantation Company, W.F. Pogue, asked the management of HC&S for an even larger allocation of water for the Kihei lands. In 1901, Samuel T. Alexander ordered the construction of a new ditch, tapping the water sources from Nāhiku to Honomanū. It was determined that the Kihei Plantation Company would receive 2/9^{ths} of the capacity from the enterprise (See Figure 11) (Dean 1950).

H. C. & S. CO.	
During Month of	
Water Delivered to	
1	1.45
2	1.35
3	1.25
4	1.15
5	1.05
6	0.95
7	0.85
8	0.75
9	0.65
10	0.55
11	0.45
12	0.35

Figure 11. A portion of an accounting statement for water delivered to the Kihei Plantation Company in 1907.

The Kihei Plantation Company failed to live up to the expectations of its promoters with an inadequate water supply as the key difficulty. With the waters of the Ko'olau Ditch flowing to the Kihei fields, production appeared to have hit its peak. Although 5,609 tons of sugar was delivered in 1903, high costs required a change of managers in Kihei, and a reduction of the HC&S milling charge to \$7 per ton. The incoming HC&S manager, Frank Fowler Baldwin, determined that the best course of action was to buy out the company for \$375,000 (Conde 1973).

In 1908, the lands of the Kihei Plantation Company were divided up between five new major business entities of HC&S. The Kahului Railroad, which had already been absorbed by HC&S, acquired the rail lines to Kihei and the rolling stock of the plantation. The Kailua Plantation Company (994 acres), the Kalialini Plantation Company (923 acres), the Kula Plantation Company (996 acres), the Makawao Plantation Company (982 acres), and the Pulehu Plantation Company (978 acres) acquired the remaining acreage not included in the railroad right-of-way. Water rights reverted to HC&S, and were reapportioned between the new plantations. The current project area currently overlies what were formerly cane field 19 and pasture field 20 (see Figure 10). Sugar operations continued in North Kihei until circa 1968, when HC&S leased lands to a corn research farm.

3.1.6 Modern Land Use

In 1968, Trojan Seed Company established a corn research farm at Kihei that included the area comprising the present project area. Trojan Seed evolved through ownership by Pfizer Genetics and DeKalb Corn to the present Monsanto Global Seeds business focusing on the development of round-up resistant corn seed. Modern land use of the project area currently includes the seed corn operation run through Monsanto Global Seeds and truck crop cultivation on the portion of the area was formerly a part of Field 19 (see Figure 5 and Figure 10).

3.2 Previous Archaeological Research

The majority of archaeological reconnaissance and inventory surveys in the North Kihei area (Figure 12 and Table 2) have produced relatively little significant information in the way of archaeological data. While this may be due in large measure to changes on the land associated with sugar cane cultivation, ranching, and military use, as well as resort and housing construction, it still seems inescapable that there are only few areas in the Hawaiian Islands abutting sandy beaches that have less in the way of documented Hawaiian cultural deposits than Kihei. While only a few projects in areas back from the coast have identified both pre-contact and post-contact agricultural features (Donham 1989 and 1990; Chaffee et al. 1997; Kennedy 1987; Cordy 1977), enclosures and deposits with a posited pre-contact and post-contact habitation function (Cox 1976; Cordy 1977; Donham 1990; Fredericksen et al. 1993 and 1994; and Fredericksen and Fredericksen 1995; McDermott et al. 2000 and 2001), pre-contact burials (Kennedy 1990) and military sites (Fredericksen et al. 1994; Tomanari-Tuggle et al. 2000), a number of archaeological studies have identified no archaeological sites at all (Hill 2005; Hommon 1981; Borthwick et al. 2002; Burgert and Spear 1997; Chaffee 1999; Burgert et al. 1998; Kennedy 1986 and b, 1988 a and b, and 1989).

During a large scale archaeological reconnaissance and salvage project for the then proposed Pīlani Highway road corridor, located directly east and adjacent to the current project area, Cox (1976) identified a total of six archaeological sites from Pulehu Nui to Kama'ole Ahupua'a. The archaeological findings included one miscellaneous alignment (-0220), two historic house complexes (-0221 and -0222), an *ahu* (-0219), and two pre-contact temporary shelter sites (-0223 and -0224). Subsequent work by Cordy (1977) identified a total of 32 additional single component and multi-component archaeological sites within the same road corridor. Including the Cox study, 23 archaeological sites were identified as pre-contact sites representing temporary habitation (n=13), agriculture (n=6), and aquaculture (n=2). Only two out of the twenty-three sites identified as pre-contact was of an indeterminate function. The remaining 15 archaeological sites were determined to be of the historic era and representative of the railroad and transportation remnants (n=6), ranching (n=3), water control (n=1), and habitation (n=1). Four wall features that were identified as historic were also recorded but function could not be determined.

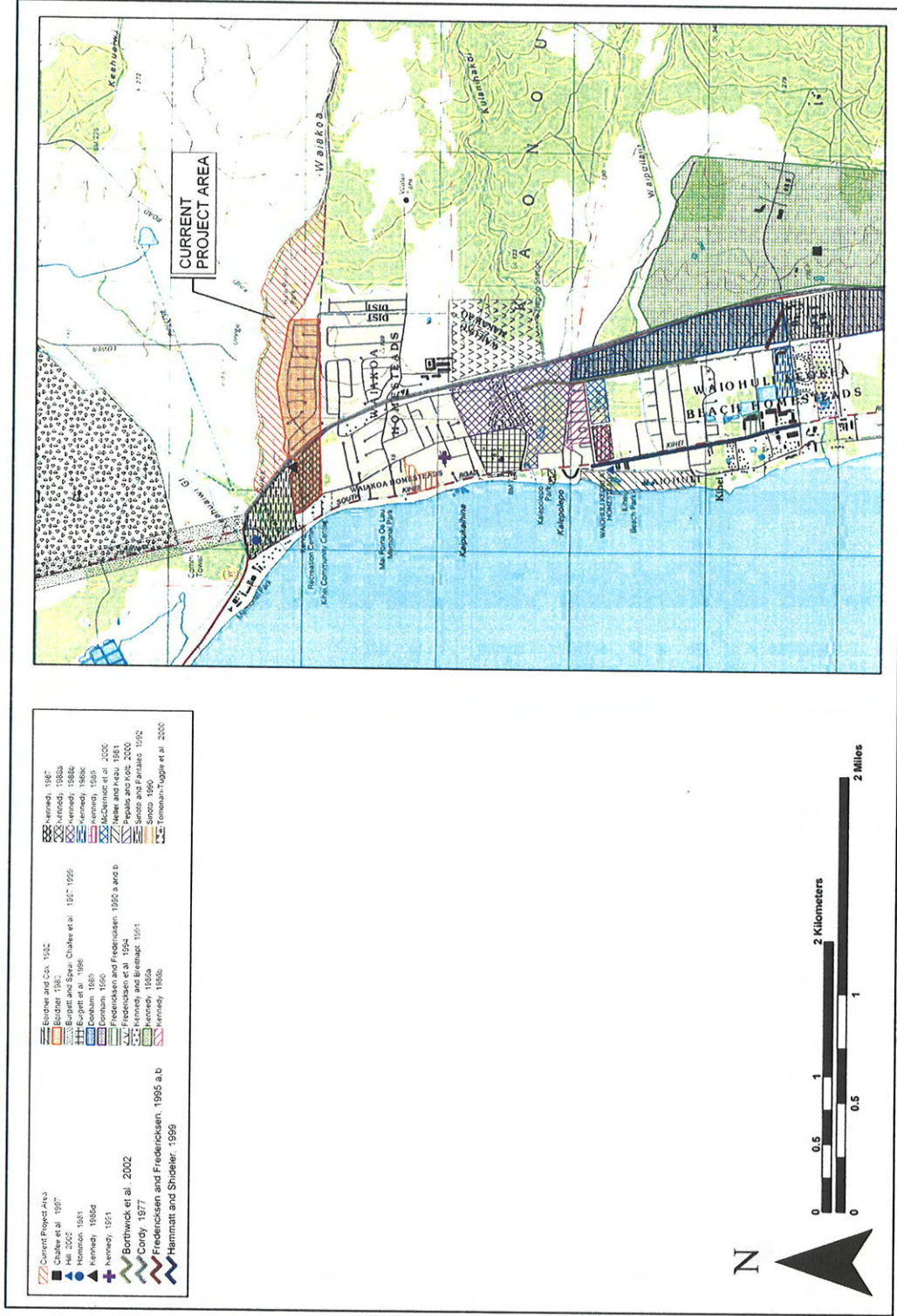


Figure 12. A portion of the 1998 Puu o Kali and Maalaea 7.5-minute USGS topographic quadrangles, showing the project area relative to areas of previous archaeology

An Archaeological Inventory Survey Report for an Approximately 100-Acre Parcel
 TMK: (2) 3-8-004-002 por., 022 por., and 030

Table 2. Summary of Previous Archaeology of the North Kihai Vicinity

Date	Author	Ahupua'a	Nature of Study	Findings
1931	W. Walker	Entire Island	Reconnaissance	three <i>heiau</i> in the uplands of Pulehu Nui
1973	W. Kikuchi	State-wide fishpond survey	Fishpond survey	Notes 3 fishponds in the Kalépolepo area
1976	D. Cox	Pulehunui to Kama'ole	Surface Survey	Identified 6 sites
1977	R. Cordy	Pulehunui to Paeahu	Reconnaissance	Identified 38 sites; 30 in Waiohuli, 0 in Ka'ono'ulu and 8 in Kēōkea
1981	R. Hommon	Coastal Waiakoa	Reconnaissance	No archaeological findings
1982	R. Bordner & D. Cox	Coastal Waiohuli & Kēōkea	Reconnaissance	Reports 9 sites
1986a	J. Kennedy	Waiohuli	Reconnaissance	No findings
1986b	J. Kennedy	Coastal Waiohuli	Reconnaissance	No archaeological sites were found
1987	J. Kennedy	Coastal Pulehu Nui	Inventory Survey	Stacked rock wall, series of rock alignments, 2 ahu, one possible upright, and one earthen mound
1988a	J. Kennedy	Coastal Ka'ono'ulu	Reconnaissance	No archaeological findings
1988b	J. Kennedy	Coastal Waiohuli	Reconnaissance	No archaeological Findings
1988c	J. Kennedy	Coastal Waiohuli	Reconnaissance	No archaeological Findings
1989	T. Donham	Waiohuli	Inventory Survey	Identified 4 sites in a portion of the Miura 1982 study area and recommended data recovery
1989	W. Fredericksen <i>et al.</i>	Coastal Kama'ole	Inventory Survey	No archaeological findings

Date	Author	Ahupua'a	Nature of Study	Findings
1989	J. Kennedy	Coastal Waiohuli	Subsurface Testing	No archaeological findings
1990a	T. Donham	Coastal Waiohuli	Data Recovery	Site 2475 was excavated
1990b	T. Donham	Coastal Kēōkea	Inventory survey	Part of Miura 1982 study area. 16 sites were identified
1990a	W. Fredericksen & D. Fredericksen	Coastal Kēōkea	Monitoring	No archaeological findings
1990b	W. Fredericksen & D. Fredericksen	Coastal Kēōkea	Survey & Monitoring	No archaeological findings
1990	J. Kennedy	Coastal Waiakoa	Survey	No archaeological findings
1990	A. Sinoto	Coastal Waiakoa	Survey & Testing	No archaeological findings (other than 2 pieces of midden)
1991	J. Kennedy & M. Breithaupt	Coastal Kēōkea	Inventory survey	No archaeological findings
1992	J. Kennedy	Coastal Kama'ole	Inventory survey	Identified 4 sites including a permanent pre-contact habitation/religious site
1992	J. Kennedy <i>et al.</i>	Coastal Kama'ole	Inventory survey wt Subsurface Testing	Identified 4 sites all believed to be historic; two military and 2 ranching
1992	Sinoto & Pantaleo	Coastal Pulehu Nui	Inventory Survey	No archaeological findings other than a bridge foundation (site -3131)
1993	D. Fredericksen <i>et al.</i>	Coastal Waiohuli	Inventory Survey/Data Recovery	A rock shelter excavation yielded lithic artifacts, midden and a date of A.D. 1560 to 1800

Date	Author	Ahupua'a	Nature of Study	Findings
1994	E. Fredericksen <i>et al.</i>	Ka'ono'ulu, <i>maka</i> of Pi'ilani Highway	Inventory Survey	21 sites were identified, some military and some pre-contact
1994	W. Fredericksen <i>et al.</i>	Coastal Waiohuli	Inventory Survey	22 backhoe test trenches were excavated but there were no significant archaeological findings
1995a	E. Fredericksen & D. Fredericksen	Waiohuli	Inventory Survey	one rock shelter site was identified as a pre-contact temporary habitation site
1995b	E. Fredericksen & D. Fredericksen	Waiohuli	Data Recovery	Four carbon dates were obtained suggesting late pre-contact use.
1997	Chaffee <i>et al.</i>	Waiohuli (120' elevation)	Archaeological Inventory Survey	3 sites were identified, all interpreted as agricultural
2000	Pepalis, J. & Michael J. Kolb	Waiohuli	Archaeological Excavations	Found evidence of a stream-fed pond near Kalepolepo Church
2000	McDermott, Shideler, and Hammett	Waiohuli, adjacent to the Kalepolepo Church	Additional Archaeological Inventory Survey (Backhoe Testing)	Document Site 50-50-09-4981, former inland pond that contains evidence of early occupation at coastal Kihai--approximately A. D. 600-900. An elaboration on Pepalis and Kolb's work, described below.
2001	M. McDermott	Waiohuli Kihai	MA Thesis	Historical ecological study of Kihai utilizing pollen, soil, and ¹⁴ C analysis as evidence to document an early habitation sequence for coastal Kihai
2002	Pepalis and Kolb	Waiohuli Ahupua'a	Sub-Surface Testing	Documented highly stratified cultural deposits of an inland pond.

Date	Author	Ahupua'a	Nature of Study	Findings
2005	Hill		Literature Review and Field Inspection	No findings.

Bordner (1980) conducted an archaeological investigation directly south and adjacent to the present project area and identified primarily historic era properties. Bordner's study area covered the residential subdivision currently known as the Hale Pi'ilani Subdivision located *maka* or west of the Pi'ilani Highway, as well as, a section *maka* or east of the Pi'ilani Highway that was later developed into the Kihai Villages Condominium Complex. During the course of the inventory survey, Bordner relocated SIHP #'s -0219, -0220, and -0221, originally identified by Cox (1976), as well as six new historic properties within the *maka* section of the study area. The six new sites consisted of historic era *ahu*, two remnant alignments of an indeterminate age, a historic stacked stone wall and an elongate basalt mound with an upright slab of an indeterminate age. Bordner reports no surface findings in the *maka* portion of the project area. In 1987, Kennedy revisited the *maka* portion of the Bordner project area in anticipation of the Kihai Villages development and identified six new early Hawaiian pre-contact era archaeological sites. These sites consisted of a stacked *ahupua'a* boundary wall approximately 300m long, two rock mounds, one upright, a series of low parallel rock alignments attributed to sweet potato agriculture, and one large mound or dune with possible burials.

Sinoto and Pantaleo (1992) conducted an archaeological inventory survey of approximately 38.5 acres east of the present project area near the former location of Kihai Camp One. Only one historic property, the remains of concrete footings from a bridge crossing Waiahoa Gulch, was recorded. Due to the considerable ground disturbances, which included several bulldozing events, Sinoto and Pantaleo did not undertake a subsurface testing program.

Tomonari-Tuggle and others (2000) conducted an intensive archaeological inventory survey of the area that encompassed the former location of Naval Air Station (NAS) Pu'unene north of the present project area. This inventory survey resulted in the recordation a total of four multi-component archaeological complexes (50-50-09-4164, -4801, 4803, and 4800), as well as one single component site noted as the Kihai Railroad Bed (SIHP # -4802). SIHP # -4164 consists of 165 features, all of which are associated with NAS Pu'unene. SIHP numbers -4800 and -4803 were representative of the sugar plantation use of the central isthmus and consisted of seven plantation era features for the former site number and remnants of the Haiku ditch and reservoir (n=5) for the latter. Historic properties reflecting post-war ranching activities (SIHP # -4801) were also recorded during the course of this inventory survey.

Xamanek Researches (Fredericksen *et al.* 1994) conducted an inventory survey in Ka'ono'ulu Ahupua'a at a similar elevation as the current project area. A total of 21 archaeological features reflecting pre-contact use of the area, as well as, post-contact military and ranch use were recorded. The pre-contact or Early Hawaiian archaeological features included five stone piles possibly representing agricultural use, five surface scatters representing pre-contact temporary habitation and one petroglyph. Military use of the area is represented by five stone cairns, three

alignments, and one enclosure. A single feature, interpreted as an erosion containment area, was recorded in association with ranching activities.

Further south of the project area, Chaffee and others (1997) identified three historic properties that were interpreted as agricultural features. Donham (1989, 1990) identified 16 sites, including nine terraces, seven enclosures, four C-shapes, four rock piles, two platforms, an alignment, and a modified outcrop. Most features were interpreted as agricultural features, while a few were considered temporary habitations. Donham concluded that these agricultural and habitation features likely indicated a more extensive use of the "transitional" or barren zone than some settlement models suggested. Donham's (1989, 1990) work took place within a portion of the Bordner and Cox (1982) project boundaries and found similar archaeological features.

The inventory surveys for the then proposed "Pi'ilani Residential Community - Phases I and II" (Bordner and Cox 1982; Donham 1989, 1990b) identified only rock alignments and no further research was conducted related to the proposed phased subdivision. A single site (50-50-10-2475) near Pi'ilani Highway, and Lipoa Street was subjected to data recovery (Donham 1990a) and interpreted as an agricultural terrace complex. Following this data recovery, no further research was recommended and the commercial and residential subdivision was subsequently constructed.

The chronological timeline for settlement of the Kīhei area however, is still being debated. Based on McDermott's (et al. 2000, McDermott 2001) results, habitation in the coastal areas may date to as early as A.D. 600-900. Without a doubt, coastal habitation along with more populous inland/upland settlement was firmly established by A. D. 1400-1500. The majority of permanent habitation would have been in the uplands, concentrated in the well-watered and fertile agricultural areas. Coastal permanent habitations were likely less numerous and centered around the ceremonial structures and fish ponds at Kalepolepo. The fish ponds are thought to date to the 1500s (Kolb et al. 1997:66).

Until recently, the few available radiocarbon dates from the Kīhei area were consistent in their rather broad, later prehistoric age determinations, most commonly post A.D. 1500 (Fredericksen and Fredericksen 1993b; Fredericksen 1994; Fredericksen et al. 1995). This fits with the model that the more intensive use of the Kīhei area was a later prehistoric development that corresponded with the expansion of upland permanent habitation, ceremonial constructions, and agricultural clearing after A.D. 1400-1500 (Kolb et al. 1997:281-282).

Evidence of earlier coastal habitation in the Kīhei area has recently come to light at excavations adjacent to the site of the Kalepolepo Church. The recent excavations described in McDermott et al. (2000) and McDermott (2001), in conjunction with those of Pepalis and Kolb (2002), provide evidence in the form of charcoal concentrations, midden deposits, 14C dates, and palynomorph identification, indicating settlement in the vicinity of an inland pond feature by c. A. D. 600-900.

3.3 Background Summary and Predictive Model

Previous archaeological studies have led to archaeological site interpretation based on the division of the settlement pattern for Maui into three zones: 1. coastal; 2. barren or transitional; and 3. inland (Cordy 1977; Walton 1972; Cox 1976). The coastal zone is a ¼ mile wide band

running along the shoreline. The inland zone begins approximately five to seven miles from the shore and is characterized by larger rainfall accumulation and lush vegetation. The transitional or barren zone is classified as the area between the edge of the coastal zone and beginning of the inland zone and characterized by brush/scrub vegetation and low annual rainfall accumulation.

Based on available archaeological evidence and interpretations, the following settlement pattern and site type expectancy is proposed. Temporary habitations related to marine exploitation, such as stacked-stone enclosures, and possibly smaller ceremonial structures, such as stacked-stone fishing shrines, may have been scattered along the coastline. It is likely that human burials would have been interred in the coastal sand dunes where present and immediately back from the coast. *Mauka-makai* trails would have connected the coastal settlement with the *mauka* permanent habitation and the coastal or *aiānuai* trails would have connected different coastal habitation areas between Mākena and Kīhei (Kolb et al. 1997:33). The upland area, with a larger water supply and good soil, would have sustained a larger population where subsistence would have revolved around dry-land agriculture. High occurrences of agricultural fields and larger structures and cultural deposits representing permanent habitation would be expected. As would be expected in area that are densely populated, larger *heiau* or ceremonial structures would occur in the inland region. Finally, the barren or intermediate zone, where the current project area lies, is broad in this portion of Maui. Inventory surveys of portions of this transitional/barren zone of Wāiohuli and Kaono'ulu Ahupua'a have found pre-contact remnants of dispersed, low-intensity, dry-land agricultural features, such as mounds and alignments, as well as temporary habitations (Chaffee et al. 1997; Donham 1990; Miura 1982).

Given that the project area is located in the transitional or barren settlement zone for this area of Maui, it is postulated that pre-contact archaeological sites representing temporary habitation or campsites may be encountered within the project area, in addition to mounds and/or small terraces related to small scale agriculture. After further review of the historic literature and the occurrence of historic agriculture in the immediate vicinity of the project area, historic properties associated with early plantation infrastructure (e.g. water control features and transportation features) as well as ranch activities (e.g. animal husbandry walls or corrals) were also probable.

Section 4 Results of Fieldwork

4.1 Survey Findings

The entire project area has been heavily modified by agriculture and pastoral activities from the mid-to late historic period (1890-1950) up until the modern era. Numerous push piles from field and pasture improvement are evident across the landscape of the eastern portion of the project area and edges of Waiakoa Gulch while fields in the central and western half of the project area are currently under cultivation (Figure 13). It is also evident that portions of the project area are also being used intermittently by the homeless, as a small and elaborate shanty town was observed along the edge of the truck crop farms in the center of the project area and small wooden shelters and coops were observed within Waiakoa Gulch. The spot checks in the portions of the project area under cultivation revealed only modern trash and remnants of small diameter black driscoll pipe that was presumably used for drip-line irrigation.

Two historic properties (SIHP 50-50-09-5744 and -5745) and a scatter of cultural materials (CSH-3) of questionable origin and antiquity were documented during the pedestrian survey of the un-cultivated portions of the project area (Table 3, see 4.2 Site Descriptions). Both the well site (SIHP -5745) and the surface scatter of cultural materials (CSH-3) are located in the easternmost portion of the project area while the historic bridge and flume spans the width of Waiakoa Gulch on the northern boundary of the project area (Figure 14).

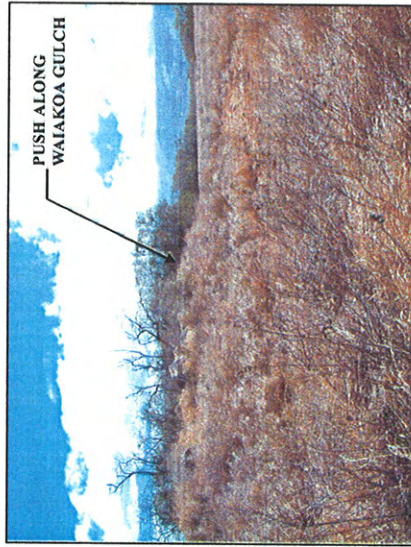


Figure 13. Typical push pile along edge of Waiakoa Gulch, view to east

Table 3. Sites Identified During Inventory Survey

Temporary Field #	SIHP (50-50-09)	Site Type	Site Function	Age
CSH-1	-5744	Bridge and Flume	Agriculture-Water Control / Transportation	Historic
CSH-2	-5745	Well	Agriculture	Historic
CSH-3	Not Assigned	Surface Scatter	Indeterminate	Indeterminate

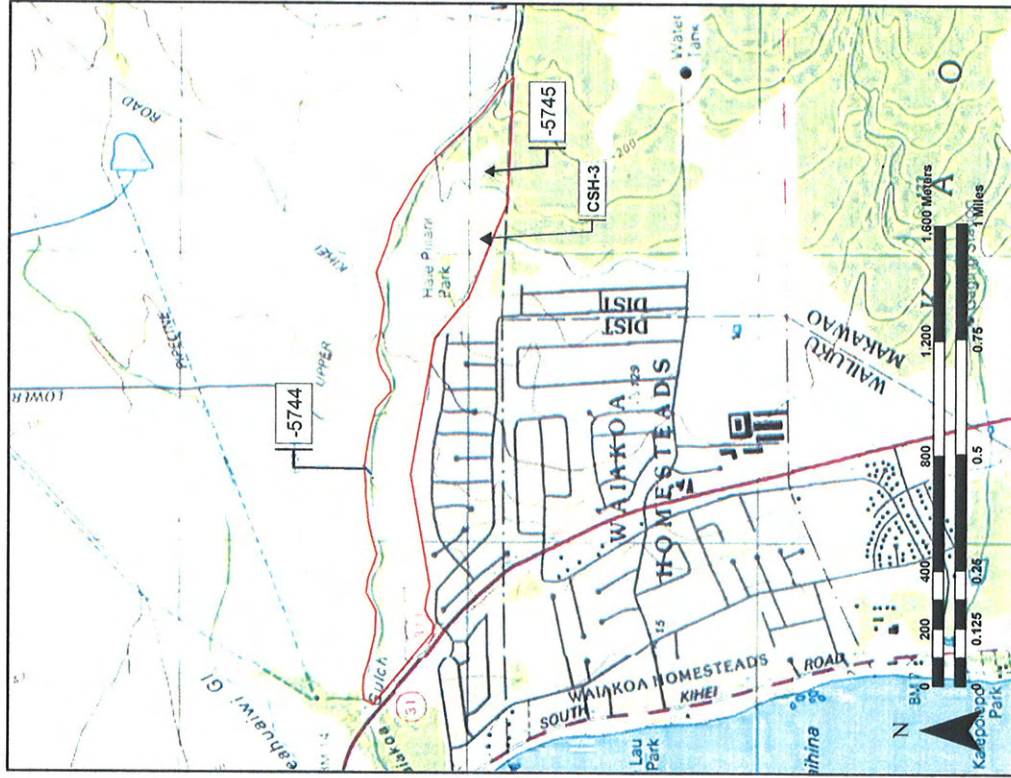


Figure 14. A portion of the 1998 Puu o Kali and Maalaea 7.5-minute USGS topographic quadrangles, showing site locations, project area in red

4.2 Site Descriptions

4.2.1 SIHP Number 50-50-09-5744

Site Type: Water Flume and Bridge
Site Function: Agriculture/Water Control/Possible Transportation
Age: Historic
Total Features: 2
Overall Dimensions: 32 m by 5 m

Description: SIHP 50-50-09-5744 is a possible railway crossing that has been modified for agricultural water control located on the northern boundary of the project area. The structure currently consists of two features, an irrigation flume (Feature A) and concrete bridge structure (Feature B) (Figure 15 and Figure 16). Based on the construction method and materials, in addition to documentary research, the structure is estimated to have been built between 1900-1920 by either Kihai Plantation or HC & S Company.

Feature: A
Site Type: Concrete Flume
Dimension: 24 m by 1 m

There are two distinct types (Type I and Type II) of irrigation flume construction. Type I was constructed of sections of concrete using a fine basalt aggregate. The finished form resulted in a concrete slab with a curved edge or "lip", which appeared to provide additional support when installed in irrigation trenches (Cross-Section A of Figure 15 and Figure 17). The sections of the castings were cemented together using a cement plaster to smooth the segments and reinforce the structure. Approximately 20 meters of Type I flume was observed at the southwestern end of the site.

Type II flume sections were also cast using a fine basalt aggregate with slightly smaller dimensions and straight edges (Cross-Section B of Figure 15). It appears that the Type II flume was waterproofed by the application of a 2" thick layer of concrete containing fine basalt aggregate and was constructed to carry irrigation water over the bridge that spanned Waikoa Gulch. The demolished remnants of the Type II flume are evident across the top of the bridge. Approximately 3.2 meters of Type II flume was recorded at the southwestern end of the site and 0.5 meters recorded at the northeastern end.

Feature: B
Site Type: Bridge
Dimensions: 32 m by 1 m

The bridge feature (Figure 15, Figure 16, and Figure 18) consists of four distinct structural components: 1. a north abutment; 2. three concrete bridge bed support piers; 3. a south abutment; and 4. a bridge bed. The north abutment measures approximately four meters across the southern face and ranges in thickness from 0.50 m across the top to 0.70 m at grade. Primary construction consists of a concrete pier that was cast using a wooden form and likely reinforced with iron bar. The composition of the concrete included an extremely fine aggregate of gravels that measured less than 0.5 cm. The north abutment is further buttressed and reinforced along the northern face with large water-rounded basalt cobbles stacked five courses high to a height of 0.9m (Figure

19). This dry-stacked wall extends for over a meter and a half to abut the gully wall and was likely built to provide extra load bearing capacity to the northern abutment structure.

The three concrete bridge bed support piers (Piers 1-3) were constructed in the streambed in a manner resistant to the gully wash from southern exposure (*Nai'ia*) storms. Each pier was constructed of concrete set in a series of pours with the use of wooden forms that were likely moved up to accommodate each set of pours. The concrete used to manufacture the piers consisted of a gravel aggregate that had apparently been screened for uniformity and reinforced with both single and woven iron wire for additional strength and support. The final elevation matched the height of the north and south abutment respectively. Concrete piers 1 and 3 were of similar design and construction. Concrete Pier 2, however, rested on a "wedge" of concrete using a natural pebble-aggregate of a different consistency than the concrete used in the pier itself (see Figure 15 and Figure 16). The "wedge" of concrete formed a base that measured 0.6 m tall on top of which Pier 2 was bolted on.

The construction of the south abutment is similar to that of the north abutment where the concrete component of the abutment appears to have been built using only one pour. The primary difference between the north and south abutment is that while the northern abutment is buttressed by a rather modest dry-stacked rock wall, the southern abutment is buttressed by a very substantial stepped rock terrace (see Figure 15 and Figure 16). The supporting terrace is composed of medium to large water-rounded basalt cobbles constructed in two levels (Level 1 and Level 2). Level 1 comprises the base level that rests on the uneven gully floor. At the point where Level 1 meets the end of the south abutment the terrace was constructed of five courses of large water-rounded cobbles neatly stacked and faced to a height of 1.90 m (Figure 20). Five meters south of this point, the terrace measured 1.0 m high and built using two courses of large water-rounded cobbles. At the southwestern end of the structure, Level 1 measured 0.80 m high and was built using three courses of neatly stacked water-rounded cobbles. Level 2 was constructed atop Level 1 to the final elevation of the south abutment. Level 2 was set back from the southwestern edge of Level 1 by approximately 0.90 m, and consisted of a uniform layer of basalt cobbles built in four courses to a final height of 0.90 m. The overall dimensions of the stepped terraces buttressing the south abutment measures 11.5 m long, and was built facing downstream.

The final component of the bridge feature, is the bridge bed (Figure 21). The concrete irrigation flumes were constructed on top of a rigid frame provided by four railroad steel rails (Figure 22) spanning all five of the concrete support abutments and piers. Each length of rail was connected to the next by the use of railroad - grade steel "fishplates" (connection plates) and steel bolts. The method by which the rails are anchored is unknown. The distance from outside edge to outside edge of the outermost rails measured 0.71 m or 28". The distance from the outside edge to outside edge of innermost rails measured 0.45 m or 18".

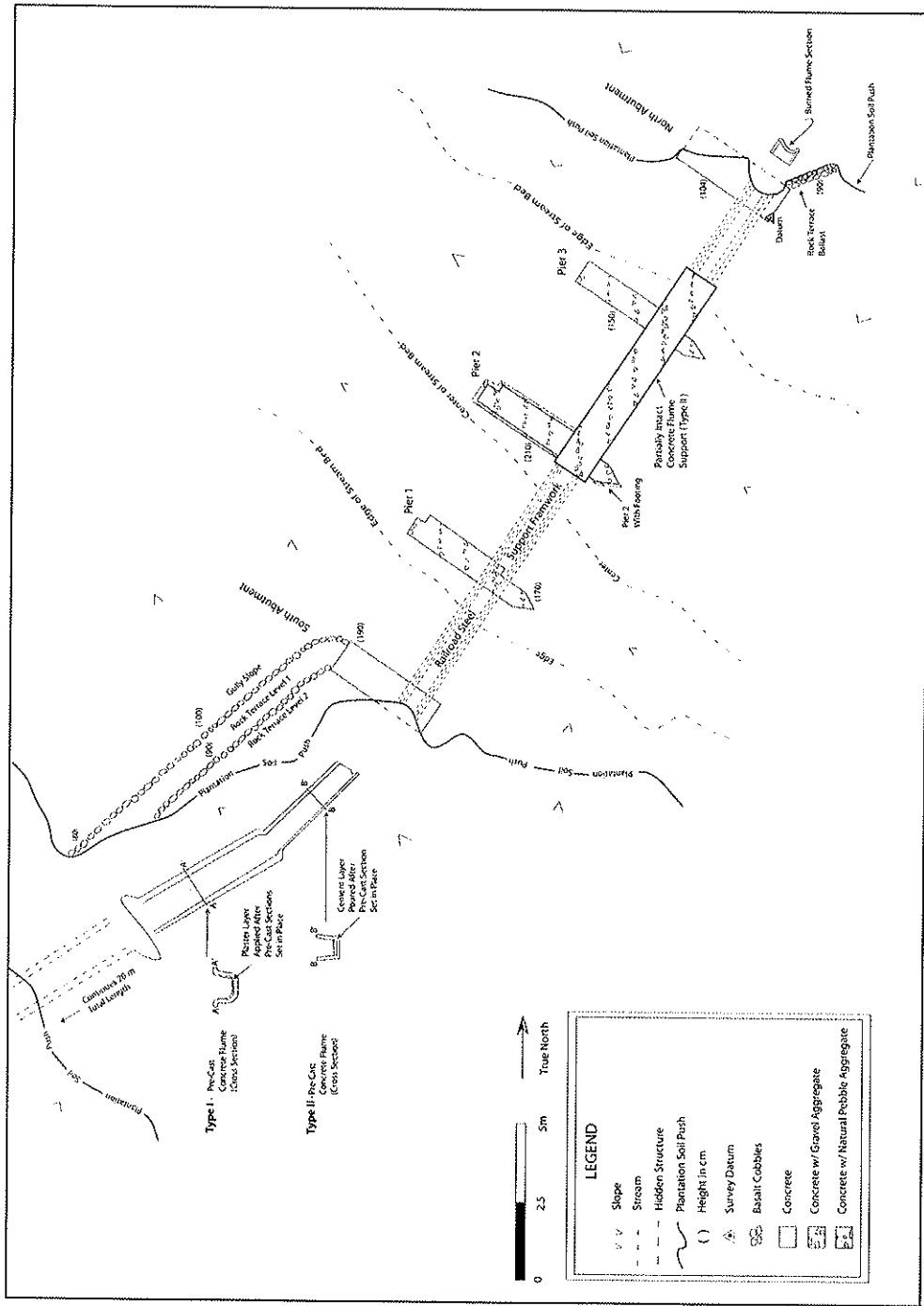


Figure 15. SIHP Site 50-50-09-5744, planview

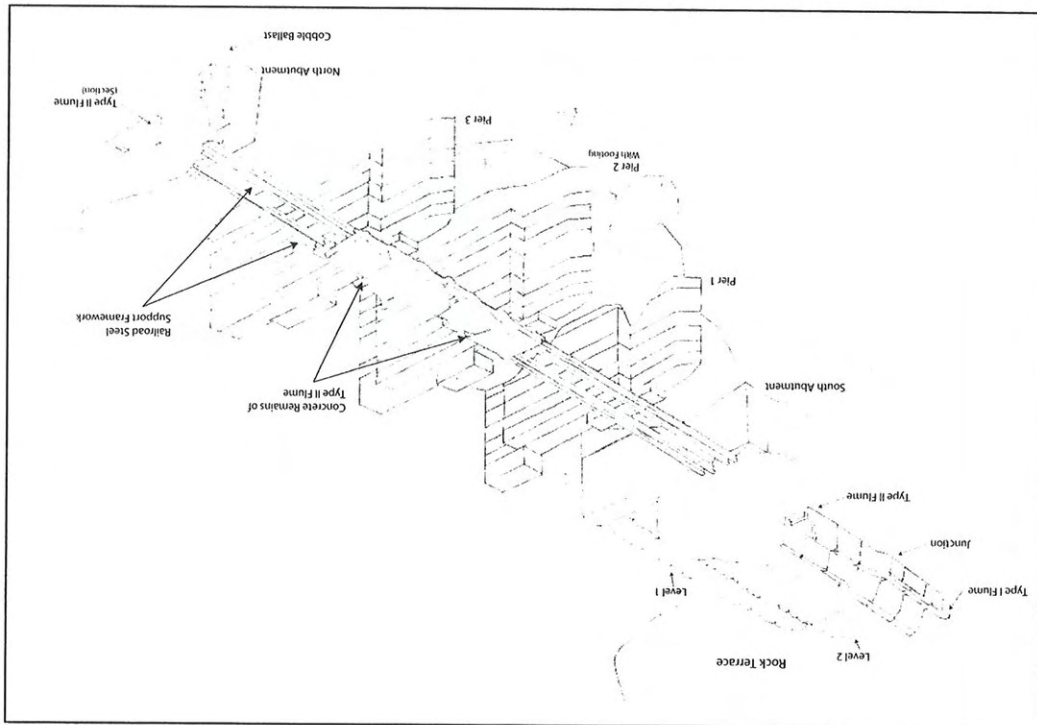


Figure 16. SIHP Site 50-50-09-5744, schematic oblique view, not to scale

An Archaeological Inventory Survey Report for an Approximately 100-Acre Parcel
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Figure 17. Feature A of -5744, intact section of Type I flume, view to west/southwest



Figure 18. Feature B of -5744, overall view to west

An Archaeological Inventory Survey Report for an Approximately 100-Acre Parcel
TMK: (2) 3-8-004:002 por., 022 por., and 030



Figure 19. North abutment component of Feature B showing basalt buttress construction, view to northwest



Figure 20. South abutment component of Feature B showing basalt construction view to southwest



Figure 21. Bridge bed component of Feature B showing support beams and flume construction, view to west



Figure 22. Bridge bed component of Feature B top view showing train rail beams and flume construction, view to south

4.2.2 SIHP Number 50-50-09-5745

FUNCTION: Agriculture/animal husbandry
SITE TYPE: Hand-dug well

TOTAL FEATURES: 1
DIMENSIONS: 1.8 m by 1.6 m

DESCRIPTION: 50-50-09-5745 is a crude, hand-dug well located in the easternmost portion of the project area (Figure 23 and Figure 24). The surface opening of the well rimmed with large subangular basalt cobbles and small subangular basalt boulders while the interior of the well is unlined. The probable water source apparently ran through a shaft that is oriented in a northwest to southeast direction whereby the northwest extension extends from the center of the well for over 2 m and the southwest extension for 1.6 m. The final depth of the well is unknown as fallen debris and rocks, likely from the rim of the well, has created an unstable "cap" at a depth of 1.4 m.

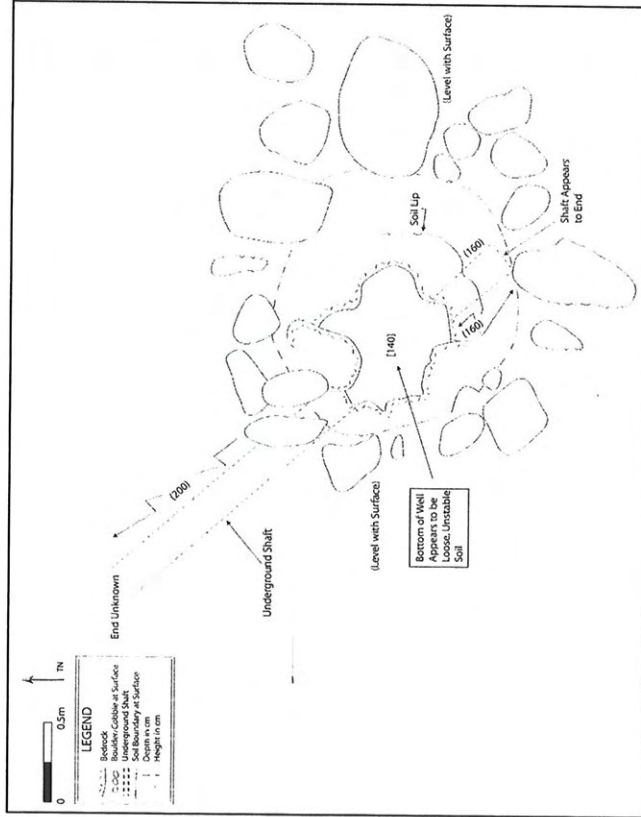


Figure 23. SIHP Site 50-50-09-5745, Planview



Figure 24. SIHP Site -5745 overall view to southeast

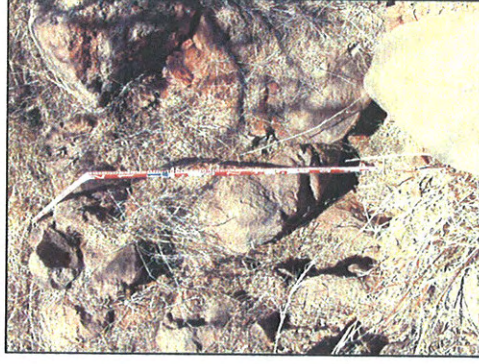


Figure 25. SIHP Site -5745 illustrating depth, view to northwest

4.2.3 CSH Site-3

CSH-3 is a surface scatter of roofing nails, branch and porites coral, unidentifiable fragments of mammal bone, pumice, and water rounded basalt pebbles or *'ili'ili*. This scatter of cultural material is located in and confined to a 30 sq m area north of an old access road in the easternmost portion of the project area (see Figure 14). From the numerous pushpiles located in the vicinity of this surface scatter (Figure 26) it is evident that the area has undergone a considerable amount of disturbance. In order to assess the depositional nature of the scatter, a 0.5 m x 0.5 m test unit (TU-1) (Figure 27) was laid out in an area where the materials appeared to be the most concentrated. The test unit was hand-dug in 10 cm levels and terminated at the apparent C-Horizon.

4.2.3.1 TU-1 (Figure 28)

Stratum I: 0-6 cmbs A Horizon; 5 yr 3/4, dark red brown silt loam; medium, crumb structure; loose consistency (dry); sticky consistency (wet); slightly plastic; abrupt irregular lower boundary. Cultural material recovered included both indigenous and historic artifacts, unidentifiable mammal bone fragments, and manuports from a mixed or disturbed context (Section 5).

Stratum II: 6-18 cmbs C Horizon; 2.5 yr 3/4, dark red brown; silt clay loam; moderate, medium, crumb structure; slightly hard consistency (dry); sticky consistency (wet); slightly plastic; weak cementation; unknown lower boundary.



Figure 26. Typical push pile in the uncultivated eastern portion of the project area

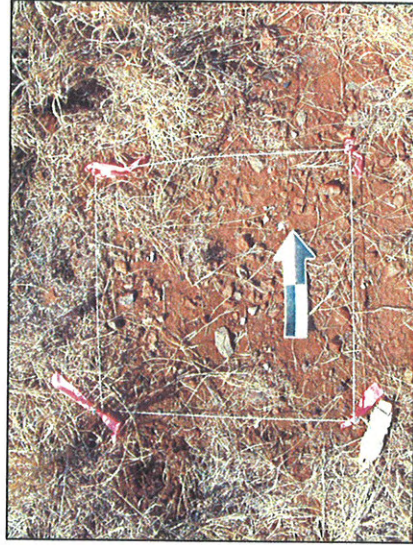


Figure 27. CSH Site-3, TU-1 top of excavation, view to west

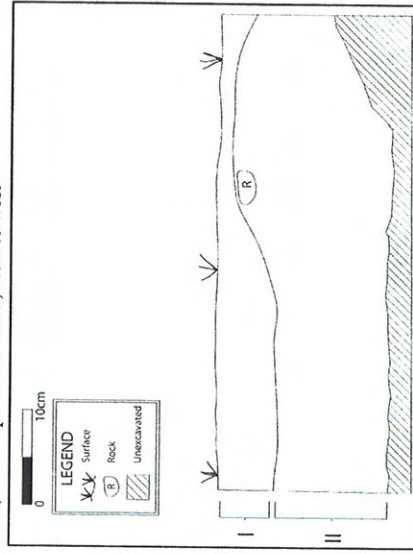


Figure 28. Soil profile of TU-1, northwall

Section 5 Results of Laboratory Analysis

A single 0.5m by 0.5m test unit was excavated within CSH-3 in order to determine the depositional nature of the scatter, as well as the probably antiquity. Portable cultural materials recovered from CSH-3 were vertically restricted to the upper 8 cm of Level 1. As shown in Table 4 the only formal artifacts recovered from the test unit were historic roofing nails (Figure 29). Intermixed with the historic artifacts were cultural materials commonly associated with indigenous habitation (Table 5).

Table 4. Formal Artifacts Recovered From CSH-3

Depth (cmbs)	Stratum	N	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Formal Type
surface	surface	1	4.8	0.2	0.2	2	Round Nail
0-10	1	1	5.2	0.3	0.3	2.7	Round Nail
0-10	1	1	5	0.2	0.2	2	Round Nail

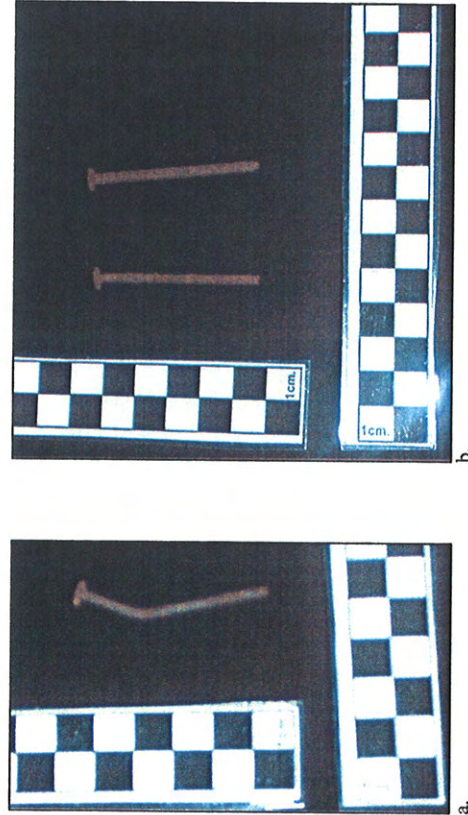


Figure 29. Historic artifacts recovered from TU-1, a. accession no. 3, b. accession no. 9 to the left of the photo and accession no. 8 to the right of the photo

Table 5. Midden and Manuport Remains Recovered From CSH-3

Depth (cmbs)	Stratum	N	Weight (g)	Formal Type	Material Type	Comments
surface	surface	9	14.8	Manuport	Coral	
surface	surface	1	5.1	Manuport	Coral	
surface	surface	4	18.5	Manuport	Coral	
surface	surface	2	2.4	Manuport	Basalt	scoria
surface	surface	2	1.3	Manuport	Basalt	iti'iti pebbles
surface	surface	7	4.4	Food Remains	Bone	burnt mammal bone
0-10	1	6	5.3	Manuport	Coral	
0-10	1	1	0.4	Manuport	Basalt	iti'iti pebble
0-10	1	6	0.7	Food Remains	Bone	burnt mammal bone

Section 6 Summary and Interpretation

In the present project area, evidence of pre-contact habitation and agricultural use were absent. This paucity of pre-contact archaeological sites can be attributed to two factors: 1. that the project area is located in what is known as the transitional/barren zone of the pre-contact settlement and therefore site density was expected to be low; and 2. the lands in and surrounding the current project area have undergone heavy landscape modifications by historic sugar cultivation and ranching operations effectively eliminating surficial pre-contact archaeological sites. Lack of pre-contact Hawaiian historic properties notwithstanding, the current inventory survey has documented historic plantation-era railroad and water control features and confirmed the history of early plantation modification within the project area.

A total of two historic era archaeological sites and one cultural material scatter of unknown origin and date was identified during the course of this study. Both historic era properties were likely originally associated with the Kihei Plantation Company and the early sugar venture in the North Kihei area.

Based on the construction technique of SIHP # 50-50-09-5744, and the considerable attention apparently paid to the reinforcement of the abutments and piers, it is evident that a significant amount of cost, time, and effort went into the initial construction of the bridge components. Sinoto and Pantaleo (1992) recorded the remains of a similar structure, 50-50-09-3131, during an inventory survey of a parcel covering the mouth of Waiahoa Stream directly west of the current project area, and postulated a railroad/transportation function. By georeferencing the 1922 U.S.G.S map using ArcView 8.0 and overlaying the GPS data collected in the field it is apparent that the bridge feature recorded during the current inventory survey crosses the Waiahoa Gulch along the Kihei railroad at its easternmost crossing (Figure 30). This analysis lends credence to the hypothesis that SIHP # -5744 was originally used as a railroad crossing and subsequently refurbished for water irrigation at a later date.

SIHP # 50-50-09-5745 is interpreted as an early historic to historic era open hand-dug well recorded in a portion of HC&S Field 20. While seemingly unusual to have a water well in the barren zone of Pulehu Nui Ahupua'a, a *Preliminary Report on the Water Resources of Central Maui* by the U.S. Geological Survey indicates that there were at least four wells, noted as Well No. 251, drilled in 1900 by McCandless Brothers for the Kihei Plantation in Field 20 (1972:A-5) (Figure 31). Stearns and MacDonald (1942:216-217) also note that two or three Maui Type Wells, referred to as K1 and K3, were drilled by McCandless Brothers in 1900 at the 165 foot elevation. While the location of Well No. 251 (K1 and K3) is north of Waiahoa Gulch and outside of the project area, it is located at approximately the same elevation as the well recorded during the present study. In 1949, Maui County drilled an eight inch diameter well, north of Waiahoa Gulch (USGS 1972) and adjacent to the project area, to a depth of 260 feet. Given the rather crude construction of SIHP# -5745 it is more likely that this well is associated with either early water prospecting or what remains of one of the original wells dug for Kihei Plantation rather than the later Maui County well.

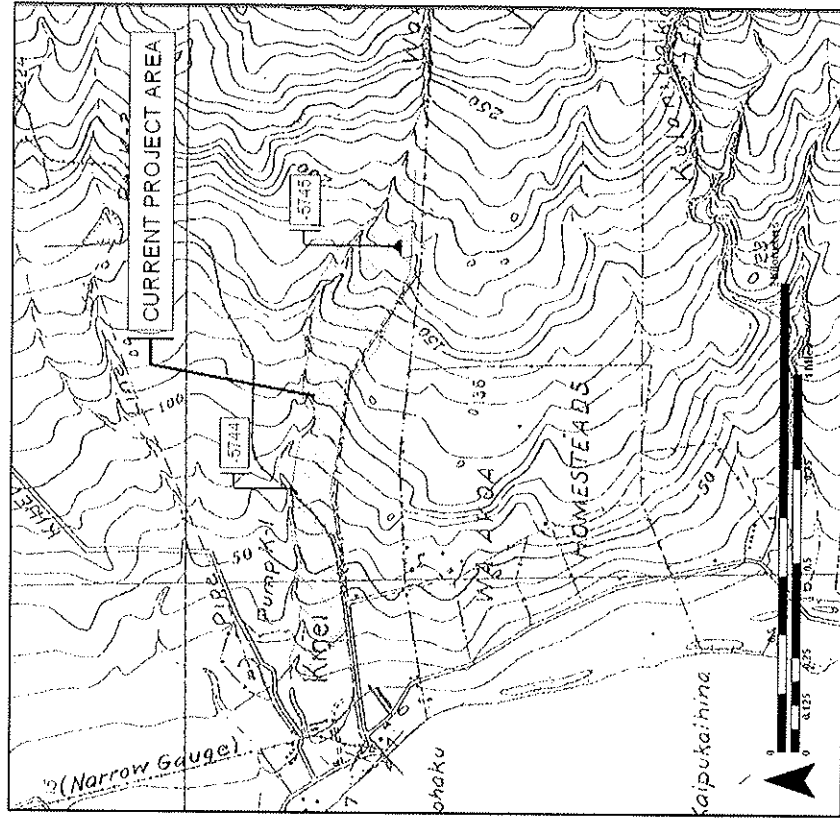


Figure 30. A portion of the 1922 USGS Map, Kihei Quadrangle showing location of Site -5744 (blue line) in relation to the railroad to Kihei and the elevation of -5745²

² Map was georeferenced with ArcView 8.1, using the NAD 83 datum. Polynomial transformation, and known points from the 1998 USGS topographic map of the Pau O Kahi quadrangle

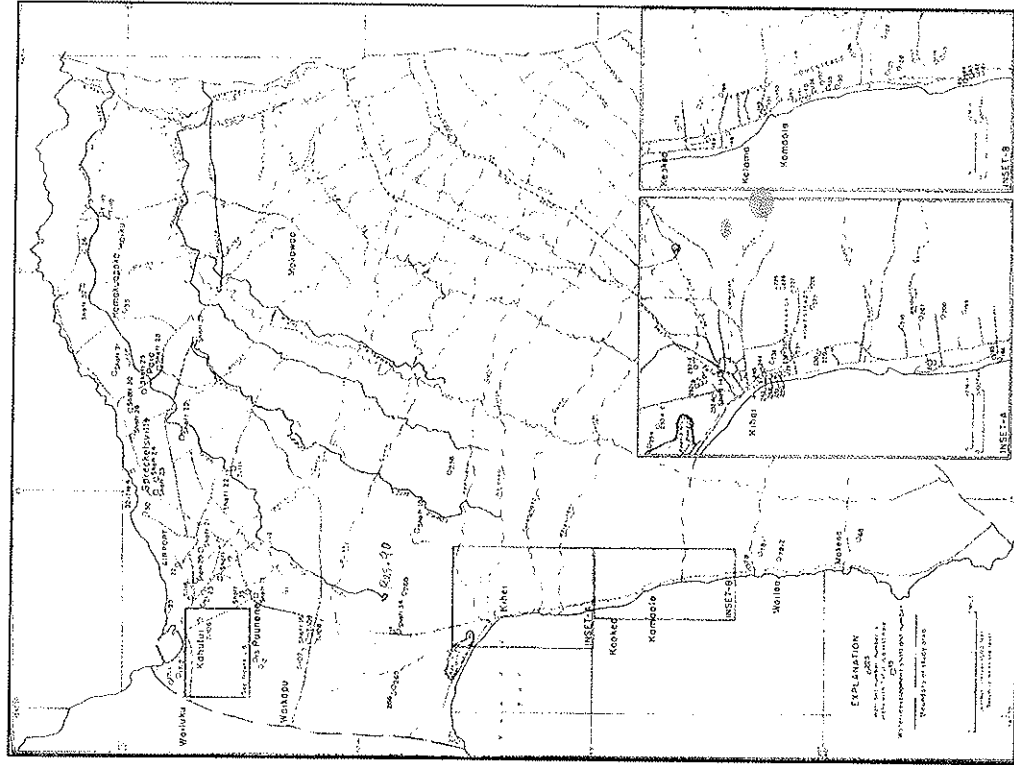


Figure 31. Central Maui drilled well locations, Well Nos. 250 (Maui County 1949) and 251 (Kihui Plantation 1900) shaded in green (USGS 1972)

CSH-3 is a highly disturbed surface scatter of cultural materials. Based on the results of the test excavation and subsequent analysis of the data, as well as the highly disturbed condition of the surrounding environment, it was determined that due to an apparent lack of spatial integrity, the age and original context of the scatter of cultural materials comprising CSH-3 could not be determined and therefore contained little to no interpretive value. As a result, no SIHP number was assigned to this scatter.

Section 7 Significance Assessments

In accordance with the State Department of Land and Natural Resources (DLNR) Chapter 13-284, Hawaii Administrative Rules (HAR), entitled "Rules Governing Procedures for Historic Preservation Review to Comment on Section 6E-42, Hawaii Revised Statutes (HRS), Projects"; Chapter 13-284-6 entitled "Evaluation of Significance", states:

- a. Once a historic property is identified, then an assessment of significance shall occur. The agency shall make this initial assessment, or delegate this assessment, in writing, to the SHPD. This information shall be submitted concurrently with the survey report, if historic properties are found in the survey.
- b. To be significant, a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:
 - A. Sites that are associated with events that have made a significant contribution to broad patterns of our history; or
 - B. Sites that are associated with the lives of persons significant in our past; or
 - C. Sites that embody the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant or distinguishable entity, whose components may lack individual distinction; or
 - D. Sites which have yielded, or may be likely to yield, information important in prehistory or history; or
 - E. Sites which have an important value to the native Hawaiian people or to another ethnic group of the State due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events, or oral accounts- these associations being important to the groups' history and cultural identity.

7.1 Significance Assessments

As CSH-3 was not assigned an SHP number and is not considered a historic property, it will not be evaluated for significance. The following table lists the historic properties recorded during the course of this inventory survey and their significance evaluation.

Table 6. Significance Assessments for Historic Properties Identified During Inventory Survey

SHP (50-50-09-)	CSH No.	Function	Age	Significance Criteria
5744	1	Agricultural: Transportation/Water Control	Early Historic/ Historic	D
5745	2	Agricultural: Water Control	Early Historic/ Historic	D

All sites are significant under Criterion D because of their potential to yield information important for understanding the history of the region. SHP -5744, as a component of the Kihei Railroad, successfully contributed to connecting the Kihei Plantation camps and sugar cane fields to the production at Pu'uene Mill and the population of Central Maui. The Kihei rail line contributed significantly to the success of sugar cultivation in the central isthmus and made it possible for HC&S to expand their then existing railroad lines to keep up with production and maintenance of the fields and water systems. SHP -5744 also contributes to the further understanding of later plantation water resources management after the use of the rail lines were discontinued following World War II and the bridge was refurbished as a flume to aid in the irrigation of the arid North Kihei sugar fields.

SHP -5745 lends an additional element to the understanding of the breadth of exploration for water resources in the central isthmus in general, and the North Kihei area in particular. The fact that the well was likely hand-dug and left open indicates that the water levels may have historically been high enough to have been reached by a dug well and in use during the winter rain season.

Section 8 Project Effect and Mitigation Recommendations

8.1 Project Effect

Under Hawai'i state historic preservation legislation, the only two possible effect determinations for a given project under historic preservation review are "no historic properties affected" and "effect, with proposed mitigation commitments" (HAR Chapter 13-284-7). In the circumstance of the current project area, two historic properties have been documented that cannot be avoided by any proposed residential development. These historic properties are significant for their information content. The current inventory survey investigation has adequately recorded the information available from these properties through location documentation, written descriptions, photographs, plan view maps to scale, and oblique view renderings. Because their significant information has been recorded, and additional historic properties, CSH recommends a project specific effect determination of "no historic properties affected." This is believed to be appropriate, despite the potential removal of these features by residential development and subsequent water run-off modifications to Waiakoa Gulch, because the information that gives these historic properties their significance has been adequately recorded.

8.2 Mitigation Recommendations

Based on the "no effect" evaluation, CSH recommends that no further historic preservation work should be necessary for the future development of this parcel, in the unlikely event that any significant pre-contact or historic deposits (i.e. subsurface concentrations of indigenous or historic era artifacts and or structural remnants) or human burials be exposed during the development of the parcel, subsurface excavation work and/or surface grading should be halted in the immediate area and the SHPD staff archaeologist for Maui County, Melissa Kirkendall, Ph.D., should be contacted.

8.3 Disposition of Materials

All recovered materials and data generated during the course of this inventory survey are currently being curated and housed at the Maui Office of Cultural Surveys Hawai'i, Inc., 16 South Market Street, Suite 2N, Wailuku, HI 96793.

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- Walker, Winslow
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Appendix A Master Catalogue of Collected Cultural Materials

Accession Number	Depth (cms)	Stratum	N	Length	Width	Thickness	Weight (g)	Formal Type	Material Type	Comments
3	surface	surface	1	4.8	0.2	0.2	2	Nail	metal	
8	0-10	1	1	5.2	0.3	0.3	2.7	Nail	metal	Flat headed nail w/ "twisted" effect
9	0-10	1	1	5	0.2	0.2	2	Nail	metal	Flat headed w/ "twisted" effect, broken tip

A.1 Artifacts

A.2 Manuports and Midden

Accession Number	Depth (cmbs)	Stratum	N	Weight (g)	Formal Type	Material Type	Comments
1	surface	surface	9	14.8	Manuport	Coral	
2	surface	surface	1	5.1	Manuport	Coral	
4	surface	surface	4	18.5	Manuport	Coral	
5	surface	surface	7	4.4	Food Remains	Bone	burnt mammal bone
6	surface	surface	2	2.4	Manuport	Basalt	scoria
7	surface	surface	2	1.3	Manuport	Basalt	ii'i'ili pebbles
10	0-10	1	6	5.3	Manuport	Coral	
11	0-10	1	6	0.7	Food Remains	Bone	burnt mammal bone
13	0-10	1	1	0.4	Manuport	Basalt	ii'i'ili pebble

APPENDIX CD-1.

State Historic Preservation Division Letter

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

PETER T. YOUNG
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BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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DEPUTY DIRECTOR - LAND

DEAN NAKANO
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AQUATIC RESOURCES
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CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

June 7, 2006

Hallett H. Hammatt, Ph.D
Cultural Surveys Hawai'i
P.O. Box 1114
Kailua, Hawai'i 96734

LOG NO: 2006.1514
DOC NO: 0605MK29
Archaeology

Dear Dr. Hammatt:

**SUBJECT: Chapter 6E-42 Historic Preservation Review –
Archaeological Inventory Survey on a 100 Acre Parcel for A & B Properties
Pulehunui Ahupua'a, Wailuku District, Island of Maui
TMK (2) 3-8-004:002 por., 022 por., and 030**

Thank you for the opportunity to review this report which our staff received on February 27, 2006 (Lee-Greig *et al.* 2006, *An Archaeological Inventory Survey Report for an Approximately 100 Acre Parcel, Pulehu Nui Ahupua'a, Wailuku District, Maui Island, TMK: [2] 3-9-004: 002 por., 022 por., and 030*)...Cultural Surveys Hawai'i, Inc., ms.

The background section acceptably establishes the ahupua'a settlement pattern and predicts the likely site pattern in the project area. The historical information provided summarizes the history of the post-Contact period land uses. The summary of previous archaeological work in the area provides a baseline for the current work. The parcel was formerly part of Land Commission Award 5230, awarded to Keaweamahe, and later area in the general vicinity was utilized by Kihei Plantation Company.

The survey has adequately covered the project area documenting two (2) historic properties. The subject parcel was heavily impacted by agricultural and pastoral activities in the early 1900s through the 1950s. SIHP 50-50-09-5744 consists of a bridge and flume related to agricultural water control and transportation activities during the historic period. The flume is constructed of concrete and basalt aggregate, and water proofed with a 2" layer of concrete. The bridge features exhibits four (4) structural components; a north abutment, a south abutment, three (3) concrete bridge support piers, and a bridge bed. It too, is constructed entirely of concrete with stacked basalt cobbles providing additional support to the north abutment. SIHP 50-50-09-5745 consists of a well, and is also related to the agricultural activities that took place on the subject parcel. It is a hand excavated well, rimmed with large basalt cobbles.

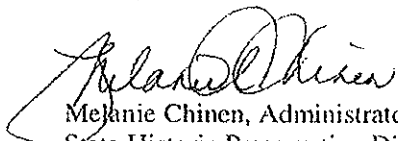
We concur that both sites are significant under Criterion "D" for their information content. SIHP 50-50-09-5744, as a component of the Kihei Sugar Railroad worked to connect the Kihei plantation camps and sugar cane fields with Pu'unene Mill and Central Maui. The well site (SIHP 50-50-09-5745) demonstrates the extent to which water exploration for resources occurred in the central isthmus and north Kihei. Both sites have yielded an adequate amount of information.

Hallett H. Hammatt
Page 2

We also agree with the mitigation recommendations that no further archaeological work is necessary on the subject parcel. As a contingency, in the event that historic resources, including human skeletal remains, are identified during routine construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Office, Maui Section, needs to be contacted immediately at (808) 243-5169.

We find this report to be acceptable. The historic preservation review process is concluded. Development of the project areas will have "no effect" on significant historic sites. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kirkendall (Maui/Lana'i SHPD 243-5169) as soon as possible to resolve these concerns.

Aloha,



Melanie Chinen, Administrator
State Historic Preservation Division

MK:kf

Cc: Bert Ratte, DPWEM, County of Maui, FAX 270-7972
Michael Foley, Director, Dept of Planning, 250 S. High Street, Wailuku, HI 96793

APPENDIX DE.

Cultural Impact Assessment

**Cultural Impact Assessment for
an Approximately 100-Acre Parcel
Pūlehu Nui Ahupua'a, Wailuku District, Maui Island
TMK: (2) 3-8-004:002 por., 022 por., and 030**

Prepared for
A & B Properties, Inc.

Prepared by
Tanya L. Lee-Greig
and
Hallett H. Hammatt, Ph.D.
Cultural Surveys Hawaii, Inc.
Wailuku, Hawaii
(Job Code: PULE 2)

June 2006

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Management Summary

Reference	Cultural Impact Assessment for an Approximately 100-Acre Parcel Pūlehu Nui Ahupua'a, Wailuku District, Maui Island TMK: (2) 3-8-004:002 por., 022 por., and 030 (Lee-Greig and Hammatt 2006)
Date	May 2006 DRAFT
Project Number (S)	Cultural Surveys Hawaii, Inc. (CSH) Job Code: PULE 2
Project Location	North of Pi'ilani Highway and east of Mokuile Highway, Pūlehu Nui Ahupua'a, Wailuku District, Maui Island TMK: (2) 3-8-004:002 por., 022 por., and 030. This area is depicted on the 1998 Puu o Kali and Maalaea 7.5-minute USGS topographic quadrangles
Land Jurisdiction	Private: A & B Properties
Agencies	Hawaii State Department of Health: Office of Environmental Quality Control (OEQC)
Project Description	A & B Properties is contemplating the possibility of future land use applications that would allow residential expansion into the project area. At a minimum, this would include the grading, dwelling construction, and street and utility installation activity commonly associated with residential development.
Project Acreage	Approximately 93-Acres
Area of Potential Effect (APE)	The project APE included an approximate seven acre section of Waiakoa Gulch located outside and adjacent to the 93-acre project area. The entire approximate 100-acre APE was considered for this investigation.
Regulatory Context	The project may require compliance with the State of Hawaii's environmental review process [Hawaii's Revised Statutes (HRS) Chapter 343], which requires consideration of a proposed project's effect on traditional cultural practices. At the request of A & B Properties (A&B), CSH undertook this cultural impact assessment to provide information pertinent to the assessment of the proposed project's cultural impacts. This document is intended to support the project's state environmental review and provides documentation of the project's consultation efforts per the Office of Environmental Quality Control (OEQC) <i>Guidelines for Assessing Cultural Impacts</i> .
Consultation Effort	Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the project area and the vicinity. The organizations consulted included the Office of Hawaiian Affairs (OHA), the Maui/Lana'i Island Burial Council, and Hui Malama I Na Kūpuna O Hawai'i Nei. Tanya Lee-Greig M.A. conducted the consultation effort under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator).

Findings

While limited traditional Hawaiian habitation, agriculture, and riverine resource exploitation may have occurred within the project area, decades of continuous historic and modern agriculture and ranch activities both within the project area and upstream of the project area have heavily modified the stream flow and landscape and consequently left no evidence of traditional cultural practices within the project area. Based on the information gathered during this assessment, residential expansion into the lands comprising the project area will have minimal impact upon Native Hawaiian cultural resources within the immediate vicinity. It should be noted however, that there are both traditional cultural concerns as well as safety concerns regarding Waiahoa Gulch. Periodic flooding of the gulch was mentioned by Mrs. Kalanikau as a safety and drainage control concern. Additional concern was raised over the potential for increased run-off from the development into the gulch and the potential negative affect that any increased sedimentation and/or water run-off might have on the coastal and off-shore fishing grounds. The impacts of such run-off on the marine resources and fishing practices are unknown at the moment and may require further study or environmental monitoring. Moreover, while the history of land modification within the current project area following Western contact is well documented, the probability for subsurface cultural deposits and human burials within the project area should not be underestimated. If any significant cultural deposits or human skeletal remains are encountered, the State Historic Preservation Division (SHPD/DLNR) should be contacted in accordance with Section 6E-46.6 Hawaii Revised Statutes and Chapter 13-300.

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Section 1 Introduction

1.1 Project Background

At the request of Mr. Daniel Yasui of A&B Properties (A&B), Cultural Surveys Hawaii'i, Inc. (CSH) conducted a cultural impact assessment of an approximate 100-acre area in Pūlehu Nui Ahupua'a, Wailuku District, Maui Island (TMK: [2] 3-8-004-002 por., 022 por., and 030), (Figure 1 and Figure 2) The project area is bound by corn and sugar cane fields to the north and east, Pi'ilani Highway to the west, and the Hale Pi'ilani Residential Subdivision to the south. A&B is contemplating the possibility of filing future land use applications that would allow residential expansion into the project area. At a minimum, residential expansion would include the grading, dwelling construction, and street and utility installation that is commonly associated with residential development. The project may require compliance with the State of Hawaii's environmental review process [Hawaii Revised Statutes (HRS) Chapter 343], which requires consideration of a proposed project's effect on traditional cultural practices. CSH undertook this cultural impact assessment to provide pertinent information regarding any impacts that the proposed project may have on traditional cultural practices. This document is intended to fulfill the cultural impact assessment requirement for the State of Hawaii environmental review and provides documentation of the project's consultation efforts per the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impacts* (Office of Environmental Quality Control 1997).

The area under consideration for future residential expansion consists of approximately 93-acres. However, the area of potential effect (APE) for the project under consideration includes an approximate seven acre section of Waiakoa Gulch located outside and adjacent to the 93-acre project area (Figure 3). The entire approximate 100-acre APE, hereafter referred to as the "project area", was considered and evaluated for potential impacts to traditional cultural practices.

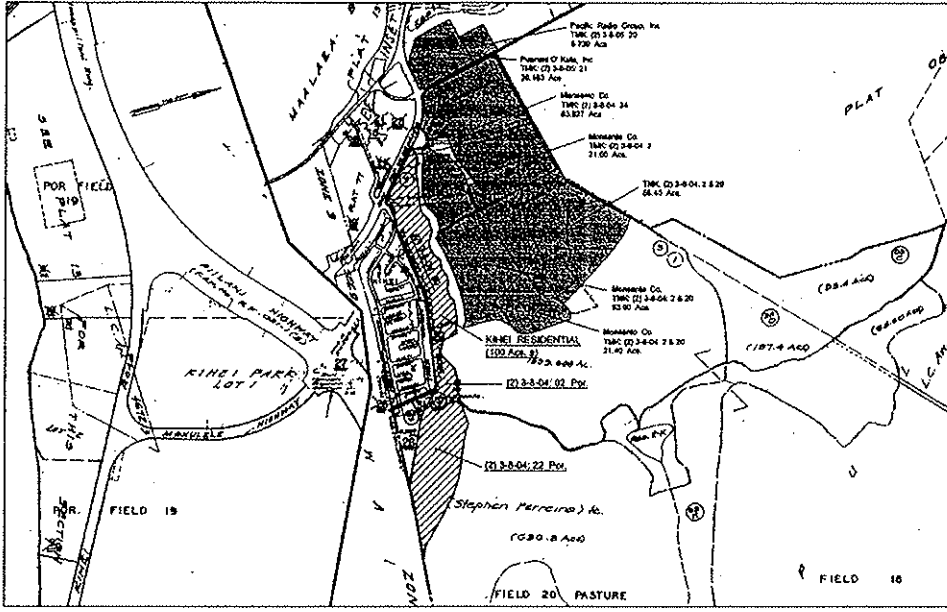


Figure 2. Portion of TMK (2) 3-8-004 showing project area in cross hatch (project area map courtesy of Mr. Daniel Yasui – A & B Properties)

Cultural Impact Assessment for Approximately 100-Acres Pulehu Nui Ahupa'a, Makawao District, Maui Island

TMK (2) 3-8-004:002 por., 022 por., and 030

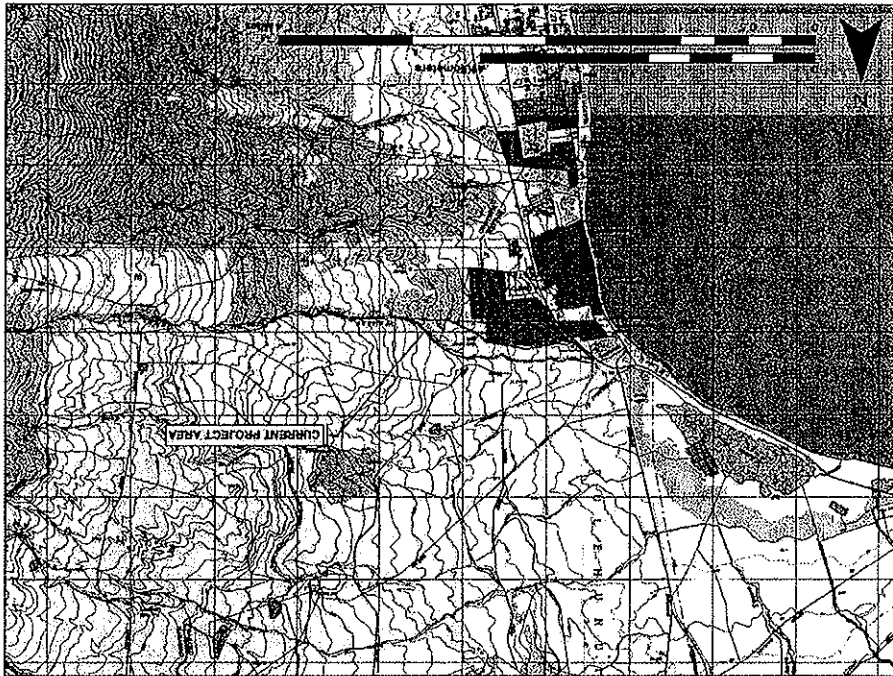


Figure 1. A portion of the 1998 Pun o Kaiti and Malaea 7.5-minute USGS topographic quadrangles, project area in red

Cultural Impact Assessment for Approximately 100-Acres Pulehu Nui Ahupa'a, Makawao District, Maui Island

TMK (2) 3-8-004:002 por., 022 por., and 030

1.2 Scope of Work

The following scope of work was adhered to for the preparation of this cultural impact assessment:

1. Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record.
2. A review of the existing archaeological information pertaining to the sites on the property as they may allow us to reconstruct traditional land use activities and identify and describe the cultural resources, practices and beliefs associated with the parcel and identify present uses, if appropriate.
3. Conduct both formal and informal interviews with persons knowledgeable about the historic and traditional practices in the project area and region.
4. Preparation of the following report on items 1-3 summarizing the information gathered related to traditional practices and land use. This report will assess the impact of the proposed action on the cultural practices identified.

1.3 Environmental Setting

1.3.1 Natural Environment

The general soils within the project area are of the Waiaikoa-Keahua-Molokai association. This soil association is found on low uplands and consists of deep to nearly level well-drained soils (Foote et al. 1972:12). More specifically, the soils within the project area are of the Alae Series, Waiaikoa Series, and Pulehu Series (Figure 4).

The Alae Series consists of excessively drained soils on alluvial fans. Alae sandy loam (AaB), found in the northwestern corner of the project area, occurs on smooth alluvial fans where permeability is rapid, runoff is slow and the erosion hazard is slight (Foote et al. 26). At the time of the US Department of Agriculture (USDA) soil survey, AaB type soils were commonly used for sugarcane and pasture with small acreages used for truck crops.

The Waiaikoa Soil Series consists of well drained, gently sloping to moderately steep soils located on the upland areas. The upper part of the Waiaikoa Series is influenced by volcanic ash and developed from material weathered from basic igneous rock. Waiaikoa very stony silty clay loam (WgB), found in the central portion of the project area, is generally smooth and found on low uplands. The permeability of WgB soil is moderate with slow runoff and a slight erosion hazard (Foote et al. 1972:126). Waikoa extremely stony silty clay loam (WID2), found along the southern boundary and eastern most portion of the project area, is like WgB soils except that it is eroded and stones cover three to 15 percent of the surface. Runoff of WID2 soils is medium and the erosion hazard is severe (Foote et al. 1972:127). At the time of the USDA soil survey, WgB soils were commonly used for sugarcane, pasture, and wildlife habitat and WID2 soil was used for pasture and wildlife habitat.

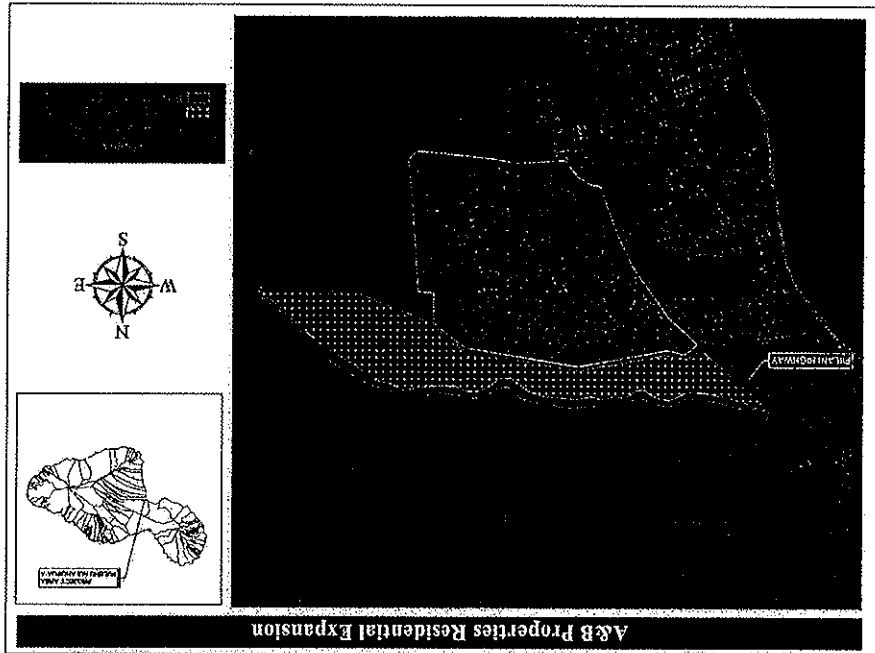


Figure 3. Aerial photograph depicting project A&B (photo courtesy of Mr. Daniel Yau) - A & B Properties

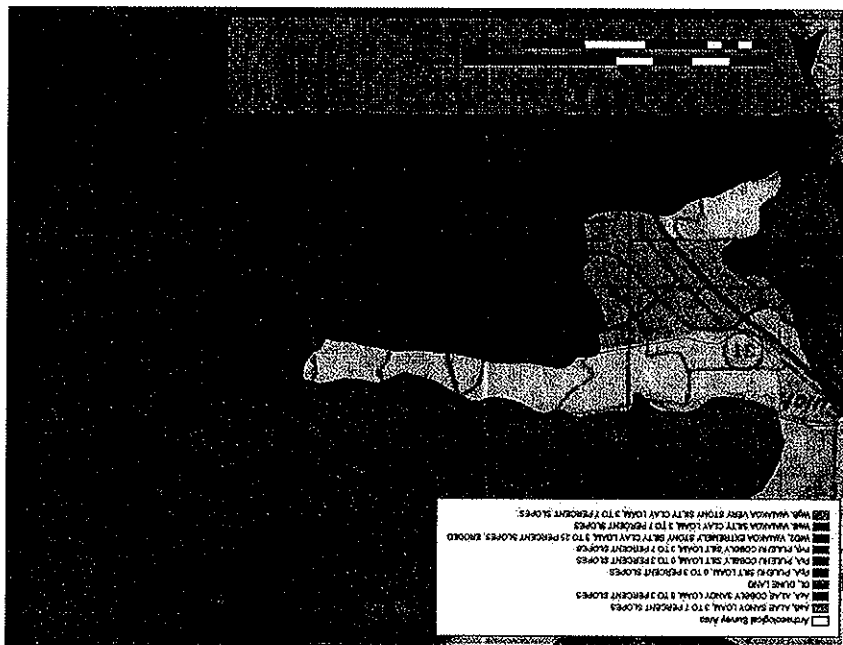
The Pūlehu Soil Series consists of well-drained soils on alluvial fans, stream terraces, and basins and are developed in alluvium washed from basic igneous rock (Foote et al 1997: 115). Pūlehu cobbly silt loam (PrB), found along the northern boundary of the project area, is similar to Pūlehu clay loam (PsA) where run off is slow with a slight erosion hazard. The available water capacity is approximately 1.4 inches per foot in the surface layer and subsoil. The only difference between PrB soils and PsA soil is that the texture is silt loam and the surface layer is cobbly. (Foote et al. 1972:116). At the time of the USDA soil survey, PrB soil was used for sugarcane with small acreages used for pasture.

Rainfall accumulation within the project area averages around 15 inches per year with the heaviest rainfall occurring during the winter months (December through February) and little to no rainfall during the summer months (June through August) (Giambelluca and Schroeder 1998). This pattern of rainfall and low annual precipitation rate once sustained a lowland, dry shrubland and grassland native ecosystem. (Pratt and Gon III 1998). The landscape of the project area, however, has been heavily modified by historic sugar cultivation, as well as, modern corn and truck crop cultivation (Figure 5, Figure 6, and Figure 7). The vegetation along the sides of Waiahoa Gulch currently consists of moderately dense *Kiawe* (*Prosopis pallida*) and *koa koa* (*Leucaena leucocephala*) with knee to waist high grasses in the gulch bottom. Thin stands of *kiawe* and *koa koa* trees, knee to waist-high buffelgrass (*Cenchrus ciliaris*) and other alien grass species, interspersed with sparse occurrences of *ilima* (*Sida fallax*) and *uhala* (*Waltheria indica*), could be found throughout the un-cultivated eastern portion of the project area.

1.3.2 Built Environment

The built environment within the project area consisted of farm sheds and a single post and pier structure in the truck farms section. The surrounding vicinity consisted of the Hale Pū'ilani residential subdivision to the south and the four-lane Pū'ilani Highway and Waiahoa Bridge to the west (see Figure 3).

Figure 4. A portion of the 1998 Pūlehu Soil Series (U.S. Department of Agriculture, Natural Resources Conservation Service 2001) to the local soil series.



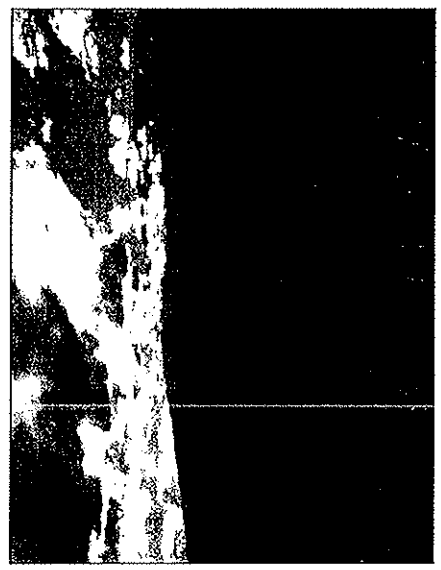
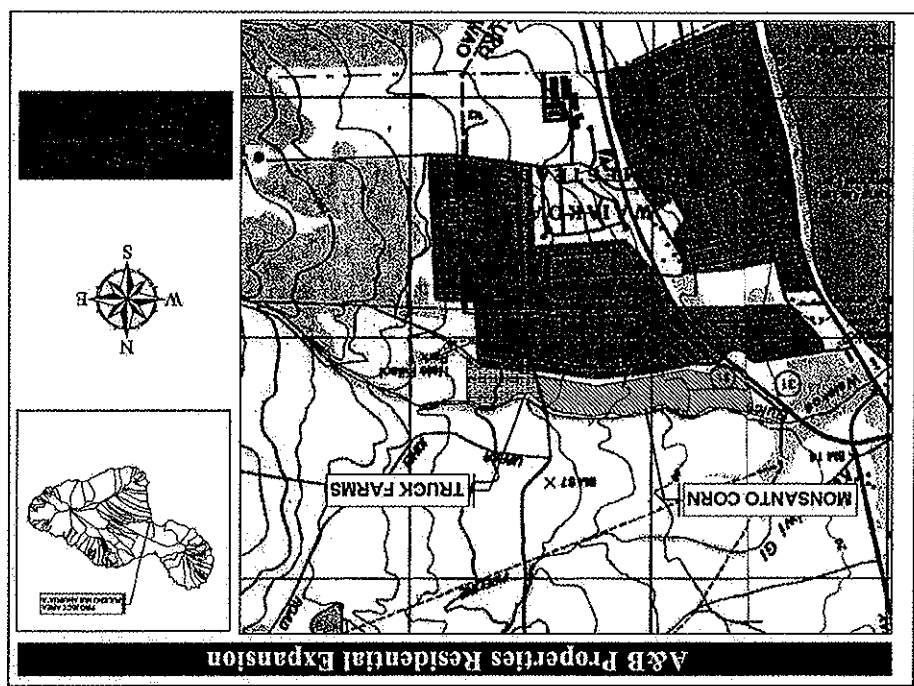


Figure 6. Overall view of uncultivated portion of project area, view to east



Figure 7. Truck farming area, Hale Pi'ilani Residential Subdivision in the background, view to east

Figure 5. A portion of the 1998 Pun o Kahi and Maalaea 7.5-minute USGS topographic quadrangles, showing the proposed residential expansion area and approximate areas currently under cultivation



Section 2 Methods

Numerous published and unpublished accounts, surveys, reports, maps and photographs found in public and private collections pertaining to Pūlehu Nui and the project area were investigated by Cultural Surveys Hawai'i Inc. Historical documents, maps and existing archaeological information pertaining to the sites in the vicinity of this project were researched at the State Historic Preservation Division library, the Hawai'i State Archives, the Bailey House Museum, and Cultural Surveys Hawai'i Library. The office of Hawaiian Affairs, Maui/Lāna'i Islands Burial Council (M/LIBC), and members of other community organizations were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the study area and the surrounding vicinity. The names for potential community contacts were also provided from the researcher's familiarity of the families who were connected to the area. Some of the prospective community contacts were not available to be interviewed as part of this project. A discussion of the consultation process can be found in the following section on Section 5 Community Consultations. Please refer to Section 5 for a complete list of individuals and organizations contacted.

Section 3 Traditional and Historic Background

The division of Maui's lands into political districts occurred during the rule of Kaka'alaneo, under the direction of his *kahuna*, Kailaha'ōhi'a (Beckwith 1970:383). This division resulted in twelve districts or *moku* during traditional times: Honua'ula, Kahikinui, Kaupō, Kīpahulu, Hana, Ko'olau, Hāmākuā Loa, Hāmākuā Poko, Ka'anapali, Lahaina, and Kula. The current project area is located on the leeward flank of Haleakalā in the *moku* of Kula and *ahupua'a* of Pūlehu Nui (Figure 8) at a place commonly known as Kīhei.

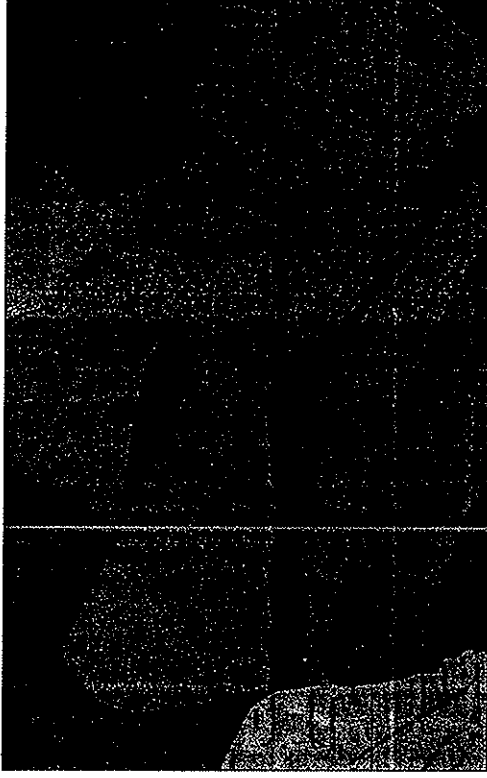


Figure 8. A portion of the F.S Dodge map (1885) showing Pūlehu Nui Ahupua'a in relation to the traditional *moku* of Kula (crown lands in yellow, government lands in green)

3.1 Traditional and Historical Background

3.1.1 Mythological Accounts

While the mythological and traditional accounts of the Kīhei area are relatively scarce, an analysis of the place name meanings for the region surrounding the project area may yield some insight into the patterns of life in an area. Literal translations of several of the place names for land areas and divisions near to the project area are listed below. Unless otherwise noted, the translations are taken from Pukui and others (1974):

Kula (*moku*) literally translated as "plain"; always an arid region (Handy in Sterling 1995:242)

Pūlehu Nui (*ahupua'a*)

large *pūlehu* where *pūlehu* is literally translated as "broiled"; an alternative meaning is related to the coastal resources of the *ahupua'a* where the large cowry or *lehu* (*Cypraea spp.*) can be found off shore where the direct translation is *pū* (shell) *lehu* (cowry) *nui* (large) (Kimoko Kapauleleua, personal communication)

Kīhei literally "cape or cloak"; sandy point and boundary marker between Pūlehu Nui and Waikapu (Sterling 1998:255); commonly used place name for the South Maui area

Kīheipūko'a

kīhei literally translates as "cape or cloak" and *pūko'a* literally translates as "coral head"; Kīheipūko'a was a place near Keālia between Kalepolepo and Ma'āleā (Sterling 1998:257)

Keālia

literally "salt encrustation"; a pond near Kīhei and major salt pan location (Sterling 1998:95)

Kale'ia

literally "the abundance"; possibly in reference to the resources available from the fishponds and offshore fishing grounds

Kalepolepo

literally "the dirt"

Ka'ie'ie

"a plaything for floating in the rapids"; ancient name of Kalepolepo (Sterling 1998:252)

Kaopala

literally "the rubbish"; dividing line between Pūlehu Nui and Waikapu

Waiaikoa

literally "water (used) by warrior"; the name of the gulch that serves as the northern boundary of the project area

Keāhuaiwi

literally "the bone pile"; the name of a gulch immediately adjacent to and north of Waiaikoa Gulch

Kalaepohaku

"the stony promontory"

Pohaku Kī'i

or Pohaki'iki'i "titled stone"; a resting place for travelers

Alakoa

"soldiers street"

Kohemamalama

"the vagina"; also the ancient name for Kaho'olawe

The above place names, together with the environmental data, suggest that the lands of and surrounding coastal Pūlehu Nui were fairly dry and barren in an agricultural sense but rich in marine resources. Previous research on pre-contact occupation in Kula District (Kolb et al. 1997) has suggested that most permanent habitations were in the uplands with a smaller permanent population located along the coastline. While a reconstruction of the coastal and archaeological landscape of Kula Moku underscores the importance of the uplands as a focus of agriculture and habitation, Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine exploitation. The relative scarcity of recorded coastal place names, however, may be an indication of a smaller population that was widely spread out across the leeward coastal line. The vicinity surrounding the current project

area was also a site of conflict between the Hawaii'i Island chief Kalani'opu'u and Maui Island chief Kahekili and is perhaps the origins for such place names as "Waiaikoa" and "Keāhuaiwi".

3.1.2 Traditional Accounts

The earliest account concerning Kīhei and Hawaiian politics is given by Kamakau (1961) during the time of Alapa'i and Kekaulike

Alapa'i sailed from Kohala on Hawaii'i...But when he landed at Mokolua in Kaupō (Maui) and heard that Ke-kau-like was dying, he gave up all thought of war and wished only to meet Ke-kau-like and his (half) sister Ke-ku'i-ipo-iwa-nui...He landed at Kīheipūko'a with all his chiefs and fighting men...While he was at Kīhei, Alapa'i heard that the ruling chief of Oahu was making war upon Molokai. Most of the chiefs of Molokai...were of Hawaii'i...Alapa'i's sympathy was aroused, for these were his own brothers and children (relatives), and he made ready to go to their help on Molokai. [1961:70]

Other accounts involve the continuing conflict between Kahekili of Maui Island and Kalani'opu'u of Hawaii'i Island during the late 18th century. Following a losing battle at Kaupō in 1775, Kalani'opu'u dedicated several war *heiau* on Hawaii'i Island to aid in the defeat of Kahekili. Upon hearing this news Kahekili sent for the *kahuna* (priest) Kaleopu'u who directed construction of the *heiau* of Kalui and Pu'uohala on the north side of Wailuku. When Kabili Heiau was completed Kaleopu'u said to Kahekili:

This is the house of your god; open the sluice gate that the fish may enter. [Kamakau 1961: 85].

In the year 1776, the army of Kalani'opu'u landed at Keoneo'o'io with their war canoes extending to Makena at Honua'ula and proceeded to ravage the countryside. Kalani'opu'u landed with additional forces at Kīheipūko'a from Kealia to Kapa'ahu, 800 strong and eager to drink the waters of Wailuku.

Across the plains of Pu'u'aimako (Can-trash-hill) and Kama'oma'oma'io shone the feather cloaks of the soldiers ... Ka-hekili was at Kalamihale just below Kīhahale and above the plateau of Ka'ilipoo at Pohakuokahi ... Kaleopu'u [said] to Ka-hekili, "The fish have entered the sluice; draw in the net." [Kamakau 1961:85]

In the Battle of Kakanilua, the forces of Kahekili descended on and destroyed the soldiers of Kalani'opu'u, slaying the Alapa (elite soldiers of Kalani'opu'u) on the sand hills at the southeast of Kālua, an *ahupua'a* or land division near Wailuku. Only two men escaped to Kīheipūko'a to tell Kalani'opu'u the news of their defeat. After a second day of warfare, Kalani'opu'u sued for peace and was granted such by Kahekili and his messengers at Kīheipūko'a (Kamakau 1961:88-89).

3.1.3 Early Historic Period

Kīhei was one of the locations visited by Captain George Vancouver. A monument at Mai Pōina 'Oe'ia'u Beach Park in Kīhei commemorates Vancouver's on-shore expedition in 1792.

when he first met the ruling chief Kahekili. With its sheltered coastline and easy access to upcountry resources over a vast slope, Kihai would continue to be a common stop for visiting ships.

During the early and middle 1800s, the Hawaiian demography was affected by two dramatic factors: radical depopulation resulting from Western disease; and nucleation around the developing port towns. The traditionally Hawaiian population was largely dispersed and, although there were royal centers and areas of more concentrated population, these areas never came close to rivaling the populations of the historic port towns that developed on Hawai'i's shorelines during the 1800s. In this regard, Kuykendall (1938:313) notes that in the period from 1830 to 1854:

The commercial development during this period, by magnifying the importance of a few ports, gave momentum and direction to a townward drift of population; the population of the kingdom as a whole was steadily going down, but the population of Honolulu, Lahaina and Hilo was growing.

We believe that Kuykendall's observation was most likely the demographic pattern at the Kalepolepo entrepot, a hub of early historic activity for Kihai and eventually all of Kula Moku (Kolb et al. 1997:69), located approximately one mile to the south of the current project area. The development of Kalepolepo as an entrepot and a focus of Christian life in the 1840s and 1850s most likely increased the population in the immediate vicinity above the pre-contact population figures, contrary to the island-wide trend of depopulation. That the population and areal extent of the Kalepolepo community reached its zenith during the mid 1800's appears to be supported by Kolb and others (1997:68):

The ancient village of Kalepolepo was relatively small, and was built around an economy primarily based upon the exploitation of ocean resources—primarily the excellent fishing grounds as well as three large fishponds. However, as the number of visiting ships increased, Kalepolepo soon became an important provisioning area. By 1830 we know that the economic opportunities were attracting a number of European entrepreneurs.

In 1820, the whaling industry was introduced in Hawai'i. Although the whaling trade centered on Lahaina, mainly affecting the Kula/Kihai area through agricultural demands, Clark (1980:47) notes that "From the 1840s to the 1860s a small whaling station was maintained at Kalepolepo [Kihai]." The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and in particular the long-lasting Irish potato. After 1830, dryland agriculture in the old Kula District expanded with a focus on Irish potato cultivation. The California Gold Rush of 1849 further intensified the demand as a California-Hawai'i potato trade began to flourish. Kula became the area of highest potato production and was known as "the potato district" (the area between 2000 and 5000 ft. amsl). During this time period sugar cultivation and ranching were established in the Kula region. Sugar was present prior to 1846, with six sugar producers operating on the slopes of Haleakala (Wong Smith in Brown et al. 1989:C-7). As Wong Smith points out (Brown et al. 1989: C-6), ranching was present in the area prior to the 1840s. Much of the produce, sugar and livestock moved down the Kalepolepo and Kekuawaha ulu ula Trails to the landing at Kalepolepo, just south and east of the project area.

Donham (1992:5) notes that the inundation of land clearing and cultivation associated with the Gold Rush resulted in "deforestation [which] adversely affect[ed] the amount of rainfall in the district, and periods of drought became more common."

Around 1849 John Haistead built the Koa House at Kalepolepo in Kihai. The building, part store and part residence, thrived on both the trade of the whaling industry and the then thriving potato industry. During the Gold Rush years, the store became "an emporium for Irish potatoes" and served as a gathering place for the whaling sailors. David Malo created a balance for the boisterous whaling crowd by constructing the Kilolani Church at Kalepolepo around 1852.

Potato production thrived in Kula from 1830-1850 until successful potato cultivation and production in California and Oregon resulted in a decline in the Hawai'i trade (Burgert and Spear 1995:6-7). Haistead ran his store until 1876, closing shop when the potato industry diminished and moved to Ulupalakua (Janion 1977:25-31).

3.1.4 Mid- to late-1800s

The most significant change in land-use patterns and allocation came with The Great Mahele of 1848 and the privatization of land in Hawai'i. This action hastened the shift of the Hawaiian economy from that of a subsistence-based economy to that of a market-based economy. During the Mahele, all of the lands in the Kingdom of Hawai'i were divided between *mā'i* (king), *ali'i* and *kono'ihiki* (overseer of an *ahupua'a*), and *maka'āinana* (tenants of the land) and passed into the Western land tenure model of private ownership. On March 8, 1848, Kauhikeouli (Kamehameha III) further divided his personal holdings into lands he would retain as private holdings and parcels he would give to the government. This act paved the way for government land sales to foreigners, and in 1850 the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995: 41-51).

Native Hawaiians who desired to claim the lands on which they resided were required to present testimony before the Board of Commissioners to Quiet Land Titles. Upon acceptance of a claim the Board granted a Land Commission Award (LCA) to the individual. The awardee was then required to pay in cash an amount equal to one-third of the total land value or to pay in unused land. Following this payment, a Royal Patent was issued that gave full title of ownership to the tenant. But by 1850, the government of Hawai'i was offering land for sale to both Native Hawaiians and foreigners. Such lands were referred to as Royal Patent Grants or as Grants.

A total of 13 land commission claims were made in Pulehu Nui and nine were awarded (Table 1). A portion of the 1880 Monsarrat and Dodge map of Kula shows that the area in which the current project area lies was awarded to Keaweama'i as a part of LCA 5230 (Figure 9) and supporting testimony given to the land commissioners indicate that the land of Pulehu (Pulehu Nui) was given to Keaweama'i by the King in 1843 and never disputed (Waihona 'Aina 2000). The testimony given by Ksauwai and Kaiakēkēka additionally maintained that there were a great many natives that lived within the *ahupua'a* of Pulehu Nui (Waihona 'Aina 2000). As indicated in Table 1, the majority of the lands that were awarded were *kūla* lands used for potato cultivation (both sweet potato and Irish potato) and primarily located along the upper elevations of the *ahupua'a*. Only one land claim, made by Kāpono (LCA 9018), made mention of fishing rights and access to a *loko*. Land commission claim # 9018 was not awarded.

Table 1. Land Commission Awards Within Pūlehu Nui Ahupua'a

Lot #	Acres	Recipient	Notes	Area (Acres)
0327B	7691	Preveer, John	Apana	6.03
9671	2202	Kekahuna	2 kula, 1 Irish potato	5.78
9019	6330	Helehuā	3 kula	9.08
4672	6560	Poonui	6 kula, 3 sweet potato plots, 1 Irish potato	4.09
9672	5190	Nāpoko	2 kula, 3 Irish potato	12.56
9673	6329	Lonoaea	2 kula	4.06
8866	5168	Kaniho and Pakeau	2 kula, 1 house lot, 1 mala of Irish potatoes	14.9
4567	7484, 7896	Wahine	11 kula, 10 sweet potato	7896
5230	8140	Keaweamahi	ahupua'a	1668.78

In 1879, following the initial division of lands during the Mahele, the western boundary of Pūlehu Nui was disputed by the owners of adjacent lands in Waikapu. The western boundary of Pūlehu Nui that was specified by the Commissioner of Boundaries and surveyed included approximately 2,000 feet along the coastline from a sand spit known as Kihēi to a point of rocks called Kalaeopohaku. The eastern boundary line that was being claimed for Waikapu, however, would cut Pūlehu Nui off from the ocean, this being the more specific issue in the boundary dispute. Testimony was given by *kama'āina* (Native Hawaiian residents) of Pūlehu Nui and/or lands next to it regarding their familiarity with the boundaries of Pūlehu Nui Ahupua'a. All witnesses, with the exception of one, consistently stated the line between Pūlehu Nui and Omaopio was along a ravine or *kahawai* (Figure 9). The line carried along this *kahawai* to Pohāki'iki'i, a rock that was a resting place, and continued to follow the same natural boundary to Ka'opala at the bottom of the East Maui slope. Ka'opala meets the bottom of the West Maui slope and creates a depression and this is where the boundary turns course, following the natural depression or shallow *kahawai* to the sea. The court agreed that the boundary likely followed this natural line and concurred with the findings of the Commissioner of Boundaries. As a result, the original 2,000 feet of coastline from Kihēi to Kalaeopohaku that was attributed to Pūlehu Nui Ahupua'a was upheld. (McCully J Court Opinion in Sterling 1998: 254-257)

By the time John Halstead closed shop in 1876, the boom years of Kalepolepo had passed. By 1880 the government survey of the Kūla area showed the demarcation of only a few Land Commission Awards and who had received awards had replaced them with grants. Lower Kūla consisted primarily of pastureland for ranching (Wong Smith in Donham 1990b:B-6). Kennedy (1992:7) notes that at this point *kiawe* was imported to feed cattle and provide wood.

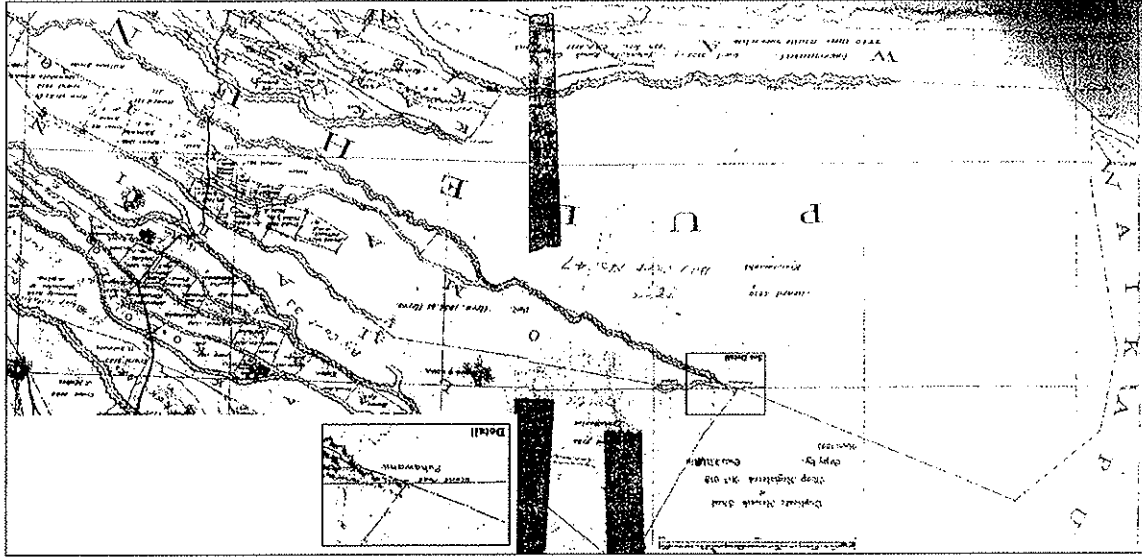


Figure 9. A portion of the M.D. Mearns and F.S. Dodge Map of Kūla (1880) showing final western boundary of Pūlehu Nui. Note the detail inset and the possibility that the "stone post" as noted on the map refers to Pohāki'iki'i, the stone resting place, that was mentioned in the Native Testimony.

Cultural Impact Assessment for Approximately 100-Acres Pūlehu Nui Ahupua'a, Makawao District, Maui Island

Regarding the settlement at Kalepolepo and the impact of the changes associated with the change to ranching on the general area known as Kihei, Clark comments:

Halstead finally closed his store in 1876, as demands for his goods had steadily decreased, and moved to Ulupalakua . . . By this time the once thriving Hawaiian village at Kalepolepo had been almost totally abandoned as well. The slopes of Haleakala had gradually become denuded of their forests and torrential rains had caused heavy soil runoffs into the Kalepolepo shoreline. Cattle had trampled down the brush and grassy fields, causing sand dunes to drift and fill up the pond. Clouds of dust filled the air instead of cooling winds. Except for a handful of fishing families, Kalepolepo (and likely the Kihei area in general) was deserted. (Clark 1980:48).

Sugar would soon fill the void and in 1898 the Kihei Plantation Company (KPC) was founded. The KPC began sugar operations in Kihei and the plain above.

3.1.5 Early to Mid-1900s

The Kihei Plantation Company, Ltd. was organized late in 1898 with a capitalization of 60,000 shares at \$50 par value. Water was the most critical component in the decision to locate sugar cultivation along the leeward shores of Maui's arid coastline. The discovery of an ample supply of irrigation water early in 1898 led to the drilling of a large, successful well, but the supply of water was limited (Stearns 1942). Over the next four years, two ditches were developed to supplement the water needs of the 4,873 acres of sugar under cultivation at Kihei (Gilmore 1936).

The history of the Kihei Plantation Company begins with the annexation of the Hawaiian Islands by the United States in 1898. With annexation came political stability for Hawai'i. Sugar prices were rising due to the outbreak of war between the United States and Spain over the colonies in Cuba, Puerto Rico and the Philippines. Henry P. Baldwin, of the Maui plantation of HC&S, entered into a partnership with O'ahu businessman Benjamin F. Dillingham to convert Lorrin A. Thurston's landholdings in Kihei into a sugar enterprise.

Up to that time, sugar cultivation within the central isthmus of Maui was centered around the main towns of Wailuku and Kahului. Water tunneled from springs in the West Maui Mountains flowed through ditches in Wailuku to irrigate fields as far away as Mā'alaea. Water from the windward rain belt of Kailua ran through a network of ditches from East Maui to Pā'ia, to irrigate fields in Pu'uhonē.

The McCandless Brothers drilled a successful Maui-Type well (U.S. Geological Survey Well 14 / Hawaiian Commercial & Sugar Well K1) in 1899. It was located just inland from the coast in North Kihei, between Keālia Pond and the Waiakea Homestead Lands. This well was drilled vertically to approximately 60 feet through the Honomanū basalts, and tunneled laterally over 1,500 feet in order to skim 10 million gallons of fresh irrigation water per day from sources beneath the Kihei plains (McCandless 1936).

The Kihei Plantation Company had the McCandless Brothers drill two or three additional Maui-Type wells on the north side of reservoir K2 at the discharge end of the existing pipeline of

Well 14. The plantation in Kihei failed in 1908 before the well site was able to be developed. It would have been named the HC&S K2 well, and would have included a large pumping station (Stearns 1942).

The plantation company in Kihei built bridges to span streams and gulches flowing through the company fields. The plantation had planned the construction of a mill in North Kihei, and ordered a plant to be built. It was decided that the new HC&S mill under construction at Pu'uhonē would have more than enough capacity to mill all the cane from the Kihei fields. The order for the mill was transferred to the 'Ōjia Sugar Company in Hawai'i, in exchange for a supply of steel rails for new railway requirements at Pu'uhonē. A large scale Kona storm hit the plantation on November 15th, 1900, and caused immense damage to both Kihei and the HC&S fields in Pu'uhonē (Dean 1950). Bridges were knocked out, buildings were flattened, and washouts filled irrigation ditches with silt. Repairs were effected immediately, with the new HC&S mill at Pu'uhonē commencing operations January 29, 1902.

3.1.5.1 Railway Operators

The Kihei Plantation Company planned to construct a railway to move their cane. The sugar agency of William Dimond & Company placed an order for a locomotive from the Baldwin Locomotive Works in Philadelphia. The order was placed April 1899, and the plantation locomotive "Haleakala" was built and sent on to Maui (Conde 1973).

By March of 1900, the first annual report of the Kihei Sugar Company stated, "It was our intention to complete the main [rail]road only as far as Camp #2, or for about 2 miles, but as the development of Camp #3 required pushing on of the road one and a half miles further, this has been done, having been completed the 15th of February." An additional six miles of track connected the Kihei wharf to the various well pumping stations, and north to meet up with HC&S track (Conde 1973). Establishing the railroad at Kihei made it possible to harvest and transport over two thousand tons of sugar in a single year (Dean 1950).

The laying of the railroad and the cultivation of the sugar cane was performed primarily by Japanese field labor (Figure 10). Kihei's plantation Camp #1 was set up inland of the Kihei wharf and mooring pier. Two stables and a plantation store were located at Camp #1. Hospital services were provided by HC&S in Pu'uhonē. Kihei Camp #3 was located 2 ½ miles north of Kihei Camp 1 at Koloaia Gulch, along the North Kihei line of the HC&S railroad and south of the current project area (Figure 11).

The 3-foot gauge track for the Kihei Plantation Company railroad was built to the same specifications as the railway linking the HC&S mill at Spreckelsville to its fields; and to the sugar warehouses at the Kahului wharf. By 1902, with the new Pu'uhonē mill completed, a new milling contract with HC&S provided that all cane loaded by the Kihei Plantation Company was to be ground and manufactured into sugar by HC&S.

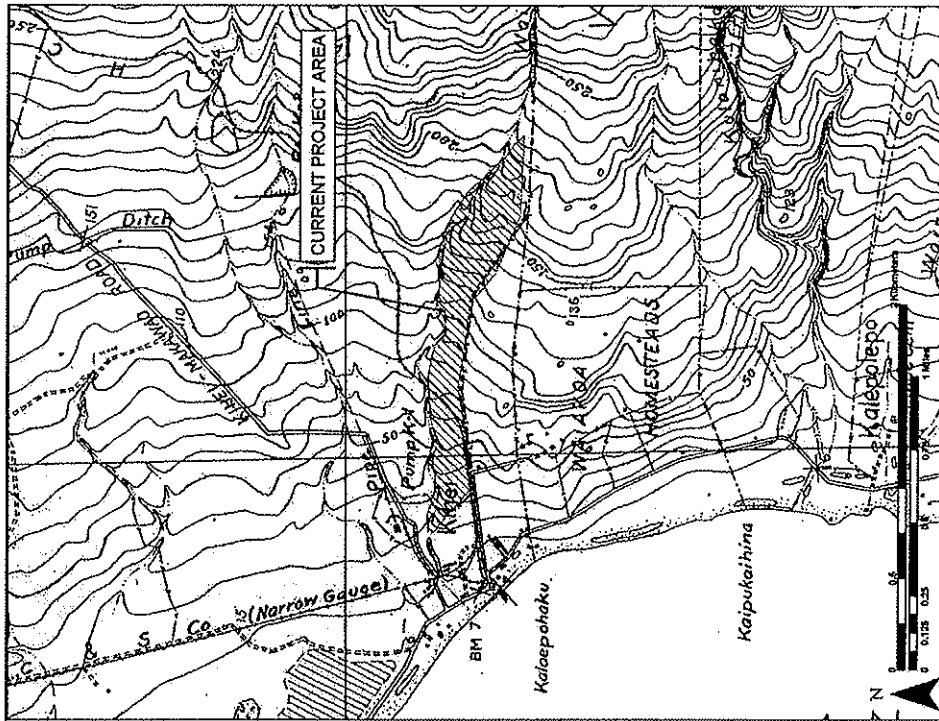


Figure 10. A portion of the 1922 USGS Map, Kihei Quadrangle showing location of current project area in relation to the railroad to Kihei

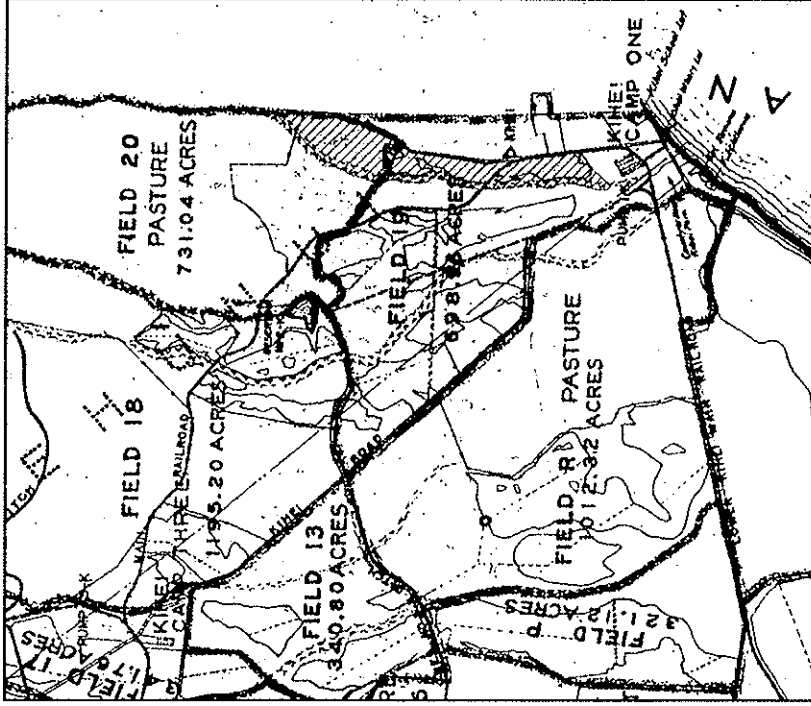


Figure 11. Portion of H.I. Shoemaker map (1910) showing Kihei sugar cane field and employee camp distribution in relation to the project area (shown in red cross hatch)¹

¹ Map was georeferenced using ARCView 8.1. Affine transformation, and known points from the 1998 USGS topographic map of the Puc O Kāli quadrangle

3.1.5.2 Water Source Development

The Lowrie Ditch project, named for former HC&S manager William J. Lowrie, brought an additional source of water to the Kihei plains. His plan was to begin the ditch at the Pāpa'a Reservoir, at the 1,000 ft. elevation, and maintain a four-foot drop per mile following the ditch's initial plunge from the Kailua reservoir. Steep mountain gulches were traversed using the force of the constant weight of water flowing in a series of siphons. The Halehaku Gulch, at 250 feet deep, and the Māliko Gulch, at over 350 feet deep, were both crossed by giant siphons fabricated of three-eighths-inch iron, and set in place by Japanese laborers. At a weir located above Pā'ia, the allocation of water began. The first tenth of the water flow in the Lowrie Ditch was divided out to the Pā'ia Plantation (an 11/20ths share) and the Haikū Plantation (a 9/20ths share). The distance traveled, from Kailua to the plantation's Kihei boundary, was 21.9 miles (Tinum 1900).

More water was required, both from wells and from the East Maui water shed. The manager for the Kihei Plantation Company, W.F. Pogue, asked the management of HC&S for an even larger allocation of water for the Kihei lands. In 1901, Samuel T. Alexander ordered the construction of a new ditch, tapping the water sources from Nāhiku to Honomanū. It was determined that the Kihei Plantation Company would receive 2/9ths of the capacity from the enterprise (See Figure 12) (Dean 1950).

H. C. & S. CO.	
Water Delivered to Kihei Plant. Co. Ltd., During Month of October, 1907.	
Days	Quantity of Water Delivered (in Ckts.)
1	0.41
2	0.45
3	0.52
4	0.60
5	0.64
6	0.70
7	0.74
8	0.80
9	0.86
10	0.92
11	0.98
12	1.04
13	1.10
14	1.16
15	1.22
16	1.28
17	1.34
18	1.40
19	1.46
20	1.52
21	1.58
22	1.64
23	1.70
24	1.76
25	1.82
26	1.88
27	1.94
28	2.00
29	2.06
30	2.12
31	2.18
Total	61.28

Pumps were run from the 1st to the 6th inclusive. Water delivered to K.P.C. Pump water - 100000 lbs. 6 Days - 2.50 @ 12.50 = 31.25 10 Days - 14.27 @ 2.00 = 28.54 21 Days - 16.80 @ 1.12 = 18.82

Figure 12. A portion of an accounting statement for water delivered to the Kihei Plantation Company in 1907.

The Kihei Plantation Company failed to live up to the expectations of its promoters with an inadequate water supply as the key difficulty. With the waters of the Ko'olau Ditch flowing to the Kihei fields, production appeared to have hit its peak. Although 5,609 tons of sugar was delivered in 1903, high costs required a change of managers in Kihei, and a reduction of the HC&S milling charge to \$7 per ton. The incoming HC&S manager, Frank Fowler Baldwin,

determined that the best course of action was to buy out the company for \$375,000 (Conde 1973).

In 1908, the lands of the Kihei Plantation Company were divided up between five new major business entities of HC&S. The Kahului Railroad, which had already been absorbed by HC&S, acquired the rail lines to Kihei and the rolling stock of the plantation. The Kailua Plantation Company (994 acres), the Kaitiimi Plantation Company (923 acres), the Kula Plantation Company (996 acres), the Makawao Plantation Company (982 acres), and the Pulehu Plantation Company (978 acres) acquired the remaining acreage not included in the railroad right-of-way. Water rights reverted to HC&S, and were reapportioned between the new plantations. The current project area currently overlies what were formerly cane field 19 and pasture field 20 (see Figure 11). Sugar operations continued in North Kihei until circa 1968, when HC&S leased lands to a corn research farm.

3.1.6 Modern Land Use

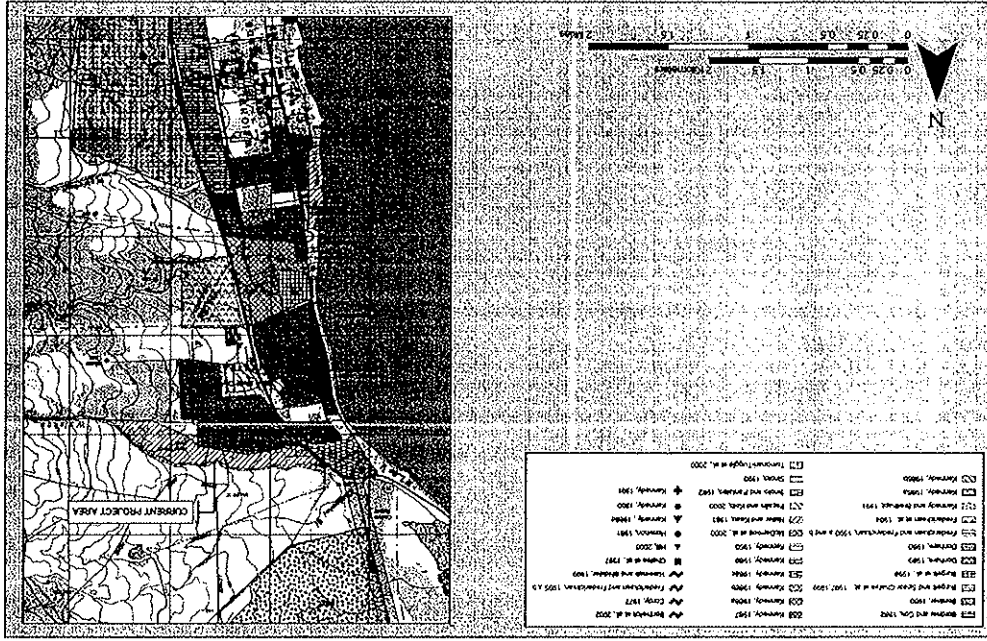
In 1968, Trojan Seed Company established a corn research farm at Kihei that included the area comprising the present project area. Trojan Seed evolved through ownership by Pfizer Genetics and DeKalb Corn to the present Monsanto Global Seeds business focusing on the development of round-up resistant corn seed. Modern land use of the project area currently includes the seed corn operation run through Monsanto Global Seeds and truck crop cultivation on the portion of the area was formerly a part of Field 19 (see Figure 11).

Section 4 Archaeological Research

The majority of archaeological reconnaissance and inventory surveys in the North Kīnei area (Figure 13 and Table 2) have produced relatively little significant information in the way of archaeological data. While this may be due in large measure to changes on the land associated with sugar cane cultivation, ranching, and military use, as well as resort and housing construction, it still seems inescapable that there are only few areas in the Hawaiian Islands abutting sandy beaches that have less in the way of documented Hawaiian cultural deposits than Kīnei. While only a few projects in areas back from the coast have identified both pre-contact and post-contact agricultural features (Donham 1989 and 1990; Chaffee et al. 1997; Kennedy 1987; Cordy 1977), enclosures and deposits with a posited pre-contact and post-contact habitation function (Cox 1976; Cordy 1977; Donham 1990; Fredericksen et al. 1993 and 1994; and Fredericksen and Fredericksen 1995; McDermott et al. 2000 and 2001), pre-contact burials (Kennedy 1990) and military sites (Fredericksen et al. 1994; Tomanari-Tuggle et al. 2000), a number of archaeological studies have identified no archaeological sites at all (Hill 2003; Hornmon 1981; Borthwick et al. 2002; Burgett and Spear 1997; Chaffee 1999; Burgett et al 1998; Kennedy 1986 and b, 1988 a and b, and 1989).

During a large scale archaeological reconnaissance and salvage project for the then proposed Pi‘ilani Highway road corridor, located directly east and adjacent to the current project area, Cox (1976) identified a total of six archaeological sites from Pūlehu Nui to Kama‘ole Ahupua‘a. The archaeological findings included one miscellaneous alignment (-0220), two historic house complexes (-0221 and -0222), an *ohu* (-0219), and two pre-contact temporary shelter sites (-0223 and -0224). Subsequent work by Cordy (1977) identified a total of 32 additional single component and multi-component archaeological sites within the same road corridor. Including the Cox study, 23 archaeological sites were identified as pre-contact sites representing temporary habitation (n=13), agriculture (n=6), and aquaculture (n=2). Only two out of the twenty-three sites identified as pre-contact was of an indeterminate function. The remaining 15 archaeological sites were determined to be of the historic era and representative of railroad and transportation remnants (n=6), ranching (n=3), water control (n=1), and habitation (n=1). Four wall features that were identified as historic were also recorded but function could not be determined.

Figure 13 A portion of the 1998 Pūlehu Nui and Makawae 7.5-minute USGS topographic quadrangles, showing the project area relative to areas of previous archaeology



Previous Archaeological Research

Cultural Surveys Hawaii Job Code: PULE 2

Table 2. Summary of Previous Archaeology of the North Kīhei Vicinity

Year	Researcher	Location	Method	Findings
1931	W. Walker	Entire Island	Reconnaissance	three <i>heiau</i> in the uplands of Pūlehu Nui
1973	W. Kikuchi	State-wide fishpond survey	Fishpond survey	Notes 3 fishponds in the Kalepolepo area
1976	D. Cox	Pūlehu nui to Kāma'ole	Surface Survey	Identified 6 sites
1977	R. Cordy	Pūlehu nui to Paeha	Reconnaissance	Identified 38 sites: 30 in Waiohuli, 0 in Ka'ono'ulu and 8 in Kēōkea
1981	R. Honnmon	Coastal Waiakea	Reconnaissance	No archaeological findings
1982	R. Bordner & D. Cox	Coastal Waiohuli & Kēōkea	Reconnaissance	Reports 9 sites
1986a	J. Kennedy	Waiohuli	Reconnaissance	No findings
1986b	J. Kennedy	Coastal Waiohuli	Reconnaissance	No archaeological sites were found
1987	J. Kennedy	Coastal Pūlehu Nui	Inventory Survey	Stacked rock wall, series of rock alignments, 2 <i>ahu</i> , one possible upright, and one earthen mound
1988a	J. Kennedy	Coastal Ka'ono'ulu	Reconnaissance	No archaeological findings
1988b	J. Kennedy	Coastal Waiohuli	Reconnaissance	No archaeological findings
1988c	J. Kennedy	Coastal Waiohuli	Reconnaissance	No archaeological findings
1989	T. Donham	Waiohuli	Inventory Survey	Identified 4 sites in a portion of the Miura 1982 study area and recommended data recovery
1989	W. Fredericksen et al.	Coastal Kāma'ole	Inventory Survey	No archaeological findings
1989	J. Kennedy	Coastal Waiohuli	Subsurface Testing	No archaeological findings
1990a	T. Donham	Coastal Waiohuli	Data Recovery	Site 2475 was excavated
1990b	T. Donham	Coastal Kēōkea	Inventory survey	Part of Miura 1982 study area, 16 sites were identified
1990a	W. Fredericksen & D. Fredericksen	Coastal Kēōkea	Monitoring	No archaeological findings
1990b	W. Fredericksen & D. Fredericksen	Coastal Kēōkea	Survey & Monitoring	No archaeological findings
1990	J. Kennedy	Coastal Waiakea	Survey	No archaeological findings
1990	A. Sinoto	Coastal Waiakea	Survey & Testing	No archaeological findings (other than 2 pieces of midden)
1991	J. Kennedy & M. Breithaupt	Coastal Kēōkea	Inventory survey	No archaeological findings

Year	Researcher	Location	Method	Findings
1992	J. Kennedy	Coastal Kāma'ole	Inventory survey	Identified 4 sites including a permanent pre-contact habitation/religious site
1992	J. Kennedy et al.	Coastal Kāma'ole	Inventory survey w/ Subsurface Testing	Identified 4 sites all believed to be historic; two military and 2 ranching
1992	Sinoto & Pantaleo	Coastal Pūlehu Nui	Inventory Survey	No archaeological findings other than a bridge foundation (site -3131)
1993	D. Fredericksen et al.	Coastal Waiohuli	Inventory Survey/Data Recovery	A rock shelter excavation yielded lithic artifacts, midden and a date of A.D. 1560 to 1800
1994	E. Fredericksen et al.	Ka'ono'ulu, mauka of Pi'ilani Highway	Inventory Survey	21 sites were identified, some military and some pre-contact
1994	W. Fredericksen et al.	Coastal Waiohuli	Inventory Survey	22 backhoe test trenches were excavated but there were no significant archaeological findings
1995a	E. Fredericksen & D. Fredericksen	Waiohuli	Inventory Survey	one rock shelter site was identified as a pre-contact temporary habitation site
1995b	E. Fredericksen & D. Fredericksen	Waiohuli	Data Recovery	Four carbon dates were obtained suggesting late pre-contact use.
1997	Fredericksen Chaffee et al.	Waiohuli (120' elevation)	Archaeological Inventory Survey	3 sites were identified, all interpreted as agricultural
2000	Pepalis, J. & Michael J. Kolb	Waiohuli	Archaeological Excavations	Found evidence of a stream-fed pond near Kalepolepo Church
2000	McDermott, Shideler, and Hammatt	Waiohuli, adjacent to the Kalepolepo Church	Additional Archaeological Inventory Survey (Backhoe Testing)	Document Site 50-50-09-4981, former inland pond that contains evidence of early occupation at coastal Kīhei-- approximately A. D. 600-900. An elaboration on Pepalis and Kolb's work, described below.
2000	Tomonari-Tuggle et al.	Pūlehu Nui	Archaeological Inventory Survey	Documented four multi-component archaeological complexes (50-50-09-4164 [NAS Puunene], -4801 [post-war ranching], 4802 [sugar plantation], and -4800 [sugar plantation])
2001	M. McDermott	Waiohuli Kīhei	MA Thesis	Historical ecological study of Kīhei utilizing pollen, soil, and ¹⁴ C analysis as evidence to document an early habitation sequence for coastal Kīhei

Year	Site Name	Method	Findings
2002	Pepalis and Kolb	Sub-Surface Testing	Documented highly stratified cultural deposits of an inland pond.

Bordner (1980) conducted an archaeological investigation directly south and adjacent to the present project area and identified primarily historic era properties. Bordner's study area covered the residential subdivision currently known as the Hale Pi'ilani Subdivision located *mauka* or west of the Pi'ilani Highway, as well as a section *makai* or east of the Pi'ilani Highway that was later developed into the Kihei Villages Condominium Complex. During the course of the inventory survey, Bordner relocated SIHP #'s -0219, -0220, and -0221, originally identified by Cox (1976), as well as six new historic properties within the *mauka* section of the study area. The six new sites consisted of historic era *ahai*, two remnant alignments of an indeterminate age, a historic stacked stone wall and an elongate basalt mound with an upright slab of an indeterminate age. Bordner reports no surface findings in the *makai* portion of the project area. In 1987, Kennedy revisited the *makai* portion of the Bordner project area in anticipation of the Kihei Villages development and identified six new early Hawaiian pre-contact era archaeological sites. These sites consisted of a stacked *ahupua'a* boundary wall approximately 300m long, two rock mounds, one upright, a series of low parallel rock alignments attributed to sweet potato agriculture, and one large mound or dune with possible burials.

Sinoto and Pantaleo (1992) conducted an archaeological inventory survey of approximately 38.5 acres east of the present project area near the former location of Kihei Camp One. Only one historic property, the remains of concrete footings from a bridge crossing Waiakoa Gulch, was recorded. Due to the considerable ground disturbances, which included several bulldozing events, Sinoto and Pantaleo did not undertake a subsurface testing program.

Tomonari-Tuggle and others (2000) conducted an intensive archaeological inventory survey of the area that encompassed the former location of Naval Air Station (NAS) Pu'uhene north of the present project area. This inventory survey resulted in the reconnection a total of four multi-component archaeological complexes (50-50-09-4164, -4801, 4803, and 4800), as well as one single component site noted as the Kihei Railroad Bed (SIHP # -4802). SIHP # -4164 consists of 165 features, all of which are associated with NAS Pu'uhene. SIHP numbers -4800 and -4803 were representative of the sugar plantation use of the central isthmus and consisted of seven plantation era features for the former site number and remnants of the Haiku ditch and reservoir (n=5) for the latter. Historic properties reflecting post-war ranching activities (SIHP # -4801) were also recorded during the course of this inventory survey.

Xamanek Researches (E. Fredericksen et al. 1994) conducted an inventory survey in Ka'ono'ulu Ahupua'a at a similar elevation as the current project area. A total of 21 archaeological features reflecting pre-contact use of the area, as well as, post-contact military and ranch use were recorded. The pre-contact or Early Hawaiian archaeological features included five stone piles possibly representing agricultural use, five surface scatters represented by pre-contact temporary habitation and one petroglyph. Military use of the area is represented by five stone cairns, three alignments, and one enclosure. A single feature, interpreted as an erosion containment area, was recorded in association with ranching activities.

Further south of the project area, Chaffee and others (1997) identified three historic properties that were interpreted as agricultural features. Donham (1989, 1990b) identified 16 sites, including nine terraces, seven enclosures, four C-shapes, four rock piles, two platforms, an alignment, and a modified outcrop. Most features were interpreted as agricultural features, while a few were considered temporary habitations. Donham concluded that these agricultural and habitation features likely indicated a more extensive use of the "transitional" or barren zone than some settlement models suggested. Donham's (1989, 1990) work took place within a portion of the Bordner and Cox (1982) project boundaries and found similar archaeological features.

The inventory surveys for the then proposed "Pi'ilani Residential Community - Phases I and II" (Bordner and Cox 1982; Donham 1989, 1990b) identified only rock alignments and no further research was conducted related to the proposed phased subdivision. A single site (50-50-10-2475) near Pi'ilani Highway, and Lipoa Street was subjected to data recovery (Donham 1990a) and interpreted as an agricultural terrace complex. Following this data recovery, no further research was recommended and the commercial and residential subdivision was subsequently constructed.

The chronological timeline for settlement of the Kihei area however, is still being debated. Based on the results of studies conducted by McDermott and others (2000) and McDermott (2001), habitation in the coastal areas may date as early as A.D. 600-900. Without a doubt, coastal habitation along with more populous inland/upland settlement was firmly established by A. D. 1400-1500. The majority of permanent habitation would have been in the uplands, concentrated in the well-watered and fertile agricultural areas. Coastal permanent habitations were likely less numerous and centered around the ceremonial structures and fish ponds at Kalepolepo that are thought to date to the 1500s (Kolb et al. 1997:66).

Until recently, the few available radiocarbon dates from the Kihei area were consistent in their rather broad, late pre-contact age determinations, most commonly post A.D. 1500 (E. Fredericksen and D. Fredericksen 1995b; W. Fredericksen 1994; D. Fredericksen et al. 1993). This indicates that the more intensive use of the Kihei area was associated with later a pre-contact development that corresponded with the expansion of upland permanent habitation, ceremonial constructions, and agricultural clearing after A.D. 1400-1500 (Kolb et al. 1997:281-282).

Evidence of earlier coastal habitation in the Kihei area, however, has recently come to light at excavations adjacent to the site of the Kalepolepo Church. The recent excavations described by McDermott and others (2000) and McDermott (2001), in conjunction with those of Pepalis and Kolb (2002), provide evidence in the form of charcoal concentrations, midden deposits, 14C dates, and palynomorph identification, that indicates settlement in the vicinity of an inland pond feature as early as c. A. D. 600-900.

The most recent work conducted within the project area consisted of an archaeological inventory survey that was performed in conjunction with this cultural impact assessment. Two historic properties (SIHP 50-50-09-5744 and -5745) and a scatter of cultural materials (CSH-3) of questionable origin and antiquity were documented during the pedestrian survey of the uncultivated portions of the project area. Both the well site (SIHP -5745) and the surface scatter of cultural materials (Temporary Field Number: CSH-3) were located in the easternmost portion of the project area while the historic bridge and flume spans the width of Waiakoa Gulch on the

northern boundary of the project area. In the present project area, evidence of pre-contact habitation and agricultural use were absent. This paucity of pre-contact archaeological sites could be attributed to two factors: 1. that the project area is located in what is known as the transitional/barren zone of the pre-contact settlement and therefore site density was expected to be low; and 2. the lands in and surrounding the current project area have undergone heavy landscape modifications by historic sugar cultivation and ranching operations effectively eliminating surficial pre-contact archaeological sites. Lack of pre-contact Hawaiian historic properties notwithstanding, the inventory survey documented historic plantation-era railroad and water control features and confirmed the history of early plantation modification within the project area. Both historic era properties were likely originally associated with the Kihai Plantation Company and the early sugar venture in the North Kihai area.

4.1 Background Summary and Settlement Pattern

Previous archaeological studies have led to archaeological site interpretation based on the division of the settlement pattern for Maui into three zones: 1. coastal; 2. barren or transitional; and 3. inland (Cordy 1977; Walton 1972; Cox 1976). The coastal zone for this portion of Maui is a ¼ mile wide band running along the shoreline. The inland zone begins approximately five to seven miles from the shore and is characterized by larger rainfall accumulation and lush vegetation. The transitional or barren zone is classified as the area between the edge of the coastal zone and beginning of the inland zone and characterized by brush/scrub vegetation and low annual rainfall accumulation.

Based on available archaeological evidence and interpretations, the following settlement pattern and site type expectability is proposed. Temporary habitations related to marine exploitation, such as stacked-stone enclosures, and possibly smaller ceremonial structures, such as stacked-stone fishing shrines, may have been scattered along the coastline. It is likely that human burials would have been interred in the coastal sand dunes where present and immediately back from the coast. *Mauka-makai* trails would have connected the coastal settlement with the *mauka* permanent habitation and the coastal or *alanui* trails would have connected different coastal habitation areas between Mākēna and Kihai (Kolb et al. 1997:33). The upland area, with a more substantial water supply and good soil, would have sustained a larger population where subsistence would have revolved around dry-land agriculture. High occurrences of agricultural fields and larger structures and cultural deposits representing permanent habitation would be expected. As would be expected in area that are densely populated, larger *heiau* or ceremonial structures would occur in the inland region. Finally, the barren or intermediate zone, where the current project area lies, is broad in this portion of Maui. Inventory surveys of portions of this transitional/barren zone of Waiohuli and Kaono'ulu Ahupua'a have found pre-contact remnants of dispersed, low-intensity, dry-land agricultural features, such as mounds and alignments, as well as temporary habitations (Chaffee et al. 1997; Donham 1990; Miura 1982).

Given that the project area is located in the transitional or barren settlement zone for this area of Maui, it is postulated that pre-contact archaeological sites representing temporary habitation or campsites may have been located within the project area, in addition to mounds and/or small terraces related to small scale agriculture. After further review of the historic literature and the

occurrence of historic agriculture in the immediate vicinity of the project area, historic properties associated with early plantation infrastructure (e.g. water control features and transportation features) as well as ranch activities (e.g. animal husbandry walls or corrals) were also probable.

Section 5 Community Consultations

The following table presents the results of the community consultations that were conducted with columns for name, affiliation, contact information, knowledge of the area and comments.

Table 3. Preliminary Results of Community Consultations

Name	Affiliation	Contacted	Knowledge of Area	Comments
Mr. Charles Maxwell	Kupuna, Chair M/LIBC, President - Hui Malama I Na Kupuna.	Y	-	Declined to comment
Ms. Hökūlani Holt-Padilla	Master Kumu Hula, Maui Arts and Cultural Center - Director of Cultural Programs	Y	Y	Gave comments and background information; see Section 6
Mr. Stan Solamilo	Maui County Cultural Resources Commission	Y	N	No comments. Called to inform that he was passing the information on to people working on the fishpond reconstruction in North Kīhei. Referred to Mr. Kimoko Kapāhulehūa
Mr. Leslie Kuloloio	Kupuna, Hui Alanui O Makana. Councilmember for the M/LIBC	Y	Y	Gave comments see Section 6
Mr. Kimoko Kapulehūa	President of 'Ao'ao O Na Loko I'a O Maui, a non-profit organization overseeing the restoration of Ko'ie Loko o I'a at Kalepolepo, Resident of North Kīhei	Y	Y	Shared comments and background information as well as the contact information for Mrs. Paula Kalanikau, formally interviewed on April 17, 2006, (see Section 6 and Appendix A)

† Key:
 Y=Yes
 N=No
 A=Attempted (at least 3 attempts were made to contact individual, with no response)
 S=Some knowledge of project area
 D=Declined to comment
 U=Unable to contact, i.e., no phone or forwarding address, phone number unknown

Name	Affiliation	Contacted	Knowledge of Area	Comments
Ms. Thelma Shimaoka	Maui Island Community Resources Coordinator, Office of Hawaiian Affairs (OHA)	Y	N	Deferred to Mr. Lance Foster
Mr. Lance Foster	Director of Native Hawaiian Rights, OHA	Y	N	Forwarded information to Mr. Clyde Namu'o.
Mr. Clyde Namu'o	OHA - Administrator	Y	N	Referred to Ms. Thelma Shimaoka; Requested that in if the project moves forward and any significant cultural deposits or human skeletal remains were encountered, that work stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) be contacted per Section 6E-46.6 Hawaii Revised Statutes and Chapter 13-300.
Ms. Sunny Greet	SHPD - Culture and History Branch	N	-	Sent letter of inquiry
Dr. Melissa Kirkendall	SHPD - Maui Island Archaeologist	N	-	Sent letter of inquiry
Ms. Vanessa Medeiros	Department of Hawaiian Homelands	N	-	Sent letter of inquiry
Mr. Kī'ope Raymond	Maui Community College, Hawaiian Studies	N	-	Sent letter of inquiry
	Maui Historical Society	N	-	Sent letter of inquiry
	Central Maui Hawaiian Civic Club	U	-	No forwarding address
Auntie Paula Kalanikau	Kupuna, long-term resident of Kīhei	Y	Y	Formal interview conducted on April 17 (see Section 6 and Appendix A); shared contact information for Mrs. Bonnie Herbert (Akina)
Mrs. Bonnie Herbert (Akina)	Noted family in the Kīhei area	A	-	-
Mrs. Ann Kenolio	Noted family in the Kīhei area	Y	N	Deferred to Ms. Hökūlani Holt-Padilla, shared contact information for Mr. David Kenolio and Mr. Kimoko Kenolio

Interviewee	Residing in the Kīhei area	Residing in the O'ahu area	Residing in the Kīhei area	Residing in the O'ahu area
Mr. David Kenolio	Y	S	Deferred to his cousin Kimo Kenolio.	
Mr. Kimo Kenolio	Y	S	Gave comments and background information; see Section 6	

Section 6 Summaries of Informal and Formal Kama'aina Interviews

6.1 Informal Interviews

6.1.1 Ms. Hokulani Holt-Padilla

An informal telephone interview was conducted with Ms. Holt-Padilla on April 3, 2006. Ms. Holt-Padilla noted that Kīheipūko'a is situated immediately *makai* of the project area near the mouth of Waiahoa Gulch and reaffirmed the importance of this location during the Battle of Kakanīlua as the landing place of Kalaniopu'u and his elite warrior troops. While Ms. Holt-Padilla asserts that the advancement of Kalaniopu'u's troops toward Waiiuku and Iao Valley likely took a more northerly route, by way of Waikapū, it is possible that the troops may have made camp in the area *makai* of and into the westernmost extent of the current project area. During the interview, Ms. Holt-Padilla also pointed out the proximity of Waiahoa Gulch in relation to the current project area and noted that prior to Western-contact and the advent of water diversion to support the historic ranching and agriculture industries, the waters likely flowed with some regularity and supported some form of agriculture and habitation in the lower reaches of the *ahupua'a*. She further states, however, that the history of intensive historic agriculture within the project area would have eliminated any archaeological signature of these activities, in the form of architecture or cultural material deposits, from the landscape.

6.1.2 Mr. Leslie Kuloiolo

Mr. Leslie Kuloiolo was contacted on April 8, 2006. While Mr. Kuloiolo noted that historic properties reflecting pre-contact temporary habitation and *kula* agriculture occurs at elevations similar to the current project area in *ahupua'a* further south (e.g. Keokea Ahupua'a and Kama'ole Ahupua'a), he also noted that if present within the project area during pre-contact times, any remnant of the traditional agricultural activities within the project area would have likely been plowed under or cleared during the intensive historic and modern era cultivation of the project area. When asked about traditional cultural practices within the project area, Mr. Kuloiolo indicated that there were not any extant traditional Hawaiian cultural practices within the project area.

6.1.3 Mr. Kimo Kenolio

Mr. Kimo Kenolio, of the Kenolio Ohana, one of the noted fishing families of Kīhei, was initially contacted by telephone on March 30, 2006. Mr. Kenolio noted that the area *makai* of the project area was primarily inhabited by plantation people and commonly known as Japanese Camp or Kīhei Camp 1. With regards to Native Hawaiian traditional practices, he recalled that the Hawaiian families in the area behind and next to Japanese Camp grew dry-land taro areas and that the Kīhei area in general was noted for fishing, particularly *waka* and *limu* or seaweed collection. As far as the lands that comprise the project area, Mr. Kenolio could not recall any specific traditional practices in the area but felt that anymore development in the Kīhei area would affect the area in general and would like to see the landscape remain as it is.

6.2 Formal Interviews

6.2.1 Mr. Leonard Kimokeo Kapahulehua

Mr. Kimokeo Kapahulehua was born in 1947 on the island of Kaua'i. His first trip to Maui in 1963 was associated with canoe paddling and in 1970 he moved to Maui permanently. Since 1980, Mr. Kapahulehua has been a resident of Kīhei and active with canoe paddling and traditional Hawaiian cultural practices in the South Maui area. As president of 'Ao'ao O Nā Loko I'a O Maui, a non-profit organization overseeing the restoration of Ko'ie Loko o I'a, the fishpond at Kalepolepo, Mr. Kapahulehua is actively involved with fishpond restoration and cultural education. In addition to his work with fishpond restoration, Mr. Kapahulehua has worked with USDA Fish and Wildlife Service to re-vegetate the native plants in Kealia park and the sand dunes in the surrounding vicinity, as well as, the area near Pu'u O Ka'i (see Appendix A for the full text of the interview).

When asked about the traditional Hawaiian cultural practices within the project area, Mr. Kapahulehua mentioned that there is:

Nothing from our time. We don't have real (native) plants up there except the wild plants. You know the *uhaloo*³, the *'ilima*⁴ tree, the *pōpolo*⁵ maybe. Everything *maika* (inland) of the highway, in that area, since the plantation ... pretty much the machine would have wiped out everything. There's really no cultural thing. The only cultural thing about the whole area would be the (location of the project area within the) *ahupua'a*, meaning that the water would have come from *mauka* to *makai* (seaward). There's evidence (of) our water coming from *mauka* to *makai* so you talking about the Waiakoa Stream is right there by Suda Store right?

That would be the only aspect that would have had any cultural significance. As an example, when that stream was flowing naturally, because of its connection to the ocean, we would have *hāhāwa*⁶ you know the freshwater *'ōpīhi* (limpet). We would have, what do they call that, the *'ōpae lōlō*⁷. The *'ōpae lōlō* is *'ōpae* but the *'ōpae lōlō* is the freshwater one but transparent...we would have (had) all of that down there (in the project area).

³ Or *hiāloa*. *Waltheria indica*, common to dry zones. Used as a gargle for sore throat. (Abbott 1992: 101)

⁴ *Sida fallax*. Used in lei making for personal adornment. (Abbott 1992: 127)

⁵ Or glossy nightshade, *Solanum americanum*. Regarded as one of the visible embodiments of the god Kāne. Used for disorders of the respiratory tract, skin eruptions, and cuts.

⁶ *Heritiza gronosa*, common in mid and lower stream sections (Department of Land and Natural Resources, Division of Aquatic Resources 2006)

⁷ *Penaeus merganensis*, brookish-water shrimp or prawn (Pukui and Elbert 1986: 291)

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When asked about the stories and knowledge that the kāpuna shared with him for coastal Pūlehu Nui and how that might tie in to land use within the project area Mr. Kapahulehua indicated the following:

Fishing village. You get all the *'apa papa* (reef), fishing was the main thing for all our south shores. Being that it was calm and everything else down in that area. *Kāpuna* talked about all the fish that they could get in from area.

You know sharing different resources, which was pretty much a flourishing thing for them on the south shore. So our south shores were pretty active. It's not so active now because we don't have all the resources we used to have. But we do have remnants out there (in the ocean) for *lōi*⁸, the *'ima*⁹, the *ha'ike'ike*¹⁰, the *wana*¹¹, the *he'e*¹² ... this one of the best *he'e* grounds. Just recently, about a year ago people started to find the *he'e* stones out in the channels. I guess we getting bigger storms so things are coming out. They found nine of them. You know what I mean? So this is a great *'ōpeli*¹³ ground, *hala'i*¹⁴ ground, today is still a great *'ōpeli* ground if you know where. And it's really easy to do just go out there with your canoe, run your line, *palu* (chum) the water, and they come in and you get a hundred pound *'ōpeli*.

So this is a good *'ō'io*¹⁵ ground. I think one person you should interview is the Akina, because that's their fishing grounds. But I do know that this is a *hala'i* ground, *'ōpeli* ground, *akale*¹⁶ ground, *'ō'io* ground and *he'e*. Of course our south shores would have been the place where they lay their turtle eggs, there's evidence that the turtle used to come lay their eggs over there. Not only the green turtle, but the hawksbill turtle. So I think if anything that would be any cultural connection would be the usage of the south shore by our *kāpuna*.

While overlooking the project area and relating the context of the place or project area to the ahupua'a of Pūlehu Nui Mr. Kapahulehua hypothesized that:

(T)hey (the traditional inhabitants of the area) would have been by Waiakoa Stream but (it wouldn't have been) a big population area. The ocean would have

⁸ *Holothuria* spp, sea slug or sea cucumber (Pukui and Elbert 1986:211)

⁹ *Echinomoria* spp, a small sea-urchin (Pukui and Elbert 1986:100)

¹⁰ *Colobocentrotus atratus*, sea-urchin, teeth were used in medicine (Pukui and Elbert 1986:60)

¹¹ *Echinohirtix diadema* or *Diadema paucispinum*, variety of sea-urchin (Pukui and Elbert 1986:382)

¹² *Polydora* sp., an octopus commonly known as squid (Pukui and Elbert 1986:63)

¹³ *Decaparus pinnulatus* and *D. marinas*, a type of maskarel (Pukui and Elbert 1986:292)

¹⁴ Young skate fish (see footnote 16)

¹⁵ *Albula wikipes*, lady fish or bone fish (Pukui and Elbert 1986:280)

¹⁶ *Trachurpus chrysomphalinus*, big-eye or goggle-eyed scud fish (Pukui and Elbert 1986:16)

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been the area that they would be in. I would think that the *ahupua'a* would be the same with every *ahupua'a*, the Hawaiians call it Ko'olau, the wet area, and this would be the Kona area, the dry area. So being that this was the dry area, you would be restricted to more ocean stuff than you would be on the land stuff.

I can just tell you that it would have been almost minimal stuff on the land, unless they were doing like we talking about sweet potato and things like that. So everything would have been down to the ocean and I don't think the village would have gone so far up (by the project area). Would have been close where they would have to bring the canoes back and forth, the fishing canoes. We have fishing *ko'a*, *heiau*, along the shoreline by the library yeah? By Kīhei library, but we don't have any *ko'a* down here. I'm pretty sure the wind was gnarly enough for them, not to really be a place that they want to spiritually connect with... Maybe before, this would have but not now. (We) don't have any *heiau* over here, we don't have *ahu*, we don't have any village that's standing, if it was, it was before, not now. And the plants that we have is really more this way (wild, indicating the wild plants in fallow fields), because of the plantation, you know the only plants that are growing out here right now is wild plants that is not really their area yeah (introduced species)?

As an example, the next area (*ahupua'a* further south) we have *wiliwili*¹⁷ forest yeah? We have no *wiliwili* forest here and the only other thing that we would have up here would be *naio*¹⁸ but we don't have any *naio* here, *akoko*¹⁹, no more, no more *nehe*²⁰ *āwīkīwīkī*²¹, if we have, we have only wild ones. I wish there was a village ... and I'm pretty sure at one time was but as far as today, if there was an impact and as far as usage, we don't use it for sweet potato, we don't use it for *kalo* (taro), we don't use it for banana, we don't use it for breadfruit. It's not that we didn't have the opportunity, there's evidence (that those things could have grown), get banana trees over there (in the truck crop area).

While driving up to and returning from the project area Mr. Kapahulehua reiterated that while development of the area would not directly impact traditional Hawaiian cultural practices within the project area, he did express some concern over increased run-off into Waiakoia Gulch and the potential negative effects that it may have on the coastal fishing grounds.

¹⁷ *Erythrina sandwicensis*, a native leguminous tree (Pukui and Elbert 1986:335), charcoal from the branches were used for making paint for canoes, the branches themselves were used for the 'iako or booms of the outrigger canoe (Abbott 1992: 81-82); seeds of the *wiliwili* were used for *lei* making (Abbott 1992:125); traditional Hawaiian long boards (*ole*) were also cut from lighwood *wiliwili* (Abbott 1992:129)

¹⁸ *Mycoporum sandwicense*, sandalwood tree (Pukui and Elbert 1986:259), large branches or munks were used for *hale* (house) posts while smaller diameter branches were used for thatching poles (Abbott 1992:67)

¹⁹ *Euphorbia* spp., an endemic shrub and tree chewed for debility (Pukui and Elbert 1986:15)

²⁰ *Lipochearta* spp., native shrub and herb in the daisy family (Pukui and Elbert 1986:264)

²¹ *Canavalia galeata*, vines were used for temporary fish traps (Abbott 1992:84, 139)

6.2.2 Mrs. Paula Kalanikau

Originally from the island of Hawai'i, Mrs. Kalanikau moved to the Kīhei area in 1965 and built her home with her husband on lands that were inherited from her father-in-law and known as the Kalanikau Estates. During this time period, Mrs. Kalanikau worked for the post office part-time and for Suda Store (near the traditional place known as Kīheipūko'a at the mouth of Waiakoia Gulch) part-time while taking care of her family. Her husband, Moki Kalanikau was a founding member of Kīhei Canoe Club in 1973.

Ms. Kalanikau noted that the Kīhei area in general was a dry and barren place:

This was all *kīawes*²² around us, all *kīawes*, across was all *kīawes*, over there all *kīawes*, ... there was nobody! And well I take it this, the corner on my left side here, the Souzas were living here yeah, the *mauka* side (toward the mountain) over there where there's the subdivision now, the Vares' were there, but the Vares' house was built far back where I don't see anybody except the yard. The Souza was fenced in with bushes where I they can't see me or I can't see them. And all of these houses never existed ... all *kīawes*, up until the (present Pī'ilani) highway, even *mauka*.

Although the area was dry, Mrs. Kalanikau did mention that garden agriculture was successful in this arid region:

(My) parents would come over from the Big Island and help us with the 'āina you know *mai'i 'ai* (farming) planting in the back and stuff. We had 'uala, potato, sweet potato, we have *mar'i'a* so we have banana and Daddy had some herbal medicine back there which he told me not to remove and I still have only one, it's the *uhāloa*²³, but the rest, I think with the years gone, and with the different terrain, the weather, I had a hard time maintaining some of them.

When asked about the traditional cultural practices of the area, Mrs. Kalanikau stated:

When I came here in '65 I didn't know too many people except the Akina's, yeah the Akina's were practicing the fishing traditions and charcoal. Do you remember before, that's why now...no more *kīawes no ho'i* but before Francis, brother Francis, he was working the charcoal business before.

Mrs. Kalanikau went on to describe how every now and then the fishermen would get together and *hukūlau* (or do communal fishing with *lau* or ropes) in front of Suda Store, as well as describe the mango farms of the Hashimoto family and the cucumber and tomato farm of the Managan family in the area of the Tesoro gas station off of Pī'ilani Highway an Ohukai Road. During a brief field visit to the project area Ms. Kalanikau remarked on how the soil looked like it was a good place for agriculture. When conducting the interview follow up, Mrs. Kalanikau

²² *Prosopis pallida*, invasive tree species native to Peru (Pukui and Elbert 1986:146)

²³ *Oryzias*, *Waltheria indica*, common to dry zones. Used as a gangle for sore throat. (Abbott 1992: 101)

mentioned that up until the mid-1970's Waiakoa Gulch would flood intermittently during the seasonal southern exposure storms and expressed some concern for safety and flood control.

Section 7 Traditional Cultural Landscape of Pūlehu Nui Ahupua'a and the Project Area

Discussions of specific aspects of traditional Hawaiian culture as they may relate to the project area are presented below. The concluding discussion examines past and present resources and practices that were identified within the project area in the broader context of the encompassing Pūlehu Nui Ahupua'a landscape.

7.1 Hawaiian Trails

Trails served to connect the various settlements within and between the *ahupua'a* and districts of the Hawaiian Islands in traditional times. While Land Commission Award and Boundary Commission testimony referred to Pohaki'iki'i, a resting rock for travelers, on the boundary of Pūlehu Nui and Waikapu, no trails were noted on the historic maps of the *ahupua'a* or *mo'ka*. Although Ms. Hoi-Padilla also indicated that there would have traditionally been overland foot trails connecting the coastal reaches to the *mauka* elevations of the *ahupua'a*, none of the interviewees mentioned or knew of any trails or access right-of-ways within the current project area.

7.2 Hawaiian Habitation and Agriculture

The current project area is situated along the southern edge of Waiakoa Gulch, in what is considered the transitional area between the *mauka* and *makai* settlement areas. Ms. Hoi-Padilla, Mr. Kapanulehua, and Mrs. Kalamikau hypothesize that due to the proximity of the lands within the project area to Waiakoa gulch, there may have been some traditional dry-land agriculture along with temporary habitation during the pre-contact or traditional times. Mr. Kenolio also confirmed that dry-land taro was cultivated by Hawaiians at or near the boundary of the coastal and transitional settlement zones. Traditional agricultural pursuits within the project area would have likely focused on *'uala* or sweet potato cultivation, a well-known crop staple of the Kona environment of Maui, as well as dry-land taro. With the exception of modern truck crop cultivation in the center of project area, none of the interviewees or persons consulted knew of any traditional agricultural practices being conducted within the project area.

7.3 Gathering for Plant Resources

While the soils and seasonal rainfall in the area may have supported traditionally used plants such as *uhala*, *wili wili*, *i'ima*, and *pōpōlo* prior to Western contact and into the early historic period, the lands of the project area have been heavily modified by historic sugar cultivation and modern seed corn and truck crop cultivation. Currently, wild patches of *uhala* and *i'ima* were noted within the project area, however, none of those interviewed for the current study knew of any existing gathering practices within the project area.

7.4 Aquatic Resources

Native stream animals supplied the Hawaiian diet with a rich source of protein. While Mr. Kanapulehua noted that Waiahoa Stream may have supported freshwater riverine resources such as *kahawai* or *ʻopae ʻiʻi* during traditional times, historic and modern water diversion for sugar cultivation and upland ranching and agriculture have since altered the regular flow of this stream. There are currently no concerns for accessing these types of resources through the project area as the stream no longer flows at regular intervals. Modern traditional use of marine aquatic resources are focused along the coastline and near shore areas of the *ahupuaʻa* (see Appendix A) and access to these resources through the project area is not required.

7.5 Traditional Hawaiian Archaeological Sites

Historical documentation and archaeological study have not identified any traditional Hawaiian archaeological sites within the project area. While an archaeological inventory survey conducted by Cultural Surveys Hawaii'i (Lee-Greig and Hammat, 2006) identified historic properties associated with historic sugar cane agriculture, the study also confirmed the absence of any historic properties related to traditional Hawaiian culture within the project area. None of community contacts were aware of any traditional sites within the project area.

7.6 Burials

No specific documentation was found regarding *iwi* (ancestral remains) in the project area. None of community contacts were aware of known burials in the project area.

7.7 Native Hawaiian Hunting Practices

While there is a passing reference to plover snaring during the *kamaʻaina* testimony regarding the western boundary of Pūlehu Nui Ahupuaʻa following the Mahele (McCully J Court Opinion in Sterling 1998: 256), no specific native Hawaiian hunting practices were identified within the project area in the historic documentation, archaeological investigations, or by community consultants.

7.8 *Wahi pana* (Storyed Places)

No storied places have been identified within or immediately adjacent to the present project area.

7.9 The Project Area within the Context of Pūlehu Nui Ahupuaʻa

The arrangement of a typical Hawaiian *ahupuaʻa* extended from the coastline to the upland forest areas. Depending on the location within this broad *makai* to *mauika* context, a wide variety of cultural practices and resources within the *ahupuaʻa* could be found. The central idea behind the *makai* to *mauika* configuration was to take advantage of the variety resources within that land division. Such resources and rights would include marine resources and fishing rights in the coastal area, arable lands for crop cultivation, as well as, water and timber rights in the planting zones, and valuable bird catching privileges at the higher elevations (Handy et al. 1991:48, see

also Section 4.1 Background Summary and Settlement Pattern). Based on the land commission award distribution in the *mauika* section of the *ahupuaʻa* and the dispute resolution in the matter of the western most boundary of the *ahupuaʻa*, it is apparent that Pūlehu Nui likely functioned as an *ahupuaʻa* in the typical traditional sense.

The current project area is situated along the southern edge of Waiahoa Gulch, in what is considered the transitional area between the *mauika* and *makai* settlement areas. Based on the settlement pattern in adjacent *ahupuaʻa* and the knowledge shared by those interviewed and consulted during the course of this study, it appears that project area may have sustained a small, seasonal population during traditional Hawaiian times. The waters of Waiahoa Stream and Gulch, although only seasonally available, may have supported some freshwater aquatic resources as well as limited agriculture during the rain seasons. As a whole, however, the primary resources would have come from the abundant marine resources of the coastal reaches, as well as, agricultural crops from the *mauika* region of the *ahupuaʻa*.

Section 8 Summary and Recommendations

Reviewing the information provided in the historic literature, archaeological research and knowledge shared by the community contacts, a picture of the traditional landscape of Pūlehu Nui Ahupua'a and the present project area emerges. Native testimony and Land Commission Award records indicate that Pūlehu Nui Ahupua'a was well populated in both the upper elevations and coastal reaches where subsistence and traditional practices thrived on agricultural pursuits and marine resource exploitation respectively. The location of the project area within Pūlehu Nui Ahupua'a is situated within the transitional zone between the intensively used *mauka* and *makai* areas. Inventory surveys of portions of this transitional zone in adjacent *ahupua'a* have identified pre-contact remnants of dispersed, low-intensity, dry-land agricultural features, such as mounds and alignments, as well as temporary habitations (Chaffee et al. 1997; Donham 1990a; Miura 1982) indicating some traditional land use as described by individuals consulted for this study and summarized in Sections 7.2 and 7.9.

By the early 1900's, however, the lands of the central isthmus of Maui and lower elevations of Pūlehu Nui Ahupua'a, including the lands that comprise the project area, had been placed in sugar cultivation. The modifications made to the landscape in order to facilitate successful sugar cultivation would have effectively eradicated any surface evidence of traditional agriculture and/or habitation in the area. None of the community contacts queried for this assessment identified any cultural sites within the project area, or recalled anyone entering the project area for any traditional cultural practice. Based on the evidence gathered, there are presently no existing cultural practices occurring within the immediate vicinity of the project area or requiring transit through the current project area.

8.1 Project Recommendation

Based on the information gathered during this assessment, residential expansion into the lands comprising the project area will have minimal impact upon Native Hawaiian cultural resources within the immediate vicinity. It should be noted however, that there are both traditional cultural concerns as well as safety concerns regarding Waiakoa Gulch. Periodic flooding of the gulch was mentioned by Mrs. Katalanikau as a safety and drainage control concern. Additional concern was raised over the potential for increased run-off from the development into the gulch and the potential negative affect that any increased sedimentation and/or water run-off might have on the coastal and off-shore fishing grounds. The impacts of such run-off on the marine resources and fishing practices are unknown at the moment and may require further study or environmental monitoring. While the history of land modification within the current project area following Western contact is well documented, the probability for subsurface cultural deposits and human burials within the project area should not be underestimated. If the any significant cultural deposits or human skeletal remains are encountered, the State Historic Preservation Division (SHPD/DENR) should be contacted in accordance with Section 65-46.6 Hawaii Revised Statutes and Chapter 13-300.

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Appendix A Kama'aina Interviews

MR. LEONARD KIMOKEO KAPAHULEHUA 2
 MRS. PAULA KALANIKAU 11

Mr. Leonard Kimokeo Kapahulehua

Maui Coffee Works and Hale Pihiani Park
 April 2006

Mr. Kapahulehua was interviewed on the morning of April 19, 2006 at the Maui Coffee Works coffee shop and continued at the Hale Pihiani Park overlooking the proposed project area. Text in italics indicate the interviewer, Tanya L. Lee-Greig of Cultural Surveys Hawaii I, Inc. (CSH), while plain text indicates Mr. Kapahulehua.

So the first thing is...if you can state your name?

My name is Leonard Kimokeo Kapahulehua, I'm a resident of several places but at the moment I'm a resident of South Maui Kīhei, at 938 South Kīhei Road, Apartment 281 and that's known as Village by the Sea.

Okay, and about when were you born?

I was born too long ago! I was born in the year 1947, December 15th, born on the island of Kaua'i.

What brought you to Maui and when?

My first trip to Maui was like in 1963, we came over here to *holoholo* (travel) with canoe racing ... Big Island. And we really came here to *holoholo* for go surfing! That was my first trip. My residence-ship took over here in 1970 and I came here to work for a company called Pascual Grayline which company (that) I worked for and that bought it out called Inter-Island Resorts. So I came here to work as a residence manager for what was called Pascual Grayline, now called Grayline Maui, owned by Inter-island Resorts. So transportation brought me here.

So did you move to South Maui....

No, I was in South Maui since 1980. I lived in Kahului.

Were you always involved with the Hawaiian Cultural Traditions of Maui?

I was more involved in the Hawaiian cultural things because of my paddling of the canoe yeah? My first canoe club on this island was in 1974 which was Na Kai Ewalu in Kahului. And then in 1980 I moved down here and paddled for Kīhei Canoe Club. I also paddled for ... the club at that time was called Malama 'Ula and now called Wailea Canoe Club. I paddled for them for about two years and then went back to Kīhei and have been with Kīhei Canoe Club since then. So...I think you might say the cultural connection came from the Hawaiian sport of canoeing and talking to the *kāpuna* (elders). I think canoeing...but I used to canoe already on Kaua'i, Numa'u River we canoe, Kaua'i Canoe Racing Association, so you know, if we talk about culture, so I think it just started with all canoe paddling and things like that. But in South Maui, pretty active from the last, I should say, the last 15 years, I've been active in Maui, in South Maui with Hawaiian culture ... more Hawaiian culture development, yeah? You know that I'm the President of Ko'ie Loko o I'a which is the fishpond and our associate 'Ao'ao o Nā Loko I'a O Maui. Took us ten years to get our permit. You know what I mean...I don't know if you've seen

the fishpond lately but we're well on our way. We just were down there this morning, the man who's building it is from Lahaina, from Kaula'ula. You know Ke'eamoku guys.

Oh...okay, yeah!

Ke'eamoku is building it with his men. And prior to that...you know where Kealia pond is at? We, in 1997-96, somewhere around there, almost ten years ago, we started to work with USDA Fish and Wildlife to revegetate the native plants in the park and also the sand dunes and everything else.

Over by the boardwalk?

Yeah.

What about the fishponds...you can kind of see them from the air? When you fly in?

Which fishponds? Kealia?

Kealia fishponds.

Kealia fishpond was basically, I think was the County of Maui, when Governor Lingie was in office ... with the county, when she was the mayor. They made an aquaculture farm. So that was an aquaculture farm, some kind of economic sustainable opportunity for people on Maui. That was a county deal.

Oh...okay.

Kealia's regular pond, you have there, I think it's just wetlands. It wasn't a managed inlet fishponds for the native Hawaiians.

It wasn't?

It wasn't. It was ... it was just wetlands. We don't have any walls. It doesn't show any ... I don't know any history about, I think it was called Kealia Ponds for that reason. When USDA Fish and Wildlife took over and called it so. But as far as a fishpond, as far as a brackish water fishpond or freshwater fishpond... I don't think there was a pond that was used. We have other ponds ... Kalepolepo Pond called Ko'ie'o Loko 'Ia, and right next is Ka'ono'ulu Pond and right next is Waiohuli Pond and in the South shore we have all the ponds that go down to Makena and La Perouse Bay. There wasn't a pond there (Kealia) that was really established for the *ali'i* (chieftly class).

Oh okay...so the traditional fishponds pretty much starts...

Starts from Ka'ono'ulu ... you know Ka'ono'ulu Road? Yeah from Ka'ono'ulu

So the area that we're looking at for this proposed project...what they're doing is they're gonna...

Where is the proposed project at?

You know where the Hale Pi'ilani Subdivision...and we'll go there in a little bit so you can see... Hale Pi'ilani ... is that across the highway?

Across the ... mauka of the highway...

Mauka of the highway

And then there's the Lipoa ... not Lipoa ... the apartment buildings, Kihei Villages makai, so this new project area is mauka of the highway, right next to the Hale Pi'ilani.

Oh, okay the Trojan Seed Farm.

Yeah the Trojan Seed Farm.

Used to be Trojan Seed Farm, now it's Monsanto. So Monsanto moving out of there right? There going down, down here by Welakahao. I think most of the acreage is up here now.

So eventually, yeah...so A&B is expanding ... looking into expanding that residential area into the former corn land between...up to Waiakoa Gulch...that gulch that comes down and across by...

Waiakoa, I know where Waiakoa Road is, so you're talking from the industrial area..

Yeah...

The kind of like temporary industrial area, you know where the dog pound stay? The animal shelter...

Yeah...

There's the traffic light there...so is it from there all the way back down or more up?

No...no further down...like from the park...the top of Hale Pi'ilani Subdivision there's a park...so if you shoot a straight line across from that ... and down and maybe 80-acres up above that...from there all the way down so it's not a big expansion...like Maui Lani.

You've been to the pig farm over there in the back? You know where Hawaiian Cement is? From there?

No...maybe...we'll take a look and you'll have a better idea.

Yeah, we'll go and look.

Do you know of any traditions that might have been in the area? It's in that sort of scrubland area.

You know if there was any sort of traditional thing...it's all scraped off yeah? Cause it's been put into farm land yeah...for a while. There's none that we know of and I don't know if you guys found any archaeological ...

All historic stuff associated with plantation

Yeah, nothing from our time. No, we don't have no real plants up there except the wild plants. You know the *uhaloa*²⁴, the *'i'ima*²⁵ tree, the *pōpolo*²⁶ maybe. There's no, if there was any traditional stuff, we would have been on it. Everything *mauka* (inland) of the highway, in that area, since the plantation went use so much sugar cane and everything...pretty much the machine would have wiped out everything. There's no really any cultural thing. The only cultural thing about the whole area would be the *āhupua'a* and meaning that the water would have come from *mauka* to *makai* (seaward). There's evidence about our water coming from *mauka* to *makai* so you talking the Waiahoa Stream is right there by Suda Store right?

Right, right...

Right? So that would be the only aspect that we would have you know, have any cultural significance. As an example, when that stream was flowing naturally, because of its connection to the ocean, we would have umm our *hiihiiwai*²⁷, you know the freshwater *'ōpīhi* (fimpet). We would have, what do they call that, the *'ōpae lāiō*²⁸. You know what is *'ōpae lāiō*?

Is that the freshwater...

The *'ōpae lāiō* is *'ōpae* but the *'ōpae lāiō* is the freshwater one but transparent...we would have all of that down there.

Is that the ones that they find in the lo'i (taro patches) and in the awai (irrigation ditches) and all that?

Yeah.

Oh okay...

So that's...but there's none of them around, none of them living. And if there was any sustainable villages on the way up, *hale* (homes), and all that they would have been close to the

²⁴ *O'hia-koa*, *Waltheria indica*, common to dry zones. Used as a gargle for sore throat. (Abbott 1992: 101)

²⁵ *Sida fallax*. Used in lei making for personal adornment. (Abbott 1992: 127)

²⁶ Or glossy nightshade, *Solanum americanum*. Regarded as one of the visible embodiments of the god Kane. Used for disorders of the respiratory tract, skin eruptions, and cuts.

²⁷ *Neritina granosa*, common in mid and lower stream sections (Department of Land and Natural Resources, Division of Aquatic Resources 2006)

²⁸ *Penaeus marginatus*, brackish-water shrimp or prawn (Pukui and Elbert 1986: 291)

Waiahoa Stream, but there's nothing. There's no remnants of umm for us to date...it's pretty much wiped out. The only evidence that we know that there were people living across it because of the fishpond that all the *po'haku* (stones) came from this Ka'ono'u Stream. We didn't get...the Waiahoa Stream wasn't big enough, and where our pond is, it's too far to carry the rock. So the Ka'ono'u Stream is right there by us, so we just went there right in the stream to get the rocks.

So they used the cobbles and rocks from Ka'ono'u and ...

Right, right. But there's no really any significant thing because you know you going from Great Mahele days which is 1841 right? To the take over of 1893, so once they start farming...everything that was in there. I couldn't give you any cultural usage or background ... but just what physically not shown but what would be in ancient times...there's no evidence of that. So it would be the same as the *āhupua'a* system. They could've grown *kalo* (taro) but this area wasn't, not necessarily for *kalo*, was more sweet potato. Where the fishpond is was a place called Halstead Building ... you know the house?

The Koa House?

The Koa House. That was pretty much bringing the sweet potato there, we were already in the commercial world, you know. I couldn't share with you anything or know of anything there (the project area) like I would be able to share with of places like Pu'u o Kali or Honua'ula or Kamaio or Kahikinui. We take, if we put them on a chart like all the villages that we have at Kahikinui and all the remnants of our villages. I wouldn't be able to place that over there (the project area) because it's totally wiped out.

It's been so long you think? What do you think? Just from your conversations maybe with the kīpuna of the area, of the Khei area, what do you think the population of the coastal part of Pālehu Nui would have been like?

Fishing village. You get all the *'apa papa* (reef), fishing was the main thing for all our south shores. Being that it was calm and everything else down in that area. *Kīpuna* talked about all the fish that they could get in from area. Anything was more shoreline, versus up the mountain area. If anything was passing by you know. The base that was pretty secure. I think *kīpuna* connection before was Kaho'olawe and always Kaho'olawe was a part of the Maui Nui connection yeah? And Kaho'olawe was apart of the *āhupua'a* of Maui, you know it speaks about Kaho'olawe as a part of the *āhupua'a*. So if anything, *kīpuna* was addressing about the canoes going back and forth, the fishing boats going back and forth, and if anything it would be the other rest they talk about trading from one side of the island to the other side. You know sharing different resources, that was pretty much a flourishing thing for them on the south shore. So our south shores was pretty active, it's not so active now because we don't have all the resources we used to have. But we do have remnants out there (in the ocean) for *loli*²⁹ the *'ima*³⁰ the *ha'ike ike*³¹, the *wana*³²,

²⁹ *Holoithria* spp. sea slug or sea cucumber (Pukui and Elbert 1986:211)

³⁰ *Echinomys* spp. a small sea-urchin (Pukui and Elbert 1986:100)

³¹ *Colobocentrotus atratus*, sea-urchin, teeth were used in medicine (Pukui and Elbert 1986:60)

the *he e*³³, this one of the best *he e* grounds. So, just recently umm, about a year ago people started to find the *he e* stones out in the channels. I guess we getting bigger storms so things are coming out. They found nine of them.

Wow!

You know what I mean? So this is a great *ōpele*³⁴ ground, *halaiā*³⁵ ground, today is still a great *ōpele* ground if you know where fo' go get 'em. And it's really easy to do just go out there with your canoes, run your line, *pālu* (chum) the water, and they come in and you get a hundred pound, hundred pound *ōpele*.

Still?

Yeah, still. So this is a good *ō'io*³⁶ ground. I think one person you should interview is the Akina, because that's their fishing grounds. But I do know that this is a *halaiā* ground, *ōpele* ground, *akule*³⁷ ground, *ō'io* ground and *he e*. Of course our south shores would have been the place where they lay their turtle eggs, there's evidence that the turtle used to come lay their eggs over there. Especially ... not only the green turtle, but the hawksbill turtle. So I think if anything that would be any cultural connection would be the usage of the south shore by our *kāpuna*. As you get further down this way ... where's Pūiehu Iki...

I don't think ... does Pūiehu Iki come all the way down to the shore?

Anyway, right over here is Pu'u o Kali? Where umm, the fencing area for the native plants. Have you been over there yet?

No, no

Pu'u o Kali have *koai a*³⁸ You know what is *koai a*?

No..

Koai a is a *koa*³⁹.

Oh, okay

So that's a *koa* tree that they use for the fishing. So at 1900' elevation or right around above *mauka*, the *Koai a* used to grow here. So that was one of the trees that they used for the canoe,

³³ *Echinothrix diadema* or *Diadema paucispinum*, variety of sea-urchin (Pukui and Elbert 1986:382)

³⁴ *Polypus* sp., an octopus commonly known as squid (Pukui and Elbert 1986:63)

³⁵ *Decapterus pinnulatus* and *D. maruadesi*, a type of makoere! (Pukui and Elbert 1986:292)

³⁶ Young *abaie* fish (see footnote 37)

³⁷ *Aribala vulpex*, lady fish or bone fish (Pukui and Elbert 1986:280)

³⁸ *Trachiroys erumenophthalmus*, big-eyed or goggle-eyed scad fish (Pukui and Elbert 1986:16)

³⁹ *Acacia koa*, like the *koa* only smaller, used for spears, fancy paddles, and tapa beater (Pukui and Elbert 1986:157)

⁴⁰ *Acacia koa*, largest of the native forest trees (Pukui and Elbert 1986:156)

for the fishhooks and everything else. So I think physical evidence of ... being available, on the property that you talking about, there's no physical evidence. Evidence of what was on the land before, is all what they have in the books or what the Hawaiians would have done then if there was nobody around. They had the freshwater coming from Waiaikoa Stream so they had the prawns. So with that freshwater they could have possibly had *kalo* but there's no real evidence *kalo* was growing down this area it was always sweet potato. They have a sugarcane called Honolua so they come from the shoreline, which would have been what I told you ... the *ōpiti*, the food came from the shoreline, *limu 'ele 'ele*⁴¹...all the different seaweeds would have been there. *pūpū'awa*⁴² the *limu kohu'i*, *limu 'ele 'ele*... Now it's been taken over by the invasive plants. You know what I mean. So there style of living would have been really harsh because of the hot, hot weather. Windy, you know what I mean? And not having so much water all year-round, they had to get the water from either the stream, or up *mauka*. But as you get further on this side, (toward Ka'ono'ulu) then would get more rain. I ... that was pretty much would have been (harsh) in that area.

Do you think that the stream used to flow year-round? Or maybe just certain times of the year...that particular one (Waiaikoa)?

I think all our streams flowed all-year round, Maui streams flowed all year-round, and it wouldn't have...I take it back, because there are some streams, like Ka'ono'ulu, never flowed all year-round. It could have stopped, but it wouldn't be that much long of a stop because this mountain (Haleakalā) can produce a couple hundred inches. Then we didn't have a diversion from all this place. So it could be, my thought is that it flowed all year round.

You want to take a drive up to the project area? I'll show it to you...

So this land really was flat and wasn't hilly (from all of the plantation related earth moving) So, and as you can see, it was dry...they would have been by Waiaikoa Stream but it wasn't a big population area. A lot of the population you find evidence (in audible). The ocean would have been the area that they would be in. Without ... to my knowledge, I would think that the *ahupua'a* would be the same with every *ahupua'a*, the usage of the land would have been, the Hawaiians call it Ko'olau, the wet area, and this would be the Kona area, the dry area. So being that this was the dry area, you would be restricted to more ocean stuff than you would be on the land stuff.

On the mauka side?

On the *mauka* side, you know like Hana, Keanae, they just flourishing with *kalo* yeah? So I think the water would have come down, but the water was nothing like the rain water that they would have on that side. Plus our water is so far from Haleakala, it wasn't a stream that was huge yeah? So, you know, being from Kaua'i we get rivers yeah? Waimea River, Hanapepe River, Waiaha

⁴⁰ *Drupa ficinas* or *Purpurea aperia*, literally "bitter shell" (Pukui and Elbert 1986:35)

⁴¹ *Asparagopsis naziformis*, small seaweed with densely branched tan, pink, or dark red furry tops, also *limu kōko* (Pukui and Elbert 1986:20)

⁴² *Euteromorpha prolifera*, long, filamentous, green edible seaweed (Pukui and Elbert 1986:40)

River, Wainiha River, Hanalei, you know we get streams that 'o'opu⁴³ and everything flourishes. I can just tell you that it would have been almost minimal stuff on the land, unless they were doing like we talking about sweet potato and things like that. So everything would have been down to the ocean and I don't think the village would have gone so far up (by the project area). Would have been close where they would have to bring the canoes back and forth, the fishing canoes. We have fishing *ko'a*, *heiau*, along the shoreline by the library yeah? By Kūhei library, but we don't have any *ko'a* down here. I'm pretty sure the wind was greatly enough for them, not to really be a place that they want to spiritually connect with...close to Ma'alaea would be in the corner yeah? They would have been connected in that area. As we get closer to Ma'alaea would have been a big difference with the stream from Lao Valley. We don't have Lao Valley or we don't have rain from Makawao Rainforest that do that yeah?

So this is kind of like what the name implies? Pūlehu Nui. Just kind of a big What's that?

The name of the ahupua'a is Pūlehu Nui?

Well you know Pūlehu, lehu is the shell is the shell you have in your deal (on the CSH logo, Cypraea spp.) the pū is the shell. So that name is really of the shoreline name yeah?

So it isn't...

It resembles the Pūlehu Nui is about more like the shoreline name yeah?

Oh, okay, as opposed to it being like how people have interpreted it before as it being kind of a dry, baked area?

It could be the same thing you know? I think that ... well this is definitely dry and the ground is hard yeah?

So as far as impact, residential development like you said before.

No, they not gonna impact anything culturally. That we have here.

Here, in particular (present time)

Maybe before, this would have but not now. There's no, we don't have any heiau over here, we don't have no ahua, we don't have any village that's standing, if it was, it was before, not now. And the plants that we have is really more this way (wild, indicating the wild plants in fallow fields), because of the plantation, you know the only plants that are growing out here right now is wild plants that is not really their area yeah (introduced species)?

Oh, ok...

⁴³ General name for fish included in the families *Eleotridae*, *Gobiidae*, and *Blenniidae*. Some are near shore species and others are freshwater species (Pukui and Elbert 1986:290).

As an example, the next area we have *wiliwili*⁴⁴ forest yeah? We have no *wiliwili* forest here and the only other thing that we would have up here would be *nai'a*⁴⁵, but we don't have any *nai'a* here, *'akoko*⁴⁶, no more, no more *nehe*⁴⁷, *'āwīkīkī*⁴⁸, if we have, we have only wild ones with the machine. Look like the Filipino's making gardens back here (reference to the truck farming)

Yeah this is all truck crop area, they lease this particular spot for truck crops. I guess for small farmers and then Monsanto is down, and then up there is just pasture.

My interpretation was (the place name of Pūlehu Nui) the *lehu* shell that's out here, the big *lehu* shell that they use for the squid.

That's common in the waters just of this shoreline?

Common, common. Versus, dry-land but I'll get it to you. I don't think so. I wish there was, I wish there was a *heiau* (temples), I wish there was an *ahua* (shrines), I wish there was a village ... and I'm pretty sure at one time was but as far as today, if there was an impact and as far as usage, we don't use it for sweet potato, we don't use it for *kalo* (taro), we don't use it for banana, we don't use it for breadfruit. It not that we didn't have the opportunity, there's evidence, get banana trees over there so must be from these Filipinos over here. I wish I had some canoe *hale* (homes) or *hale pe'a* (menstrual hut) or any *hale* to tell you about for an *ahupua'a*.

Thank you so much for taking time out of your day, for coming to talk to me...

'A'ole piilikial. (No problem!)

⁴⁴ *Erythrina sandwicensis*, a native leguminous tree (Pukui and Elbert 1986:385), charcoal from the branches were used for making paint for canoes, the branches themselves were used for the 'iako or booms of the outrigger canoe (Abbott 1992: 81-82); seeds of the *wiliwili* were used for lei making (Abbott 1992:125); traditional Hawaiian long boards (*olo*) were also cut from lighthouse *wiliwili* (Abbott 1992:129)

⁴⁵ *Myoporum sandwicense*, sandalwood tree (Pukui and Elbert 1986:259), large branches or trunks were used for *hale* (house) posts while smaller diameter branches were used for thatching poles (Abbott 1992:67)

⁴⁶ *Euphorbia* spp., an endemic shrub and tree chewed for debility (Pukui and Elbert 1986:15)

⁴⁷ *Lipochaeris* spp, native shrub and herb in the daisy family (Pukui and Elbert 1986:264)

⁴⁸ *Canavalia garletta*, vines were used for temporary fish traps (Abbott 1992:84, 139)

Mrs. Paula Kalamikau Kenolio Road and Hale Piliiani Park April 2006

Mrs. Kalamikau was interviewed on the morning of April 19, 2006 at both her home in Kihai and at the Hale Piliiani Park overlooking the proposed project area. Text in italics indicates the interviewer, Tanya L. Lee-Greig of Cultural Surveys Hawaii i, Inc. (CSH), while plain text indicates Mrs. Kalamikau.

Tanya, my maiden name is ... Paula Kapela Travis, Paula Kapela Kalamikau is my married name. I come from the Big Island, I'm from a small town called Kahe and it's currently known by the more modern children as Kukaia and it's in the Hamakua coast, very close, not too far from Waimea and Honoka'a. It's a beautiful country, we grew up there. What I miss most of all today is, as little children we have a farm lot there that was recently sold after being in the family for many years by great-grandparents. But no one want to go back there, *po'ho* (lost) yeah? *Miamina* (too bad) though, everybody moved away, *mo'opuna* don't want to go there. With the Hawaiian Homes available today everybody have their own life, they select to go. But the good thing about them and I always keep that in my memory and I share this with my kids, there was a pond there, and still is, we called it gulch but it's a river too. Like Keanae and Hana we used to go clean the pond, there was a pond there. Had the 'o'opu'⁴⁹ and 'opae'⁵⁰ and only when we finish our responsibilities with the farm and at home, that we get a privilege to go up there and swim and pick our *mea'ai* (food) whether it's rice or whatever and *kaukau'* (eat) and then spend some time and come home. I miss that, I miss that, because it's not prevalent like before. The place, the river itself has been diverted by the plantation, it's been ruined by the plantation, there is no river there now. Well ... if it is a river, it's a gulch where there's a lot of obstruction, rubbish from the plantation and it's to my dismay the DLNR really should be taking care of things like that, it's the *'aina* (land), it's the natural stuff there. The *'opae* the 'o'opu, but as the years go by we lose that and I hope that doesn't happen to Hana and Keanae. But anyway, as I grew up, I attend my parents could not afford sending all seven of us to high school, so being the youngest of seven children, youngest of the girls because there was one boy below me ... I went to Hilo High School and worked my way through high school. I lived in with a telephone company manager and his wife, Mr. and Mrs. Smiddy, and two kids and my expectation from them was to help with the household, help take care of the *kamali'i* (children), I prepared meals, help clean the house, part-time housekeeper for my keep there and at that time, that was in the '50's Tanya, I was paid \$20 a month.

Oh my gosh \$20! Was that decent then?

Umm yeah, I guess, it wasn't the best bust free room and board is better than nothing. Weekends off. You know amazing, even then in the '50's you become more frugal um well you become

⁴⁹ General name for fish included in the families *Eleotridae*, *Gobiidae*, and *Bleenniidae*. Some are near shore species and others are freshwater species (Pukui and Elbert 1986:290).

⁵⁰ General name for shrimp (Pukui and Elbert 1986:291)

⁵¹ "*Kaukau'*" is the Hawaiian Creole or pidgin word meaning "food" or "to eat." The two theories on the origin of the word "*kaukau'*" are the Hawaiian word for table, *paikaukau*, and the Chinese word for food, *chow chow*. (<http://www.haleonahale.com/index.htm>)

careful in your spending and you just have to make do with what you have and that's what I did and most of the time, you know, you have to get your own toiletries, your personal things and your school supplies so I really had to watch my budget because it has to last the whole month. And sometimes I wouldn't take or even buy lunch, many of the time I wouldn't buy lunch because I thought I'm not gonna have money come the end of the month. Many times the manager and his wife would say "if you want to make a light lunch you can take with you or can have breakfast at home" so I use to try to have breakfast at home. But most of the time we in a hurry in the morning so no time to make lunch so if I did not make lunch or I couldn't buy lunch, you know I would go with out. You know it wasn't unusual for a lot of us because we used to go sit down under the coconut tree, and talk story, I guess like they say today "chew the fat" yeah? And before you know it time is over for recess, there's the two morning recess, one morning and one afternoon. The morning one is short, the afternoon was a little longer, half an hour maybe, then you kind of forget about being hungry so you just go in and do your homework, you study and it was all good. Then I finally got my degree in 1956 from Hilo High School, you know known as the Vikings. The sad part about it is that both my parents couldn't make it to my graduation, you know, they didn't have car at that time. It was nice to see everybody's parents there but I was sad to not see my parents. But, you know you, come to the point where you accept things that cannot change and that's what I accepted, my parents not being able to come. But we celebrated over the weekend, I went home and they made little bit *mea'ono* (dessert) and *mea'ai* (food) over there which was nice. Right after that, my girlfriend and I, Haktie Maluho, we're very close in high school. We thought maybe, were not going have jobs. To tell you the truth, back then - and I don't know if this is going to be slander but you can delete that if you want to ...

Okay... (laughing)

But the *Ke'epane* (Japanese) used to have the jobs

Oh... I see..

The Portuguese, Filipino, Hawaiians, Chinese were all plantation workers and I think if you talk to most of the people then, in that area, the Oriental was the one who would get the cashier, the office work... and they very well maybe deserved it ... I don't know. But my girlfriend told me "Hey, we go join the Service" and I told her "You gotta be crazy. You gotta be outta your mind girl!" She said "No! We go!" And I says "Oh country girl!" and I'm saying "I don't think so" and she said "Well what are we gonna do here?" I said "Well we go school" and she said "With what? Pennies?" and I said "Oh... I guess we go find a job" and she said "oh hello girl, hello I'm trying to tell you no more job! No more job over here! You like go work plantation? We going *hoe kanaa*⁵² or something?" and that's really true! I think um, it was hard to get in the business it was hard to get in the department stores, so ahh that was probably our fault too, because even with our high school graduation degree, we were kind of afraid to even kind of apply? For fear that we would be denied. That's what basically it was. So I told her no. She told m "you go home and think about it" Yeah, I'll go home and think about it. So umm she said "what we gonna do at home? You don't want to stay at home not doing work you know you gotta help the family". I

⁵² Field work using a hoe, usually to cut the weeds in the cane or pineapple field

said "I know that but I'll let you know" well it didn't take but a few days, a few days and she called. "Well have you decided?" and I said "no, you know I haven't even talked to my parents yet" because I was only seventeen, and she said "Well, I'm going" I said "are you serious?" she said, "yeah, I'm going" so I said "Oh, let me talk to my parents" and I was really kind of scared? I was almost certain that they were gonna say no but I took a chance. My mom didn't want me to go. My dad, he was a stronger person I guess, more broad minded and accepting, my dad is *hapa-kaole* (Part white) Hawaiian. And he says, "Well baby, you do what you think is right for you" and I said "Dad I don't know if it's right, I'm so young and scared"

Tape paused

Daddy spoke to mom. They had a talk and they also had a disagreement because dad did want what he thought was best for me...there wasn't much job there." But mom thought maybe for a woman to go that was not a good thing... she worries and that's true, I can understand that. So it took another day or two and finally, because I had to have consent because I was still considered a minor umm my umm dad signed it but not my mom. So my dad talked to her again and said "you know if she wants to do this, let her try it, I mean she won't know unless..." so reluctantly, my mom signed and then we both, my girlfriend and I went!

In the Service?

So we are veterans. We went into the Navy and right after school, we graduated in June, and in August we were gone. We went to Honolulu for processing and yeah, we were sent to San Diego and again we were processed there and both she and I ended up, because through our tests and our interests they put us both into the medical field. And so we went to Bainbridge Maryland for our thirteen weeks of training and that was intense training. It was really hard, and I mean we really worked hard to study because it had to do with all the medical parts, psychological parts, and we had to do that within that time frame. It was so hard, and we cried! We were homesick we were crying, crying, we want to come home but we thought "no we are not going to disappoint our parents" so when it came time after the training session, it was three months total, we received our graduation certificate in an awesome military graduation ceremony and again my parents couldn't come. We were separated after graduation. She went to Florida to the Airmen Section, and I went to Bethesda, Maryland, in the National Naval Medical Center there.

Wow! That's quite a ways from...

Wow yeah! It was a culture shock for both of us. For training we were already having a hard time, but we were trying to do the best we can with what we had...and it was a culture shock for us already because we came from the country going into this big city life all this different culture that we never was exposed to, and what we were brought up, it's so, it's so hard. So we got separated and by that time it was really hard for us but we were kind of overcoming our obstacles.

Bethesda Naval Medical Center was one of the best experiences I ever had. I was a Corpswaver or hospitalman...worked as doctors and nurses. I've had seen presidents come and go in and the tower there because that's where they treat them and all the VIPs from Washington D.C. and having to take responsibility of a ward all by my self with the supervisor gone had been quite an experience. A scary experience! But a challenge and yet acceptable, you learn to be strong and

tough. Anyway, it was four years of that and after discharge, I went to Texas to visit my brother for about a year, he was in Texas. Then after that I took another six months vacation. While in Texas I worked in Thomas Spann Clinic and Hospital in Corpus Christi. And it was sort of like a vacation but get a job, you know, Get a job and after one year I decided to go to upstate New York and visit my Aunt and on the way to upstate New York. I went to go visit a dear friend of mine at Georgetown, Washington. - Maryland area. So I had a visit with them then I left to go to ... New York, Rochester to visit my aunt up there for six months and that was a good experience for me too, we got to site-see and stuff. Eventually though I decided it's time to come home to see my family and I did. I came home and visit my parents and then all my friends were gone. My girlfriend was still gone, she had gotten married already and had a set of twins! And I'm still single! And I said to my parents, I was glad to see both of them and visit with them. It was kind of hard too though because all your old friends are gone, they're married or they move elsewhere. So finally I came here to Maui, where my sister lives, Mary and visit with her. And here on Maui, while visiting and contemplating whether I should go back to school here or back to the mainland. Ironically she had me introduced to this young man, and she did it in such a interesting way. She said "We're gonna go bowling, cause I'm trying to learn how to bowl." And I says "oh okay" and bowling was far from my mind but I went with her and then I was rather bored watching, I didn't know really what was going on I said "that's okay" ... and her instructor was this Hawaiian guy little did I know that he was gonna be my husband. But she introduced me to him and you know I was like "Okay". Anyway we got to know each other better. We courted and got to see each other more. And then about a year and a half later we got married. We got married, umm, raised our family, our oldest one was born in Waihuku. Our second one Valerie, we were in the transition of moving from Waihuku to Kihei because I was *hapa* (pregnant) to Valerie, number two. And in '65 we moved down here, and then a year and a half later we have Vanessa down here. We were already in Kihei. My husband was a painter from Endo Contractors for Valley Isle painting. He painted for several company here on Maui he was also a high school basketball official, referee for the high school basketball for 17 years and in the National Guard. But anyway we eventually moved down here, and then that was in '65.

Okay 1965 ...

This place where we have today, Tanya, was an inheritance from my father in law to my husband. This is what they call the Kalanikau Estate because it goes from here (by the mango tree) to the fence over the fence, the white fence, because *ohiana* lives within that property right next there. And then it goes in the back. So my husband said, "Better we go build down there" so the boys, the three boys, him and his two brothers, they got together and they divided this place share the cost and they divided into four and left the fourth piece for their mom. Which is *makai* (seaward) corner, and that's how we started to build our home here. And when we built here, was when I first came I told my husband, "It's like a forsaken place you know." I said "Are we gonna live here all by ourselves?" [laughing] I was kinda scared!

You more used to Keanae kite of environment? [laughing]

Yeah I mean it's country but I said...you know something Tanya? This was all *kiawes*⁵³ around us, all *kiawes*, across was all *kiawes*, over there all *kiawes*, ... there was nobody! And well I take it this, the corner on my left side here, the Souzas were living here yeah, the *mauka* side (toward the mountain) over there where there's the subdivision now, the Vares' were there, but the Vares' house was built far back where I don't see anybody except the yard. The Souza was fenced in with bushes where I they can't see me or I can't see them. And all of these houses never existed ... all *kiawe*, up until the (present P'i'ilani) highway, even *mauka*.

Oh my gosh!

But there was one house that was standing where, down the street down here only about half a block down, green house that belonged to the Padilla family. And further down, where Southpoint (Condominiums) is the beginning of Southpoint used to have a green house where the old-folks, the Moikcha family, Andrew lived in. And um. Maui Lu was in existence..

In '65?

As I can recall, yeah, and I believe it was pretty popular you know. But we were not, we were not you know, inclined to go for entertainment and stuff because you know our children were small so we were too busy trying to take care of the 'aina and stuff. Okay so, I stayed home to take care of the children, never worked right away. My husband continued to be a painter and also work part-time so that we could, not only afford to pay for our home but to all the other necessities, the *mea 'ai* the car, gasoline, and maintain the car, cause we had only one car and my parents would come over from the Big Island and help us with the 'aina you know *mahi 'ai* (farming) planting in the back and stuff.

So things would grow pretty good in this area? Garden vegetables and things like that?

Yeah! We had 'uala, potato, sweet potato, we have *mai'a* so we have banana and Daddy had some herbal medicine back there which he told me not to remove and I still have only one, it's the *uhalooa*⁵⁴, but the rest, I think with the years gone, and with the different terrain, the weather, I had a hard time maintaining some of them. But there's still some on the 'aina back home. And then in 1970, the kids were all in school except my baby, but my sister-in-law was here, with my brother living up Kihnei Heights. She babysat because she wasn't working, wasn't planning to work was only two of them. So I started working with John Ventura and Clara Ventura who was the postmaster then. The post office was right next to Suda (Store) and that post office was so small! It was so small ... one little window. I wish I had taken picture of that place, one little window and very little boxes you know to pick up your mail. You know what? I couldn't really tell you back in '65 what was the population back here in Kihnei, but I know that I worked part time for the post office as a delivery person. So I could do my delivery, if I left by 8:00 if I left by 8:30 or 9:00 I usually am back before or around noon ... because I would cover the whole Kihnei....There was no Makena. We only knew Makena by name but there were no houses, that I

⁵³ *Proscopis pallida*, invasive tree species native to Peru (Pukui and Elbert 1986:146)

⁵⁴ Or *Hidloea*, *Waltheria indica*, common to dry zones. Used as a gargle for sore throat. (Abbott 1992: 101)

can recall, and if they had, they were having maybe P.O. Box. But I would only go as far as ... you know where Mana Kai? You familiar with this?

Yeah...is that down by Kama'ole?

Yeah Mana Kai and umm the hill...that hill what they call that? Mana Kai area was all *kiawe*'s. A family friend of ours bout it back then, Henry Teixeira, then sold it later in the years.

Maui Hill?

Maui Hill. Right next to Maui Hill, the Miyamotos used to live in there, only a few houses in there. And that's it was my turn around point and come back. Back then, there was no Maui Hill.

Jeez! So you're saying from 9:00 to 12:00...

I'm back already. Down by Iikai, there was a few apartments there, mama Kenolio and Charlie Young folk were down there. There was no Maui Vista. There was Kimio Ke Apartments, ... I don't know what they call it today to be honest with you because there's new owners, but you know where Waiaka Street is? Uh right across, kinda past Charlie Young Bridge and you turn a left before Maui Vista? That's Kimio Ke apartments before, that brown two story. Used to have that, and no more buildings *mauka*, I used to do only *makai* side by Auntie Betty's and the little Iikai over there ... Benson (?) ... and then I would move on down to Mana Kai and *mauka* side ... plenty *kiawes* over there yet. Not developed. No more ABC (store) Pacific Shores...well Pacific Shores just recently. Never had that, was all *kiawes*. So the delivery was fast. There was a few houses at Kihnei Heights, Manini Street, all that area. I think those was a little bit more heavier area, and probably some to the apartments down by Charlie Young's, a few by Iikai and Kimio Ke. The rest you cruise...and it was good Ianya, you know, I loved it! But I couldn't do it steady full-time because I still had one little one, so Mr. Ventura was so nice, he was our postmaster, and he lived down here in front. And the property is still there. The last I saw the place was up for sale. Whether they bought it or not...or sold it, I'm not sure but the son Glen Ventura and all them were all living over there. Mr. Ventura was quite a post-master, he used to understand I told him, "I cannot work full-time John., because I have one *keiki* (children) at home and you know...she comes first" so he says "oh! a 'ole *piliikia* (no problem)! You come weekends then." So I used to go do Saturdays.

That's so nice they were able to work around your schedule, these days....

Yeah, work around my schedule, I guess they needed somebody and I felt like the little bitty help in the money would do good and as long as it doesn't rattle our household schedule and make it hard for my husband and the kids. So it went like that for a while, about a year, and I didn't want to leave....Mr. Ventura said "Why don't you stick with this part-time because no more full-time right now." "No...cannot, I cannot work weekdays with my kids and my youngest one was gonna go in '71, she was gonna start kindergarten. So the early part of '70, January I believe ... I got a call, I applied for the school health program in the school and I didn't think I would get in because there was over 228 applicants and I thought Oh forget that! Find something else, but to my dismay and surprise I was called for an interview and I got in. It was the school health project, but it was gonna be a pilot project for a year. So whether we really go into a permanent position, that was no guarantee. So ...I talked to my husband and said "Well, one year...and you

find out whether you like the job also in the mean-time and if it become a permanent position...you know you folks have first choice" And then you know my youngest one went to school. And you know, the hours was good because you know I don't start until 7:30 I *pa'u* (finished) 2:30 and the kids are in school from 7:30. So it worked real well and guess what, I worked right here at Kihei Elementary School. I worked over there when they all started school, I was working in the school health program, in the school. Where the ambulance is now? (Kihei Kenolio Center) Stored in that corner? That's where my office was. And I tell you now there was only about 200 students. Was so nice. Was so nice, I mean I couldn't ask for more. I used to peddle myself on the bicycle from here to school and the kids used to follow me. Or if they wanted to go ahead then they go. Because the traffic here was very minimal. The only cars that would pass here at the time ... oh well, I remember the bus as I started on with the bicycle, I would always pull on the side and get off the bike because the path is so narrow, this is wider now, but the path is so narrow I'm afraid the bus is gonna hit me or I'm gonna hit the bus so I used to pull on the side and get off the bike and wait till the bus pass, and then continue my way on to work. And the kids ask me now, they say "Wow, you used to peddle?" I said "Yes! Only right down here, it was good!" They say "All right!" and I says "yes that's good exercise." So I worked until they closed this school, because of the tsunami exposed area...

Oh! That's why they closed the school...

There was this danger yeah! So now they all had to move up to the New Kihei School. I think it was in the 1980's. I can't tell exactly ... yeah but then I moved on with them. I went over there, work over there. Knew all the kids from the neighborhood, everybody's kids. The good thing about it, it reminds me it's like when we were growing up -- you know -- "You no listen, I going talk to your mormmy, I going talk to your daddy about you?" and you know they don't like that. I don't think that was ever a threat to them, and I think... it was not meant to be a threat, but because it was like an *'ohana* at that time it was good. Kids at that time was very respectful, very respectful, and that's gotta be from how they're brought up definitely. And I retired in 1997.

So just recently then?

Yeah from the school health program. Yeah, so I was in the Navy, then I came here got married, had a family, then worked at the post office for about a year...it was a good experience, I would encourage anybody whose interested in getting in go! I look back on it and I think "Wow! If I made a choice which one, I probably would have, if I was thinking about the money, would be there. The federal government. But I wasn't, I was thinking about the hours and what would be practical for me and my children, my family, and the money wasn't that much compared to the post office, but at that point it didn't matter. It wasn't the money thing, it was a family thing. Then I retired. I retired and I got more active in my church, which is the Mormon Church, and I do volunteer work. My husband and I were active when the kids were in school, with the PTSA and the community base program, and the parenting program, we were very busy. And then he is also the co-founder of the Kihei Canoe Club and then I joined after my retirement, the Kihei Community Association and then went to their meetings then became a board member for two years. I just resigned this past year. I'm also president of the Ladies Auxillary for the Veterans of Foreign Wars. So I think that's enough to keep me going...

That's a lot! I'm glad we were able to catch you at home today!

That's what everybody says! "My goodness! We were lucky you're home!" or they lucky they get me on the phone. Yeah I lost my husband back in 1986. I became a widow from when I was 48 years old, I never re-married. I raised our oldest *mo'opuna* well we *hānai* (fostered or adopted) him, the oldest of ours from when he was one year old until he was 21 he went to fulfill his mission but I think in a way that was a blessing that he was with me when my *kāne* (husband) died, Moke died of cancer and it was quite suddenly, it really was quite suddenly. He was feeling sick and five months later he was gone. So I was left to raise my, our youngest, the one we had *hānai* and in a way that was good because he was good company for me, he kept me distracted from thoughts and he was a comfort for me. And I saw him through school, high school, everything, graduation ... through good and bad times we saw, I saw him through all that ... now I'm enjoying my grandchildren, one great-grand. I'm active in the relay for life...for cancer...I go to that, we form a team every year. In the Ladies Auxillary for the Veterans of Foreign Wars we have a program that we have for cancer aid and research and I spearhead that with the program through out the state. We do recycling bottles and cans and we donate that to the cancer and research. And both my husband and I was active in cancer drives and cancer advocating for many years. We did the heart also but we decided to take only one instead of two although we still support heart. I concentrate mostly on cancer because my family Tanya, my dad and my mom died of cancer, my husband died of cancer, I have a nephew who was a fireman here in Kihei Fire Department, Walter, he was only 36, he died of cancer...I'm a cancer survivor of 20 years...so I have much to owe yeah? I have much to dedicate to that program, because I think we're doing great progress and I sure would like to see it conquered. So anyway, you know when we built our place over here, it was all good and then later on my mother-in-law built her, I think maybe 5 years later. One thing that I don't know will ever happen, with every change of mayors or council. There's always different changes, different goals. But I remember this that one year my parents, my in-laws were trying to build down there. They built their house and everything and there was this low-lying area there little bit below their place they were trying to fill up with soil and rocks and they were told by the county then that they couldn't do that. But to my dismay as the years go by, things changes you know? And you wonder which is and which isn't right? Or they need to be more careful on how, I don't know with every administration we got different ideas, just different experts and what not. So they stopped doing that and then later on, kity-corner of their property next property, here comes Isana, the big condominium there and then they fill up yeah? So now when there's flood, Kihei floods a lot, you know about Kihei, water comes down, and this has been for years, the water comes, go collect, goes down the road, down here and it floods back there and usually back up. And then the drainage like most flooded area, you know Hawai'i, the rain don't come but storms maybe winter time, or we call it winter time, rainy season time. And by that time the drain and everything plugs up yeah? There's nobody maintaining the place so everything backs up and does a lot of damages back there. Even on mine, I'm still working with the county on trying to address the front here because since they built up there, the topography of the road, I had mentioned to them when I went to the council meeting, my concern of the flow of water. How they going to do the topography will have a big impact of how the water is going to run correctly or wrong. I was opposing them building if they couldn't correct or remedy that. Well, like everything else they said it's gonna be done this way, this way, this way. Well when they had the rainstorm, the first rainstorm we had the water ran

over into my road, even worse, into the road over my place, even worse! And I've been trying to work with the county I still have documentation, I'm almost giving up, but I'm not! Um, because my neighbor Mr. Souza also got flooded and worst the drain over there is not able to absorb all of the water that comes out from out there. I started what they called the Kenolio Ohana meeting. It's so funny because there is so many things that we want to have happen here and you know when you first start something, it takes just a few and as the word get's out I know the work with Kimokea and the youth center ... everybody has concerns here from speeding to traffic to drugs to the park there by the Kiheti Youth Center. The park grounds are bad there and they told me about that. So we were trying to get ... we had about two meetings and we had our county prosecutor attorney then well she was for the Kiheti area and she's no longer with us, I'm so disappointed because she's now in practice with the county instead we miss her ... Terri Shephard. And she used to come and give us ideas on how to start our meetings, who to invite and it was all good and the second meeting was small yet, then we did the speed check over here we got speed check equipment from Calvin Dang. We did that and that was slowing down traffic, people were seeing the speed limit....but we need it again and it's been a while since we got it because people are signing up for it, think he has only a limited amount. Anyway that and trying to work with the water run-off. Apparently, what I was told before, the Arizumi subdivision before, this was called an Arizumi subdivision on Koki. When they built, they never made the drain, which at that time wasn't required. So the water from there comes across, and the water from over there doesn't collect good and it spill over you know, come over here. And the water from there go across and some spill over, comes here. So I was really *hahizi* (angry) with the county and said you folks should really do something about it and we had the county people come to that meeting and said "What can be done?" And I said well they have to see, check with the county and see in the budget what's allotted for Kiheti and da-da-da. But that's been many years and I said well, could we have something like a berm or something to be built here so the water diverts and go down where it's supposed to drain out and they said that's possible. But you know they don't follow up with you, you gotta really, really be on top of them and you can burn out to ...

That's the hard part, you have to always call, call....

Yeah and I'm not done calling this guy, bugging him. I haven't bugged him in a while, I think I gave him a long break only because I was side-tracked with so many other things but I haven't forgotten. But all I can tell you Tanya, Kiheti, Suda Store used to be there...oh! I worked over there part-time you know? The old Azeka Store was there too but it was small then with a gas pump outside too.

At Suda Store?

I used to be, I used to work at Suda Store little bit before I work with the post office. And that's why John (Ventura) asked me, because I was working as a cashier...and those days they no more automatic the kind you press the button and the gas come out...you gotta pump it...

Crank it?

You gotta crank it and then ...yeah! So that the was the fun part, we used to go out and crank the gas and then come in and it was a busy time those times. Construction people used to come

mornings and afternoons. I worked with the Suda family and that was a good experience and didn't have Kiheti Village. It was all *kiawe*.

All of this was kiawe? (at the intersection of Suda Store and Kenolio Road)

Yeah...never had the youth center and the Kiheti Canoe Club was all *kiawes* over there, they cleaned it up, cleaned up the area so that they could put whatever canoes they think they were gonna get (laughing) they didn't have anything then! They had so much positive, I mean I was so proud of them! They so determined! They gonna use the corner, get the okay from the county. Clean it, they clean it real good, they left the big *kiawe* tree for shade and umm...the *hale*¹⁵ for shade and then they *kālua* (cook in an *imu* or underground oven) a pig over there on the ground, and bless the ground which was really nice. Such a good turn out. And umm they went out and raised money to get a canoe and we finally got one from Honolulu, we all, everybody so happy! This was in '73. Only one canoe Tanya, and they were tickled pink! We had about 300 people signed up and only one canoe! And we thought, how is this gonna happen? So everybody had to take turns in the morning the young men, the ladies they would come like 6:00 if they want to come the weekdays. Paddle, Paddle. The teenagers and the ... and anyway the *keiki* would come after school, after their homework, but you know what? There was such a camaraderie there, the *'ohana* was so strong I look back and with great happiness because the kids at that time did not have very much to do here. Didn't have much recreation because no more, now no more the park there yet. I think they were just starting to develop down there, the basketball/tennis court...starting plans for development. They had a small one, they had a small one and the kids were kinda bored! So we thought this is a good thing, my husband thought this is a good thing, and it was a good thing. I mean only one canoe with about 300 people but they worked it out, they were ... the young men and women...fine! And all go, the young adults and the men go in the morning if they can, they had certain time like 6:00-7:00 or whatever and then the afternoon the *keikis* come with the coach. Dutchie Hikino also help my husband, Dutchie Kino was one of the best paddlers that I have known, come here to help from Honolulu coach the club, the kids and everyone. He was a good coach. And it grew, it grew. The family came together, they donated their time, there was so much excitement they wanted to make pot-luck the other would make *leis* for when they come in, give them *leis*...it was strong. Then before you know it they got another canoe, then they got one donated from Darvon Leis and his wife Betty. And Betty and Darvon's two sons used to paddle for the canoe club, and those two, the mama and papa used to always come to their event. I look back ...and I think "Some wonderful, wonderful times we've had there at that *hale*." The camaraderie was good, the *ohana* feeling was good, all good, all good! Good feelings Tanya, *maika'i* (good). I want to see that today.

Is it not like that so much anymore?

Too much *hukihuki* (quarreling), not satisfied. And as I talk to my other canoe paddlers from the other clubs, they have little bit of that but...unless you understand the way of the culture hard, hard. You cannot come, make changes to your way...you have to have lots of respect yeah? And when you feel that you can do better than others, or you can do better...you want to make your own rules or disrespect the way you were taught of your *ama* (outrigger), your canoe. Everything

¹⁵ *Hibiscus tilloceus* (Pukui and Elbert 1986:60)

about your canoe is respect you know first, respect the culture. But when you have an infiltration of different minds and ideas, sometimes some of it is good, sometimes others is not. It brings, it tears apart the 'ohana. And maybe you don't or maybe you do understand what I am saying, but I wish I could see them come back together you know? Every year when I go, last year never have because they have new schedule now...but when I go for my husbands regatta, I feel a strong spirit, I feel my husband there and I just think that I wish you know a lot of the clubs are pono (right, behave correctly) but there are some that needs to have ho'oponopono (intervention to things pono) because the idea is not just winning, the idea you think of your culture first you respect second, next to culture, and be humble. No need pride, no need that. As I talk to Kimo'kea, we share a lot...you know, he's a good man.

So back in 1965, 1970's were the people of this area of Kīhei, were they continuing with the traditional Hawaiian practices maybe from long time ago...do you recall what the common...

Umm when I came here in '65 I didn't know too many people except the Akina's, yeah the Akina's were practicing the fishing traditions and charcoal. Do you remember before, that's why now...no more kīawas no 'he'i but before Francis, brother Francis, he was working the charcoal business before. His children are still living here in Kīhei, he had the charcoal business. He used to take care of all the charcoal and sell it of course....

[end of space on recorder. Mrs. Kalamikau went on to describe how every now and then the fishermen would get together and hukilau (or do communal fishing with lau or ropes) in front of Suda Store, as well as describe the mango farms of the Hashimoto family and the cucumber and tomato farm of the Managan family in the area of the Tesoro gas station off of Pi'ilani Highway an Ohukai Road. During a brief field visit to the project area Ms. Kalamikau remarked on how the soil looked like it was a good place for agriculture]

APPENDIX EF.

Traffic Impact Analysis Report

**TRAFFIC IMPACT ANALYSIS REPORT
KIHEI RESIDENTIAL PROJECT
KIHEI, MAUI, HAWAII**

**TRAFFIC IMPACT ANALYSIS REPORT
KIHEI RESIDENTIAL PROJECT
Kihei, Maui, Hawaii**

FINAL

FINAL

May 22, 2007

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TRAFFIC IMPACT ANALYSIS REPORT KIHEI RESIDENTIAL PROJECT Kihei, Maui, Hawaii

I. INTRODUCTION

This report documents the findings and recommendations of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. to identify and assess the potential traffic impacts resulting from the development of the Kihei Residential Project (hereinafter referred to as the Project) which is being proposed by A&B Properties, Inc.

A. Location

The Project is located on the southern part of the island of Maui, on an elongated parcel that extends approximately 9,000 feet mauka of Piilani Highway in North Kihei. The Project site consists of 94.3 acres and is currently vacant. The Project site is bordered by Piilani Highway to the west, Hale Piilani Subdivision to the south, and agricultural land to the north and east. Figure 1 shows the location of the Project.

B. Project Description

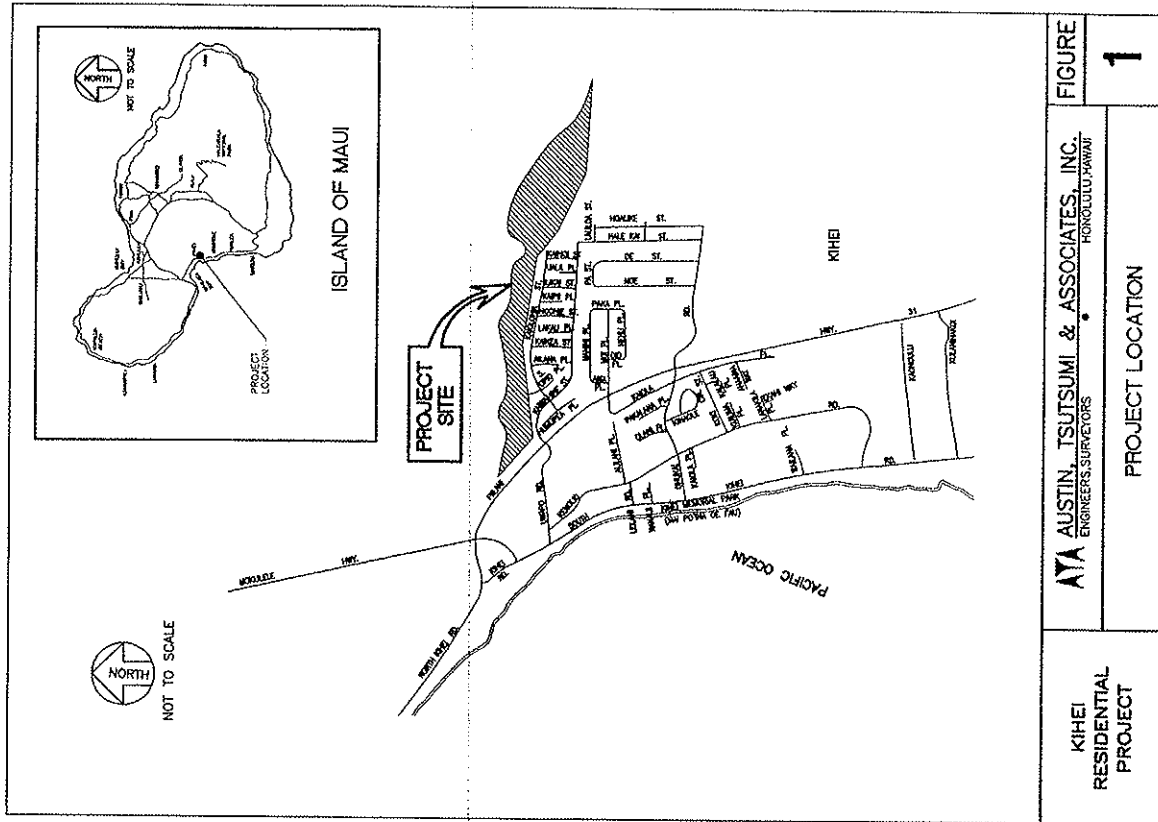
The Project is proposed to consist of approximately 400 single-family detached units, approximately 200 multi-family units, a small neighborhood commercial area, parks, and open space, including an open space buffer along Waialea Gulch. Approximately 40 percent of the units will be designated as affordable housing. Planned vehicular access is at a proposed new right-turn in/flight-turn out only intersection on Piilani Highway, and the existing Piilani Highway/Kaiwahine Street/Uwapo Road intersection. Future connectors to the

south will be provided once adjacent properties to the south are developed. Figure 2 shows the site plan for the Project.

C. Study Methodology

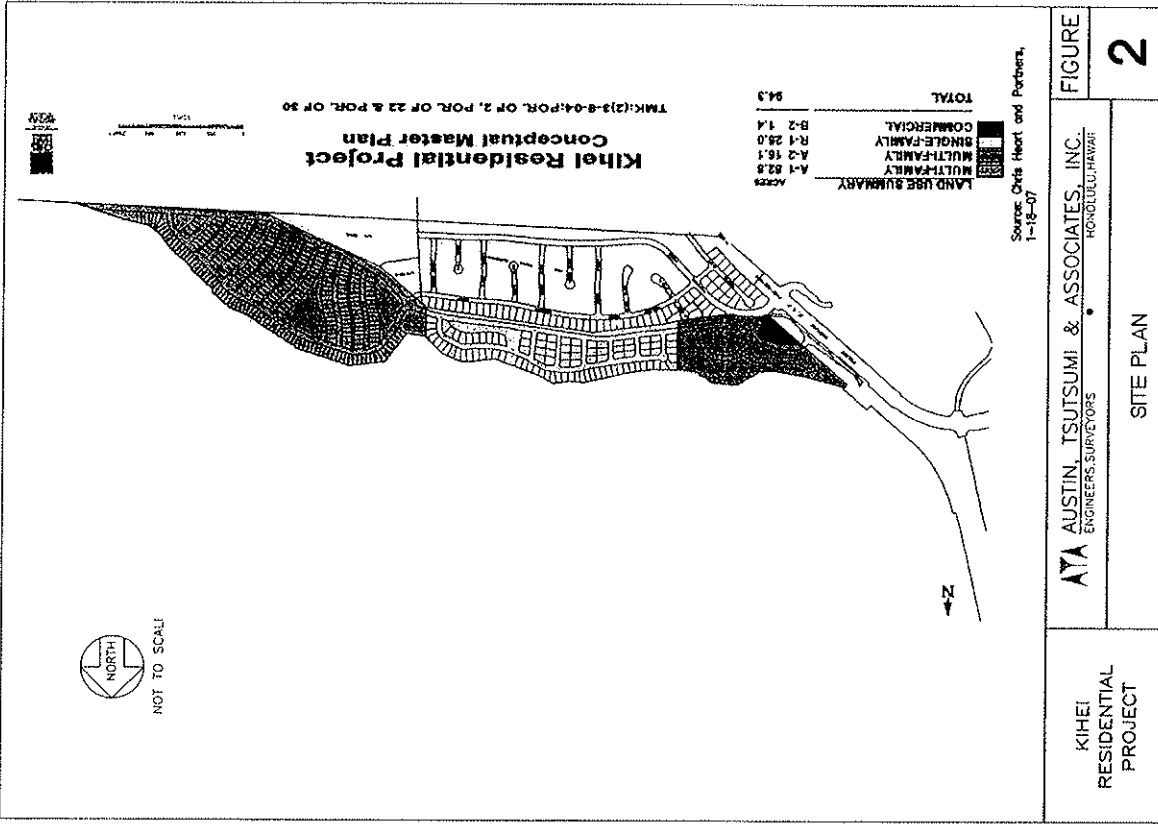
This study will address the following:

1. Existing traffic operating conditions at key intersections within the study area.
2. Base year (buildout year for the Project) traffic projections without Project-generated traffic, but including traffic generated by other known developments in the Kihei, Wailea and Makena areas that are expected to be completed and occupied by the base year, and generate significant traffic demand within the study area.
3. Recommendation of traffic mitigation measures, as appropriate, to mitigate traffic conditions for the base year without Project-generated traffic.
4. Trip generation and traffic assignment characteristics for the proposed Project.
5. Determination of the potential impacts of Project-generated traffic on base year traffic operations.
6. Recommendation of traffic improvements, as appropriate, to mitigate the traffic impacts resulting from Project-generated traffic.



KIHEI RESIDENTIAL PROJECT

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS
HONOLULU, HAWAII



KIHEI RESIDENTIAL PROJECT

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ENGINEERS, SURVEYORS
HONOLULU, HAWAII

SITE PLAN

D. Definitions

- **Base Year 2016** – describes scenario where vehicular traffic volumes for the year 2016 are projected without the traffic generated by the Project. In simple terms, this is the “no-build” or “do-nothing” alternative.
- **High, or Heavy Turning Movement Volume** – a subjective term that for this report, shall be used to describe conditions where the turning movement volume forms a significant component of the traffic processed through the intersection, and noticeably reduces capacity along the main arterial. This term can apply to a single heavy turning movement, or the collective effect of all turning movements.
- **Mitigation** – applies to recommendations aimed at improving unsatisfactory traffic conditions (i.e. LOS = F, volume/capacity ratio > 1) experienced as a result of Base Year 2016 conditions.
- **Year 2016 with Project** – describes estimated vehicular traffic volumes for the year 2016 with the traffic generated by the Project.
- **Level-of-Service (LOS)** – as based on *The Highway Capacity Manual – Special Report 209 (HCM)*, dated 2000, LOS is a qualitative measure used to describe the conditions of traffic flow at intersections. Values range from LOS A (minimal delay) to LOS F (congested). In the case of intersection analysis, control delay is used as the Measure of Effectiveness (MOE) by which LOS is gauged.
- **Trips** – for the purposes of this report, vehicular trips traversing the roadway network. Note that this term can also signify other modes of transportation, however vehicular trips will be the only trips considered in this report.
- For a complete glossary of terms, refer to Appendix D.

II. EXISTING CONDITIONS

Existing conditions refers to conditions at the time traffic count data was collected.

A. Roadway System

The following is a brief description of the existing roadway network within the study area.

Mokulele Highway – begins across Puunene Avenue at Hansen Road in Kahului, extends south to intersect with Piilani Highway in Kihei, and curves to terminate in the east/west direction at South Kihei Road. In the vicinity of the study area, Mokulele Highway is currently a two-lane, undivided, State arterial highway. From Kahului to approximately the Maui Humane Society, Mokulele Highway is a four-lane, divided roadway. Mokulele Highway serves as the primary route between Kihei and Kahului. Within the study area, the posted speed limit on Mokulele Highway is 30 miles per hour (mph). The Mokulele Highway Widening, Vicinity of Maui Humane Society to Piilani Highway is currently under construction. See Section III.C. for details.

Piilani Highway – begins as an east/west roadway across North Kihei Road at its intersection with South Kihei Road, and curves to extend south to Wailea Ike Drive. In the vicinity of the study area, Piilani Highway is a four-lane, State arterial highway that provides access to Kihei and Wailea. South of Kiichana Drive, which lies approximately 5.5 miles south of the project, Piilani Highway narrows to two (2) lanes. Left-turn storage lanes, right-turn deceleration lanes and medians are provided at all major intersections on the highway. The shoulder areas of the highway are designated as bicycle lanes throughout the length of the highway. Within the study area, the posted speed limit on Piilani Highway is 40 mph except west of Mokulele Highway where the posted speed limit is 30 mph.

North Kihei Road – begins at its intersection with Honoapiilani Highway and extends southeast to its intersection with South Kihei Road after which it continues as Piilani Highway. In the vicinity of the study area, North Kihei Road is a two-lane, undivided, State arterial roadway that will be designated as an

east-west roadway for the purposes of this report. North Kihei Road is used primarily by vehicles traveling between West Maui and Kihei. The posted speed limit on North Kihei Road is 45 mph.

South Kihei Road – begins at its “tee” intersection with North Kihei Road, runs along the coastline through Kihei, and eventually connects to Okolani Drive in Wailea. In the vicinity of the study area, South Kihei Road is a two-lane, undivided, north/south County collector roadway. South Kihei Road provides local access to shopping centers and visitor accommodations.

Uwapo Road – is a two-lane, undivided, east/west County collector roadway between South Kihei Road and Piliiani Highway. Uwapo Road provides access to residences and Kenolio Park.

Kaiwahine Street – is a two-lane, undivided, County collector roadway that extends east from Piliiani Highway across Uwapo Road to provide access to and internal circulation within a residential area.

B. Study Intersections

The study intersections and existing lane configuration at the study intersections are described below and shown on Figure 3.

North Kihei Road/South Kihei Road/Piliiani Highway – is a “tee” intersection with South Kihei Road forming the stem of the “tee.” The northbound South Kihei Road approach is striped as an exclusive left-turn lane and exclusive right-turn lane. Left-turn traffic on this approach is stop sign-controlled, and right-turn traffic is yield-sign controlled and channelized by a raised traffic island. The westbound Piliiani Highway approach is striped as an exclusive left-turn lane and a through lane. The eastbound North Kihei Road approach is striped as a through lane and an exclusive right-turn lane. Right-turn traffic on this approach is channelized by delineators.

South Kihei Road/Mokulele Highway – is a “tee” intersection with Mokulele Highway forming the stem of the “tee.” The northbound South Kihei Road approach is striped as a through lane with a channelized right-turn. Right-turn traffic on this approach is channelized by a painted traffic island. The southbound South Kihei Road approach is striped as a shared left-turn/through

lane. The westbound Mokulele Highway approach is striped as an exclusive left-turn lane and exclusive right-turn lane. Left-turn traffic on this approach is stop sign-controlled, and right-turn traffic is yield-sign controlled and channelized by a raised traffic island. Southbound vehicles turning left from South Kihei Road onto Mokulele Highway are received in a lane between the westbound left-turn lane and right-turn lane. These vehicles are stop-sign controlled immediately after entering Mokulele Highway as they must cross opposing traffic in the westbound left-turn lane before heading further eastbound.

South Kihei Road/Uwapo Road – is a “tee” intersection with Uwapo Road forming the stem of the “tee.” The northbound South Kihei Road approach is striped as a shared through/right-turn lane. Right-turn traffic on this approach is channelized by a painted traffic island. The southbound South Kihei Road approach is striped as a dedicated left-turn lane and a through lane. The westbound Uwapo Road approach is striped as an exclusive left-turn lane and exclusive right-turn lane. Left-turn traffic on this approach is stop sign-controlled, and right-turn traffic is yield-sign controlled and channelized by a raised traffic island.

Piliiani Highway/Mokulele Highway – is a signalized “cross” intersection. The northbound Mokulele Highway approach is striped as a shared left-turn/through lane and an exclusive right-turn lane. The southbound Mokulele Highway approach is striped as an exclusive left-turn lane, a shared left-turn/through lane and an exclusive right-turn lane. The westbound Piliiani Highway approach is striped as an exclusive left-turn lane, a through lane and an exclusive right-turn lane. The eastbound North Kihei Road approach is striped as an exclusive left-turn lane and a shared through/right-turn lane. Right-turn traffic on all approaches except for the eastbound approach is channelized by a raised traffic island. The traffic signal at this intersection is fully-actuated with separate phases for westbound and eastbound traffic on Mokulele Highway, also referred to as “split-phase.”

Piliiani Highway/Uwapo Road/Kaiwahine Street – is a signalized “cross” intersection. The northbound and southbound Piliiani Highway approaches are each striped as an exclusive left-turn lane, two (2) through lanes and an

exclusive right-turn lane. The westbound Kaiwahine Street approach and eastbound Uwapo Road approach are each striped as a shared left-turn/through lane and an exclusive right-turn lane. Right-turn traffic on all approaches is channelized by a raised traffic island. The traffic signal at this intersection is semi-actuated with a protected phase for northbound and southbound left-turn traffic on Piliāni Highway.

C. Traffic Volumes

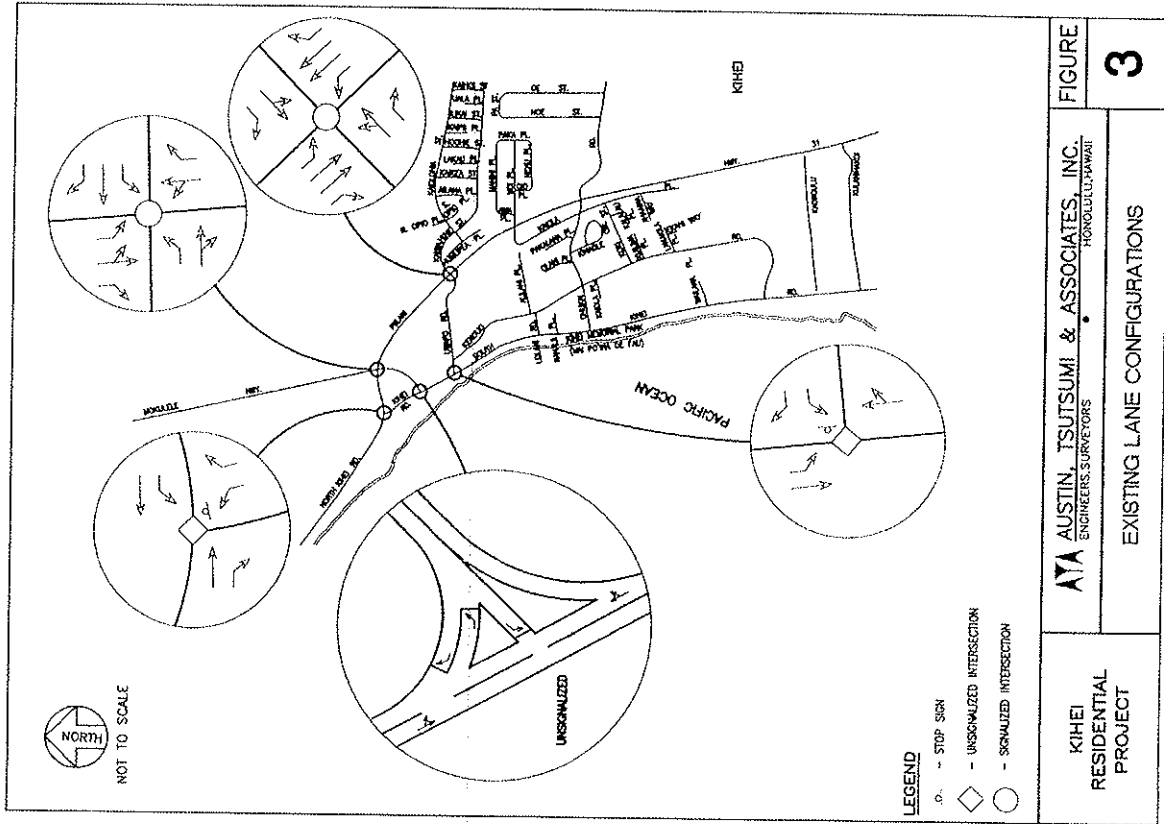
Manual turning movement counts and field observations were conducted on Wednesday December 6, 2005, and Thursday December 7, 2005, at the study intersections described in the previous section. Based on the traffic count data, the weekday morning and afternoon peak hours of traffic were determined to occur from 7:00 to 8:00 AM and from 4:15 to 5:15 PM, respectively. Peak hour-traffic volumes are included in Figure 4 and traffic count data is provided as Appendix A.

D. Field Observations and Level of Service Analysis

Level of Service (LOS) is a qualitative measure used to describe traffic operations ranging from free-flow conditions at LOS A to congested conditions at LOS F. Methods for calculating volume to capacity ratios, delays and corresponding LOS presented in the Highway Capacity Manual, 2000 (HCM 2000) were utilized for this study. LOS definitions for unsignalized and signalized intersections are provided as Appendix B. The LOS results for all study intersections are included in Figure 4 and Table 4. Appendix C contains LOS calculations for all scenarios in this report.

North Kihel Road/South Kihel Road/Piliāni Highway

The LOS analysis results for this intersection are shown in Figure 5 below. Northbound traffic operates at LOS F with a volume to capacity (v/c) ratio greater than 1.0 during the AM and PM peak hours of traffic. The maximum northbound queue on South Kihel Road was observed to be approximately 10(6) vehicles during the AM(PM) peak hours of traffic. This intersection will be signalized and modified when Mokuiele Highway is widened through the study area.



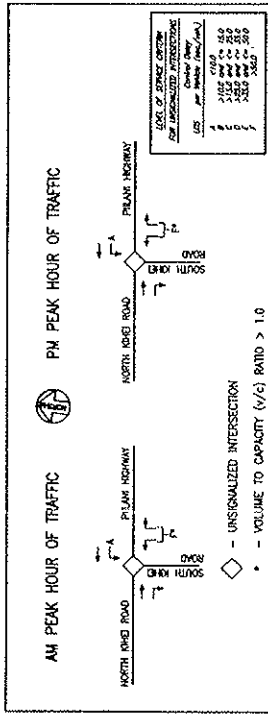


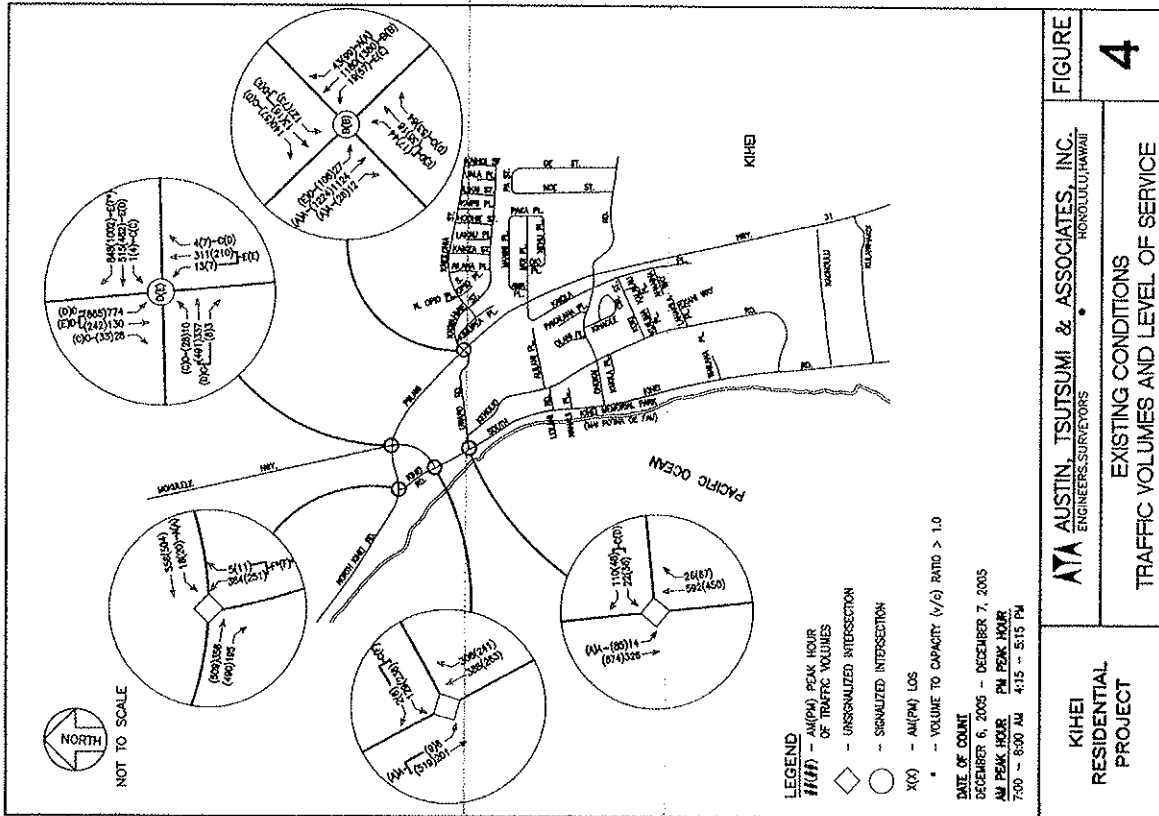
Figure 5: Existing Conditions LOS at North Kihei Road/South Kihei Road/Piilani Highway

South Kihei Road/Mokulele Highway

As previously described, southbound vehicles turning left from South Kihei Road onto Mokulele Highway are received in a lane between the westbound left-turn lane and right-turn lane. However, for the purposes of this report this intersection was analyzed as a standard "tee" intersection at which westbound left-turn traffic must yield to southbound left-turn traffic. This should not have a significant impact on the LOS analysis since there were only 6(9) southbound left-turn vehicles during the AM(PM) peak hours of traffic.

In the field, it was observed that generally, westbound left-turn queues were five (5) vehicles or less during both the AM and PM peak hours of traffic. The southbound left-turn and westbound right-turn movements experience relatively light volumes (less than ten (10) vehicles) during each of the AM and PM peak hours of traffic, and therefore do not cause any significant traffic disruptions.

The LOS analysis results for this intersection are shown in Figure 6 below. Westbound traffic operates at LOS F during the PM peak hour of traffic. Existing traffic volumes at this intersection may warrant a traffic signal. However, this intersection will be eliminated when Mokulele Highway is widened through the study area.



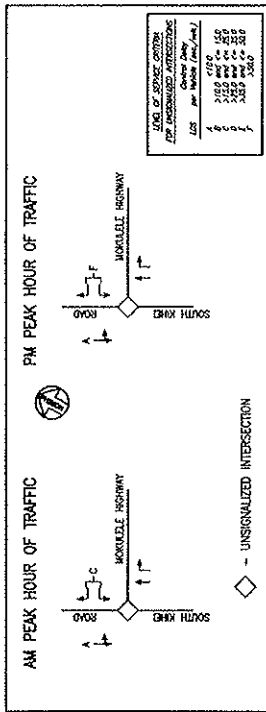


Figure 6: Existing Conditions LOS at South Kihei Road/Mokulele Highway

South Kihei Road/Uwapo Road

The LOS analysis results for this intersection are shown in Figure 7 below. Traffic at this intersection was observed to operate well during the AM and PM peak hours of traffic.

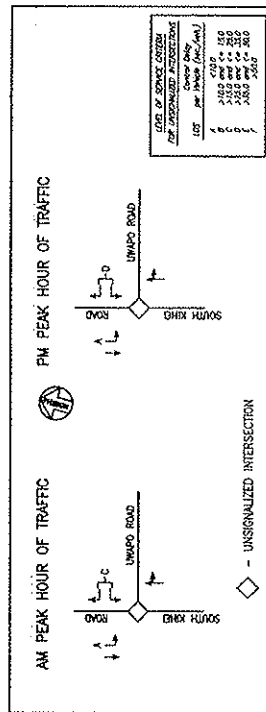


Figure 7: Existing Conditions LOS at South Kihei Road/Uwapo Road

Piliiani Highway/Mokulele Highway

Traffic volumes on both Piliiani Highway and Mokulele Highway are heavy at this intersection since Piliiani Highway serves as the main route between Kihei and West Maui, and Mokulele Highway serves as the main route between Kihei and Kahului. There were 774(865) vehicles during the AM(PM) peak hours of traffic turning left from southbound Mokulele Highway onto Piliiani Highway. There were 848(1,002) vehicles during the AM(PM) peak hours of traffic turning right from westbound Piliiani Highway onto Mokulele Highway.

The LOS analysis results for this intersection are shown in Figure 8 below. Several individual movements operate at LOS E during the AM and/or PM peak hours of traffic. Westbound right-turn traffic operates at LOS F with a volume to capacity (v/c) ratio greater than 1.0 during the PM peak hour of traffic. This is consistent with field observations as traffic at this intersection was observed to experience long delays. The maximum queue of westbound traffic on Piliiani Highway was approximately 40 vehicles and extended beyond the Waiakoa Gulch Bridge during the AM peak hour of traffic. Similarly, during the PM peak hour of traffic westbound right-turn and southbound left-turn queues were observed to be approximately 25 vehicles long. This intersection will be modified and realigned when Mokulele Highway is widened through the study area.

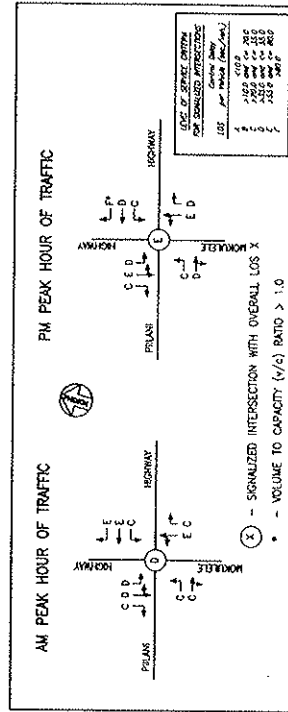


Figure 8: Existing Conditions LOS at Piliiani Highway/Mokulele Highway

Piliiani Highway/Uwapo Road/Kaiwahiine Street

The LOS analysis results for this intersection are shown in Figure 9 below. In general, this intersection was observed to operate relatively smoothly during the AM and PM peak hours of traffic. No major queues were observed to occur. Several individual movements operate at LOS E during the PM peak hour of traffic.

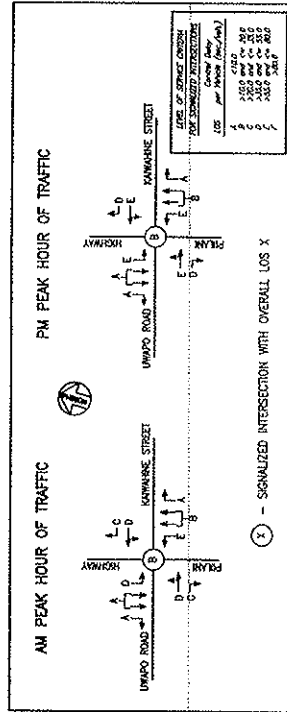


Figure 9: Existing Conditions LOS at Piliiani Highway/Uwapo Road/Kaiwahiine Street

iii. **BASE YEAR TRAFFIC CONDITIONS WITHOUT THE PROJECT**

A. **Projected Traffic Volumes**

Year 2016 was selected as the build-out year for this study based on the Project schedule. Base Year 2016 projections were formulated by applying a default growth rate, which was determined to be 2 percent annually. This rate was selected based on the traffic volumes projected onto Piliiani Highway and South Khei Road for the Year 2020 in the Mauili Long-Range Land Transportation Plan (MLRLTP), dated February 1997, by Kaku Associates, Inc.

B. **Other Known Developments**

Traffic volume projections for Base Year 2016 includes traffic generated by known future developments near the Project that were assumed to be constructed by Year 2016 and generate significant traffic demand within the

study area. It should be noted that some of these projects are in the planning and entitlement phase and may not materialize within the 2016 time horizon. Of particular importance is Honua Ula and Makena. See description of these projects below.

Other known future developments and the number of vehicular trips they are expected to generate are shown in Table 1. Traffic generated by the developments discussed below was obtained from traffic impact reports or other sources. Traffic projections for developments for which traffic impact reports were not available were estimated by applying appropriate trip generation rates in Trip Generation, 7th Edition, published by the Institute of Transportation Engineers (ITE).

Table 1
Trip Generation Summary for New/Future Developments Near the Project

Development	Land Use	No. of Units	AM Peak Hour of Traffic		PM Peak Hour of Traffic	
			Enter (vph)	Exit (vph)	Enter (vph)	Exit (vph)
Kaonouli Industrial Park Honua'ula (Wailea 670)	Light Industrial	88 AC	510	134	152	574
	Single-Family Residential	475 DU	86	256	275	161
	Multi-Family Residential	475 DU	23	16	110	109
	Multi-Family Residential	225 DU	17	82	78	39
	Multi-Family Residential	225 DU	20	30	26	51
	Shopping Center	80000 SF GLA	84	53	203	223
	Golf Course	200 AC	31	11	19	38
	Single-Family Residential	89 DU	17	52	59	34
	Single-Family Residential	85 DU	23	16	20	19
	Multi-Family Residential	285 DU	20	99	95	47
Wailea Resort	Multi-Family Residential	285 DU	25	38	33	64
	Shopping Center	20000 SF GLA	36	23	104	113
	Offices	60000 SF GFA	135	18	53	276
	Warehouse	40000 SF GFA	4	2	5	3
	Single-Family Residential	59 DU	12	35	38	23
Makana Resort	Single-Family Residential	53 DU	14	10	12	12
	Multi-Family Residential	536 DU	34	184	159	79
	Multi-Family Residential	536 DU	47	71	62	120
	Shopping Center	100000 SF GLA	96	61	300	326
	Multi-Family Residential	191 DU	15	72	68	34
Ka Ono Ulu Estates Maui Lu Redevelopment	Resort Hotel	788 Rooms	197	77	171	226
	Resort Hotel (existing to be demolished)	174 Rooms	-21	-8	-19	-26
Silversword Golf Estates	Single-Family Residential	182 DU	34	103	116	68
	Total		1559	1415	2139	2620

vph= vehicles per hour
DU= Dwelling Units
AC= Acres
SF GFA= Square Feet Gross Floor Area
SF GLA= Square Feet Gross Leaseable Area

Kaonouli Industrial Park - will consist of 88 acres of light industrial uses. Currently, Maui Industrial Partners, LLC is proposing to subdivide part of the 88 acres into roughly half-acre lots according to conversations with the civil engineer for this development. The remaining land will be subdivided by another owner. Traffic generated by the ultimate development of the Kaonouli Industrial Park was obtained from the Traffic Impact Analysis Report for Kaonouli Industrial Park, dated March 1994, by Julian Ng, Inc. and is included in base year traffic projections for this report.

Honua'ula - is also known as Wailea 670. Traffic generated by uses other than residential units were obtained from the Coordinated South Maui

Traffic Study, Honua Ula/Wailea 670, Wailea Resort, Makana Resort, dated September 2006 by Parsons Brinckerhoff Quade & Douglas, Inc. Trips generated by residential units were estimated using the number of residential units and trip rates contained in the Coordinated South Maui Traffic Study, Honua Ula/Wailea 670, Wailea Resort, Makana Resort. Base Year traffic projections include only those land uses that are expected to be completed by 2016. Note that this project has not yet received approval by the Maui County Council.

Wailea Resort - Traffic generated by planned new land uses other than residential units were obtained from the Traffic Impact Analysis Report for the Wailea Resort, Revised Master Plan - 2005, dated May 23, 2005, by Austin, Tsutsumi & Associates, Inc. Trips generated by residential units were estimated by applying trip rates contained in the Coordinated South Maui Traffic Study, Honua Ula/Wailea 670, Wailea Resort, Makana Resort to the number of residential units in the Traffic Impact Analysis Report for the Wailea Resort, Revised Master Plan - 2005. Base year traffic projections for this report include only those land uses within the Wailea Resort that are expected to be completed by 2016.

Makana Resort - Current planned new land uses were obtained from correspondence with the traffic engineer for the Makana Resort. Traffic generated by commercial uses was estimated by applying appropriate trip generation rates in the Trip Generation, 7th Edition. The remaining planned new land uses are residential units for which traffic was estimated by applying trip rates contained in the Coordinated South Maui Traffic Study, Honua Ula/Wailea 670, Wailea Resort, Makana Resort. Fifty percent of the residences were assumed to be affordable units and the remainder was assumed to be resort residential units. Base year traffic projections for this report include only those land uses within the Makana Resort that are expected to be completed by 2016. Note that this development is in the process of changing ownership, and therefore its revised development plans and timescale will be subject to revision.

Maui Lū Redevelopment – Plans to demolish its 27.3-acre existing hotel facilities and construct new time-share buildings. Also included would be a lobby area, restaurants, health club, kids club, pools, and gardens. For the purpose of this report, it was assumed that this project would be complete by 2016.

Silverword Golf Estates and Ka Ono Ulu Estates – Not much was known about these projects at the time of this report. However, these projects have conservatively been included in the assumptions contained within this report. The assumptions used are shown in Table 1.

Not all of the trips generated by the other known future developments would pass through the study area. For the Kaonoulu Industrial Park, traffic assignment was obtained from the previously cited traffic studies. Traffic generated by the remaining developments was assigned to the roadway network based on the trip distribution patterns contained in the Coordinated South Maui Traffic Study, Honua Ula/Waialea 670, Waialea Resort, Makana Resort.

G. Planned Roadway Improvements

The improvements shown on the plans for Mokulele Highway Widening, Vicinity of Maui Humane Society to Piliāni Highway, dated July 2005 are currently under construction by the State of Hawaii Department of Transportation and therefore were assumed to have been completed by Year 2016.

According to these plans, Piliāni Highway and Mokulele Highway will be realigned such that at the intersection of these roadways, Piliāni Highway will become the northbound and eastbound approaches, with Mokulele Highway remaining as the southbound approach. A new roadway that will provide access to agricultural lots mauka of Piliāni Highway will form the westbound approach. Furthermore, Mokulele Highway will no longer intersect with South Kihei Road.

With the existing roadway network, a vehicle on Piliāni Highway heading from the Waialea/Makana area to Kahului needs turn right onto Mokulele Highway. With the realigned roadways, this vehicle would go straight through the intersection to get onto Mokulele Highway. As a result, the South Kihei Road/Mokulele Highway intersection will be eliminated. The South Kihei Road/Uwapo Road intersection and the Piliāni Highway/Uwapo Road/Kaiwahine

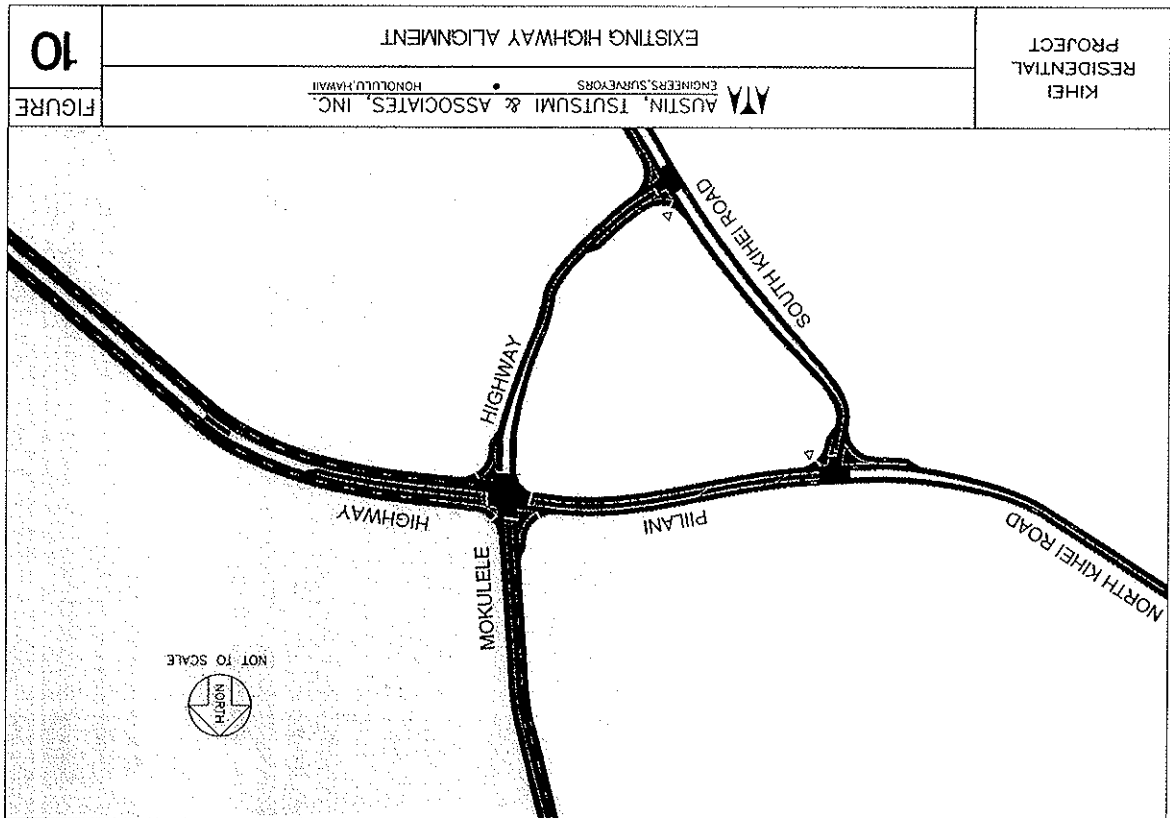
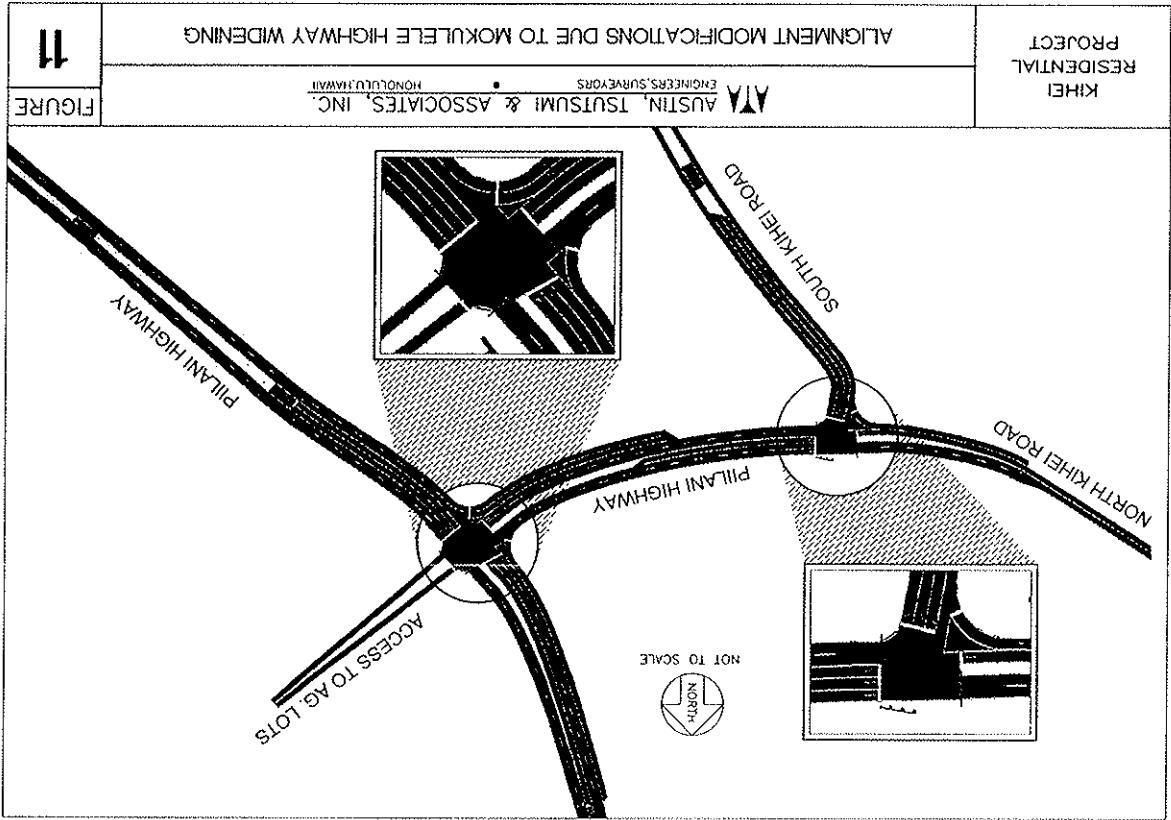
Street intersection will remain as existing. The affected study intersections are described below.

North Kihei Road/South Kihei Road/Piliāni Highway – The northbound South Kihei Road approach will be striped as two (2) exclusive left-turn lanes and an exclusive right-turn lane. The westbound Piliāni Highway approach will be striped as an exclusive left-turn lane and two (2) through lanes. The eastbound North Kihei Road approach will be striped as a through lane and an exclusive right-turn lane. Right-turn traffic on the eastbound North Kihei Road approach will be channeled by a raised traffic island. A traffic signal system with a protected phase for left-turn traffic on the westbound Piliāni Highway approach will be installed at this intersection.

Piliāni Highway/Mokulele Highway – is a signalized “cross” intersection. The northbound Piliāni Highway approach will be striped as two (2) exclusive left-turn lanes, a through lane and a shared through/right-turn lane. The southbound Mokulele Highway approach will be striped as an exclusive left-turn lane, two (2) through lanes and an exclusive right-turn lane. The eastbound Piliāni Highway approach will be striped as an exclusive left-turn lane, a shared left-turn/through lane and two exclusive right-turn lanes. The agricultural road westbound approach will be striped as a shared left-turn/through/right-turn lane. Right-turn traffic on the southbound Mokulele Highway approach and westbound Piliāni Highway approach will be channeled by raised traffic islands. The traffic signal at this intersection will provide a protected phase for left-turn traffic on the northbound Piliāni Highway approach and southbound Mokulele Highway approach. Traffic on the westbound Piliāni Highway approach and eastbound agricultural road approach will be “split-phase.”

These improvements have been assumed to have been completed by Base Year 2016.

Figure 10 shows the existing highway alignment, and Figure 11 shows the realigned roadway configuration resulting from the Mokulele Highway Widening, Vicinity of Maui Humane Society to Piliāni Highway.



D. Base Year 2016 Traffic Operations

During Base Year 2016, overcapacity conditions are projected to occur at the study's signalized intersections. See the following subsections for analysis of individual intersections.

North Kihei Road/South Kihei Road/Pili'ani Highway

As stated earlier, this intersection will undergo realignment as part of the Mokulele Highway widening project. Although the intersection geometrics will be augmented to incorporate an exclusive northbound double left-turn lane and signalization, the intersection will also experience a greater westbound left-turning movement due to the removal of the segment of Mokulele Highway between Pili'ani Highway and South Kihei Road, whose traffic will be diverted to this intersection.

Therefore, this intersection will operate at LOS E with overcapacity conditions during the PM peak hour of traffic. This will primarily be due to the high left-turn volumes in the westbound and northbound directions, wherein 325 and 350 vehicles are projected to be making the respective movements during the PM peak hour of traffic. Although the northbound left-turn is projected to be higher at approximately 525 vehicles during the AM peak hour, the intersection will be operating at LOS C and under capacity due to the lower conflicting volumes. See Figure 12.

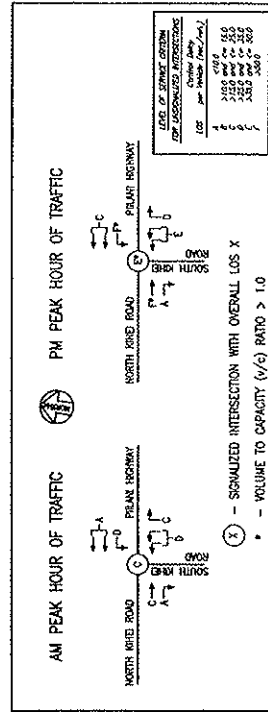


Figure 12: Base Year 2016 LOS at North Kihei Road/South Kihei Road/Pili'ani Highway

South Kihei Road/Uwapo Road

Although the westbound approach will operate at LOS F during the PM peak hour of traffic, the projected traffic volumes at this intersection do not warrant the installation of a traffic signal system according to criteria in the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD), 2003 Edition. It is not uncommon, however, for a low volume minor street to experience long delays especially when trying to execute a left-turn onto a major regional facility such as South Kihei Road. See Figure 13.

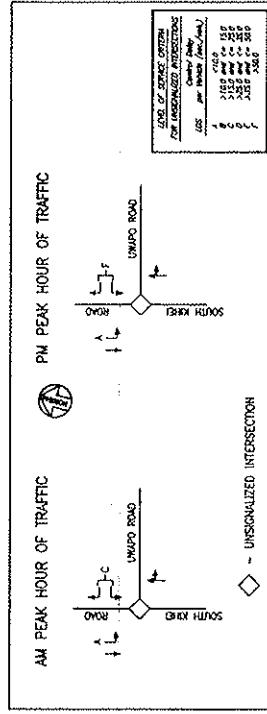


Figure 13: Base Year 2016 LOS at South Kihei Road/Uwapo Road

Pili'ani Highway/Mokulele Highway

This intersection will experience overcapacity conditions, primarily due to the conflict between the

- northbound left-turn volume at 955(1005) and
 - southbound through volume at 1410(1995)
- during the AM(PM) peak hours of traffic. Ninety-fifth percentile queues in the southbound direction are projected to extend approximately 100 vehicle lengths northward during the PM Peak hour of traffic. However, the planned lane configuration will already have two (2) lanes each for its high-volume turning movements. See Figure 14.

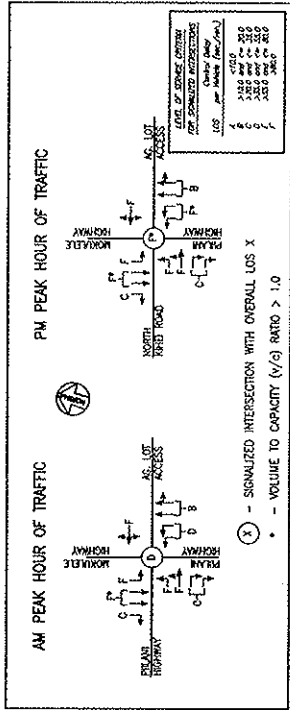


Figure 14: Base Year 2016 LOS at Piliiani Highway/Mokulele Highway

Piliiani Highway/Uwapo Road/Kawahine Street

This intersection will experience overcapacity and LOS F conditions during both the AM and PM peak hours of traffic, primarily due to an increase in through volumes along Piliiani Highway. See Figure 15.

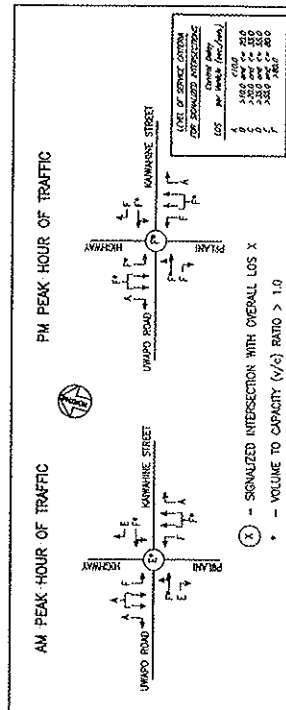


Figure 15: Base Year 2016 LOS at Piliiani Highway/Uwapo Road/Kawahine Street

Figure 16 shows the traffic volumes and LOS at the study intersections for Base Year 2016. Table 4 includes a summary of the LOS analysis for Base Year 2016.

E. Base Year 2016 Traffic Mitigative Measures

General Capacity Issues

Individual movements at the Piliiani Highway/Mokulele Highway intersection and Piliiani Highway/Uwapo Road/Kawahine Street intersection will continue to operate at LOS E or LOS F and/or be operating at overcapacity conditions during the AM and PM peak hours of traffic due to heavy through traffic volumes on Piliiani Highway. On Piliiani Highway just south of the Piliiani Highway/Mokulele Highway intersection, approximately 2,835(3,235) northbound vehicles projected during the AM(PM) peak hours of traffic, and 2,045(3,050) southbound vehicles projected during the AM(PM) peak hours of traffic.

Ultimate Makena and Honua Ula Development Schedules and Land Uses Unknown

Implicit to the projected volumes is the assumed full or partial implementation of all of the aforementioned "other known developments." However, the status of Honua Ula and Makena is of particular importance with respect to the traffic projections contained within this report. As mentioned earlier, Honua Ula has not yet received approval from Maui County Council. Makena is in the process of changing ownership. Therefore, it is unknown what the eventual timeframe and land uses will be for these developments.

Should these projects be delayed, not approved, or reduced in magnitude, a significant reduction in projected traffic volumes would result. Combined, the land uses for Makena and Honua Ula (as based on the most current information) will generate 1955(3134) vehicular trips during the AM(PM) peak hours of traffic. As a corollary to this, it is estimated that approximately 58 percent of residential traffic generated by these projects will pass through either Piliiani Highway or South Kihei Road in the vicinity of the Project. The effect of the non-inclusion of these two projects will be investigated in section IV.E.

Kihei-Upcountry Bypass

Currently, South Kihei Road and Piliāni Highway, via Mokuālele Highway and North Kihei Road serve as the only viable routes by which drivers are provided access to Upcountry. However, the proposed Kihei-Upcountry Bypass would offer a more direct and less congested route. It is estimated that this improvement would reduce traffic along Mokuālele Highway and Piliāni Highway north of Kaonoiū Street by approximately 25-30 percent. In its current proposed alignment, the bypass provides a direct connection between Kaonoiū Street and Heilimālle Road.

TDM Measures

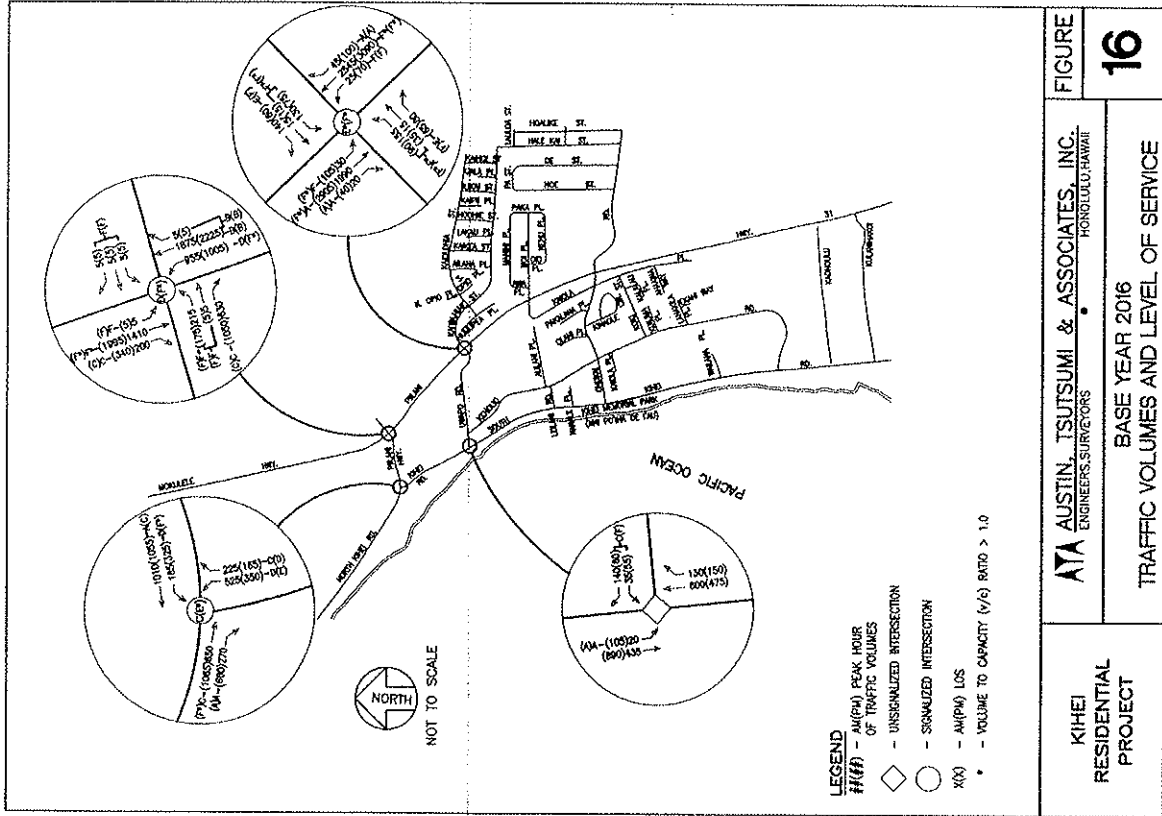
According to the Federal Highway Administration's Web Site (http://ops.fhwa.dot.gov/aboutus/one_pagers/demand_mgmt.htm), "the original concepts to travel demand management (TDM) took root in the 1970's and 1980's from legitimate desires to provide alternatives to the single occupancy commuter travel to save energy, improve air quality, and reduce peak period congestion. Today, managing travel demand has broadened to encompass the desire to optimize transportation system performance for commute and non-commute trips and for recurring as well as non-recurring events."

TDM measures could include incentive programs for carpooling by employers, further subsidy of bus fares, and an increase in the frequency and capacity of the existing bus routes.

As based on the 2000 census, Hawaii currently has a 6.3% transit ridership share, which is statistically dominated by Honolulu, which has a 12.02% transit ridership.

North Kihei Road/South Kihei Road/Piliāni Highway

As described previously, the eastbound through movement would operate at LOS F during the PM peak hour of traffic. One potential mitigative measure would be to widen the eastbound approach to include two (2) through lanes. This would increase capacity at the intersection, and allow more green time for the northbound approach.



As a result, all movements will operate at LOS E or better during the AM and PM peak hours of traffic, with no overcapacity conditions. Figure 17 shows the LOS for the North Kihei Road/South Kihei Road/Piliati Highway intersection. Figure 18 illustrates the revised lane configuration. Figure 19 shows traffic volumes and LOS at the study intersections for Base Year 2016 with mitigative measures. Table 4 includes a summary of the LOS analysis for Base Year 2016 with mitigative measures.

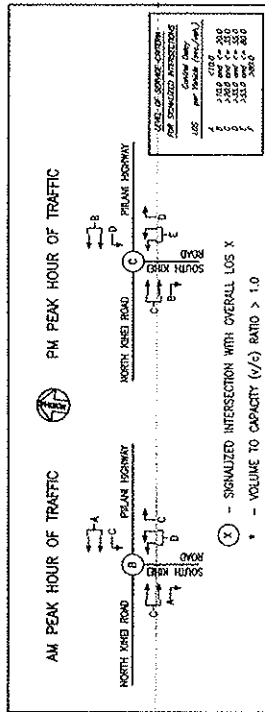
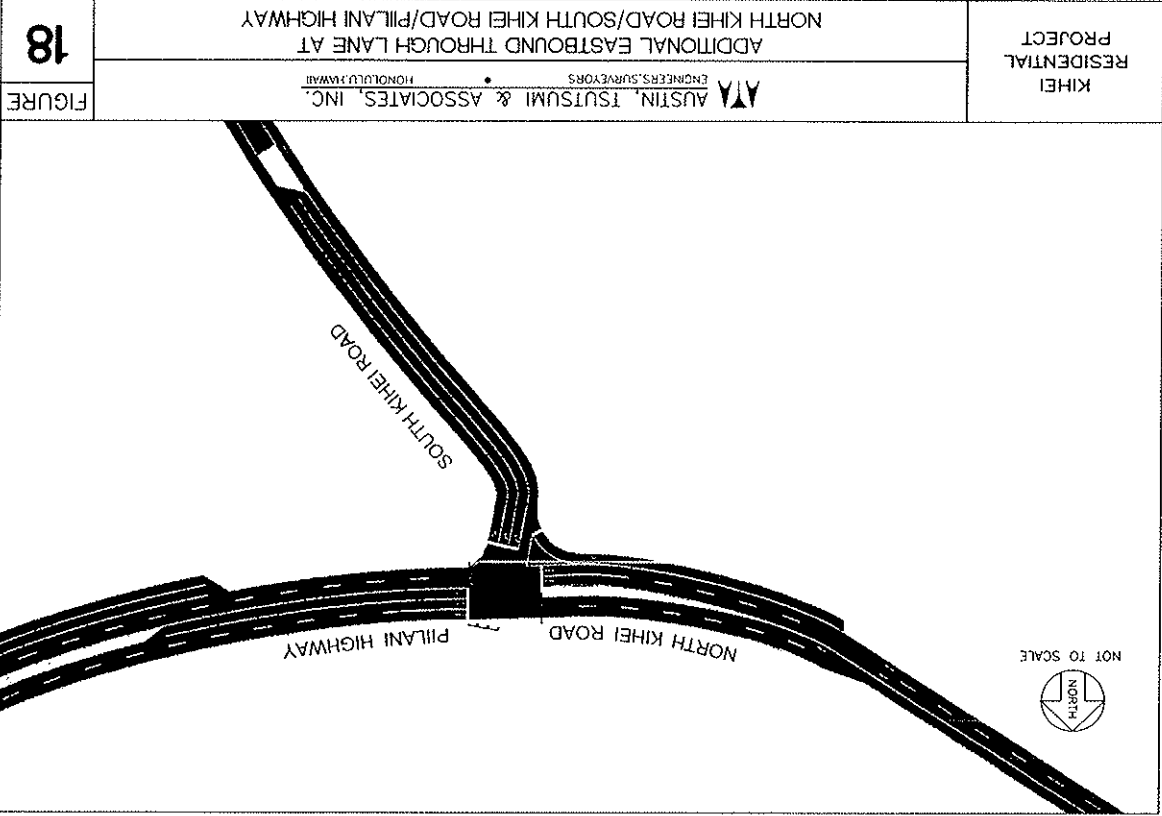


Figure 17: Base Year 2016 LOS at North Kihei Road/South Kihei Road/Piliati Highway with Mitigative Measures



IV. PROJECT-GENERATED TRAFFIC

A. Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled *Trip Generation, 7th Edition*, provides trip rates and/or formulae based on graphs that correlate vehicular trips (Y Axis) with independent variables (X Axis). The independent variable can range from Dwelling Units (DU) for single-family attached homes to Gross Floor Area (GFA) for commercial or office development. These trip rates/formulae and their associated directional distributions were used to estimate the number of vehicular trips generated by the Project. Table 2 shows these trip rates/formulae and Table 3 shows the number of peak hour trips that are expected to be generated by the Project.

As a conservative measure, all of the Project-generated trips were assumed to be external to/from areas outside the Project. In actuality, some interaction between the residences and neighborhood commercial area can be expected.

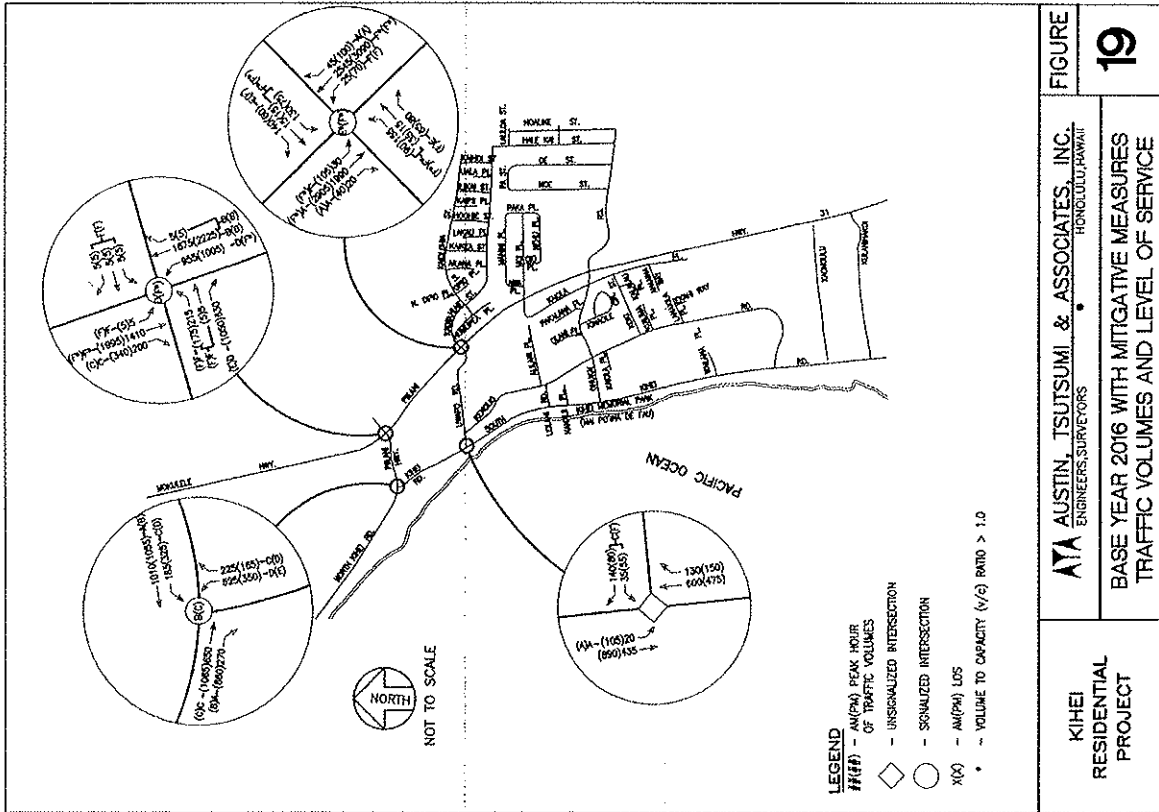


Table 2: Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak Hour of Traffic		PM Peak Hour of Traffic	
		Trip Rate	% Entering	Trip Rate	% Entering
Single-Family Home (210)	DU	a	25%	b	63%
Multi-Family Home (230)	DU	c	17%	d	67%
Commercial (652)	1,000 SF GLA	e	50%	f	49%
Office (710)	1,000 SF GLA	g	88%	h	17%
Community Park (412)	AC	0.01	80%	0.06	41%

DU= dwelling units
SF GLA = square feet of gross leasable area
AC= acres
T= number of trip ends
X= independent variable

a T= 0.70(X)+9.43
b Ln(T)= 0.90 Ln(X)+0.53
c Ln(T)= 0.80 Ln(X)+0.26
d Ln(T)= 0.82 Ln(X)+0.32
e T= 291.89(X)-662.10
f T=175.88(X)-358.94
g Ln(T)= 0.80*Ln(X)+1.55
h T= 1.12(X)+78.81

Source: Trip Generation, 7th Edition, Institute of Transportation Engineers.

Table 3: Project Land Uses and Trip Generation

Land Use Designation	No. of Units	AM Peak Hour of Traffic		PM Peak Hour of Traffic	
		Enter (vph)	Exit (vph)	Enter (vph)	Exit (vph)
Single-Family Home	400 DU	72	217	235	138
Multi-Family Home	200 DU	15	75	71	35
Commercial	3,000 SF GLA	106	107	83	86
Office	7,000 SF GLA	19	3	15	72
Community Park	10 AC	1	1	1	1
Total		213	403	405	332

vph = vehicles per hour
DU = dwelling units
SF GLA = square feet of gross leasable area
AC = acres

B. Trip Distribution

The next step after performing Trip Generation is to determine where the vehicles will originate from/destined to, and which path(s) they will use to make their trips. Trip Distribution estimates the former, and Trip Assignment the latter.

Trips were distributed across the roadway network within the study area based on the following existing traffic patterns during the peak hours of traffic:

- Twenty percent of the Project-generated traffic was assigned to/from North Kihai Road, of which 75 percent use Pilihi Highway and 25 percent use South Kihai Road.
- Thirty percent of the Project-generated traffic was assigned to/from Mokuia Highway, of which 100 percent use Pilihi Highway.

- Fifty percent of the Project-generated traffic was assigned to/from areas within Kihei, Wailaea and Makena, of which 90 percent use Pili'ani Highway and 10 percent use South Kihei Road.

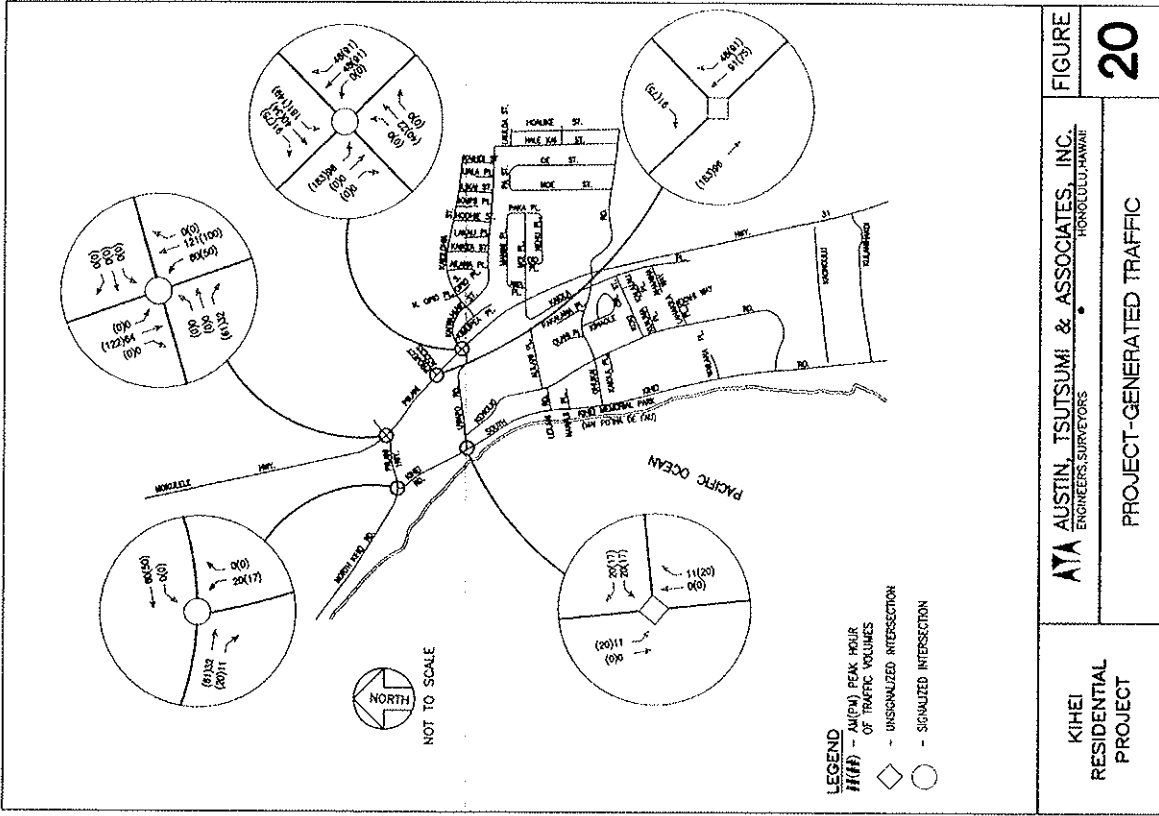
As mentioned earlier, vehicular access will be provided via a new right-turn in/right-turn out connection to Pili'ani Highway, and through the existing Pili'ani Highway/Uwapo Road/Kaiwahine Street intersection. Note further that vehicles will also be able to access Pili'ani Highway via Ohukai Road through the use of back roads. However, no trips were assigned as such.

Fifty percent of the traffic exiting or entering the Project to/from northbound Pili'ani Highway was assigned to use the proposed right-turn in/right-turn out only intersection. The remaining 50 percent of the traffic exiting or entering the Project to/from northbound Pili'ani Highway was assigned to use the existing Pili'ani Highway/Kaiwahine Street/Uwapo Road intersection. Figure 20 shows the assignment of Project-generated traffic.

At the proposed right-turn in/right-turn out only intersection on Pili'ani Highway, the northbound Pili'ani Highway approach was assumed to be striped as two (2) through lanes and an exclusive right-turn deceleration lane. The westbound Project Access approach will be striped as an exclusive right-turn lane connecting to an exclusive northbound acceleration lane terminating just before Waiakoa Gulch Bridge.

C. Year 2016 With Project Traffic Operations

Traffic generated by the Project was added to Base Year 2016 traffic volumes to estimate traffic volumes for Year 2016 with the Project. Similar to Base Year 2016, the analysis of traffic conditions for Year 2016 with the Project assumed the improvements shown on the construction plans for Moku'ele Highway Widening, Vicinity of Maui Humane Society to Pili'ani Highway. In addition, mitigative measures for the North Kihei Road/Pili'ani Highway/South Kihei Road were assumed. Project Traffic is shown in Figure 20.



North Kihei Road/South Kihei Road/Piliani Highway

Traffic at this intersection will operate similar to Base Year 2016 with mitigative measures. All individual movements will continue to operate at LOS D or better during the AM and PM peak hours of traffic. See Figure 21.

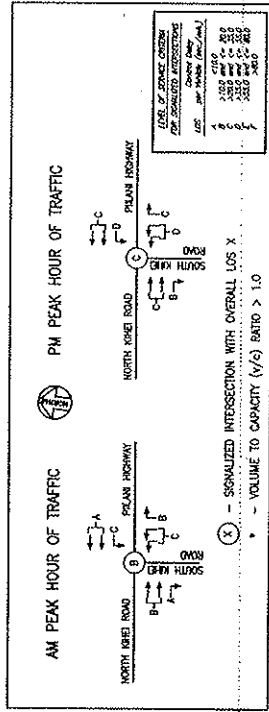


Figure 21: Year 2016 with Project LOS at North Kihei Road/South Kihei Road/Piliani Highway

South Kihei Road/Uwapo Road

At the South Kihei Road/Uwapo Road intersection, traffic on the westbound Uwapo Road approach will continue to operate at LOS F during the PM peak hour of traffic. Even with the traffic generated by the Project, the projected traffic volumes at this intersection do not warrant the installation of a traffic signal system according to criteria in the MUTCD, 2003 Edition which states that a traffic signal system should only be installed if warranted. It is not uncommon, however, for a low volume side street to experience long delays especially when trying to execute a left-turn onto a major regional facility such as South Kihei Road. Including Project-generated traffic, a total of 75 westbound vehicles are projected to turn left from Uwapo Road onto South Kihei Road during the PM peak hour of traffic.

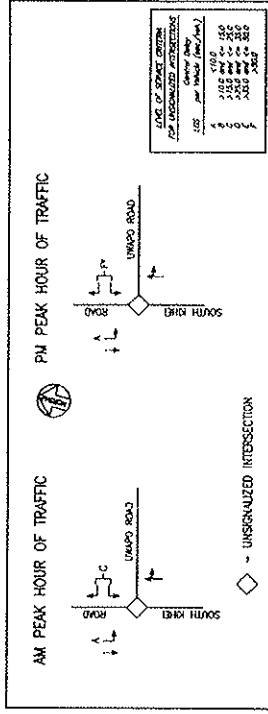


Figure 22: Year 2016 with Project LOS at South Kihei Road/Uwapo Road

Piliani Highway/Mokulele Highway

Similar to Base Year 2016, Overcapacity conditions and LOS F will continue to occur at this intersection, primarily due to the regional component at this junction between three regional facilities. See Figure 23 Below.

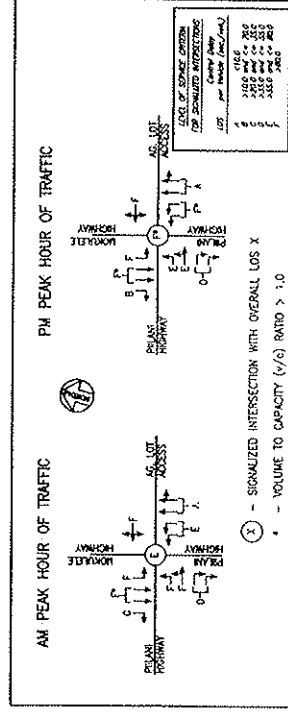


Figure 23: Year 2016 with Project LOS at Piliani Highway/Mokulele Highway

Piliāni Highway/Uwāpo Road/Kaiwāhine Street

With the existing lane configuration at this intersection, LOS F and overcapacity conditions will necessitate lane and traffic signal phasing modifications at this intersection. These modifications will be discussed in section IV.D. See Figure 24.

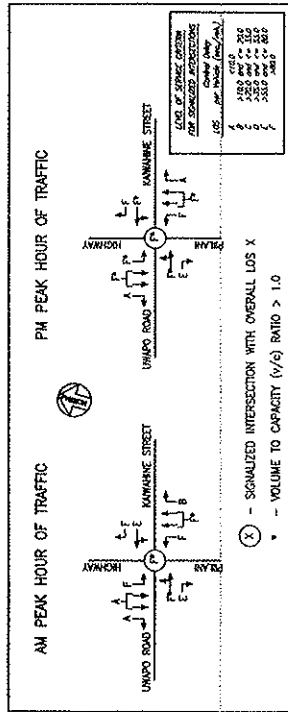


Figure 24: Year 2016 with Project LOS at Piliāni Highway/Uwāpo Road/Kaiwāhine Street

Piliāni Highway/New Project Access

It is recommended that the new project access road be a right-turn in/right-turn out configuration.

At the proposed new Piliāni Highway/Project Access intersection, westbound right-turn traffic will operate at LOS C. If constructed as a right-turn in/right-turn out only intersection, this will be the only movement that must yield to conflicting traffic. See Figure 25.

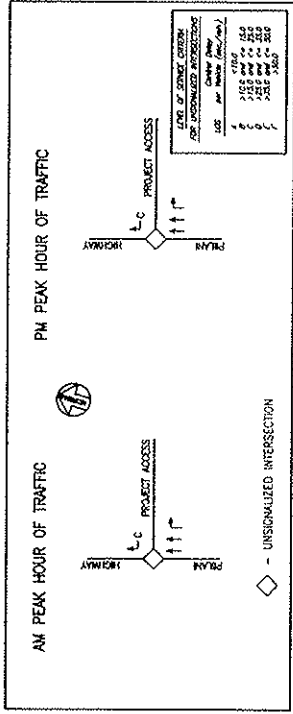


Figure 25: Year 2016 with Project LOS at Piliāni Highway/New Project Access

Figure 26 shows the traffic volumes and LOS at the study intersections for Year 2016 with the Project. Table 4 includes a summary of the LOS analysis for Year 2016 with the Project.

D. Recommended Improvements for Year 2016 With the Project

General Discussion

As with Base Year 2016, due to heavy regional traffic along Piliāni Highway, many of the intersections and their turning movements will experience LOS F with overcapacity conditions. As discussed in Section III.E, the following factors could potentially improve traffic conditions:

- Delayed construction and/or modification of land uses for Makena and Honua Ula.
- Kihel-Upcountry Bypass Road
- TDM measures

See Section III.E for discussion of these topics.

Piliani Highway/Uwapo Road/Kaiwaha Street

As discussed earlier, this intersection will be operating at LOS F and overcapacity conditions during both the AM and PM peak hours of traffic. This is due both to the regional component, and heavy turning movement volumes, which warrant or nearly warrant the construction of double left-turn lanes at the southbound and westbound approaches.

The Highway Capacity Manual (HCM, 2000) recommends providing double left-turn lanes for volumes of 300 vehicles per hour or more. The following movements meet or nearly meet this condition:

- Westbound left-turn – 310 vehicles during the AM peak hour of traffic
- Southbound left-turn – 290 vehicles during the PM peak hour of traffic

Therefore, the following improvements are recommended:

- Institute 8-phase signal operation
- Construct an eastbound dedicated left-turn lane.
- Widen the southbound Piliani Highway approach to incorporate two (2) exclusive left-turn lanes
- Widen the westbound approach to incorporate two exclusive left-turn lanes, a through lane, and an exclusive right-turn lane connecting to a northbound acceleration lane terminating downstream of the proposed right-turn in/right-turn out.

These improvements will reduce average delay at the intersection by 140(122) seconds during the AM(PM) peak hours of traffic. However, regional traffic will still cause the intersection to operate at LOS F and overcapacity.

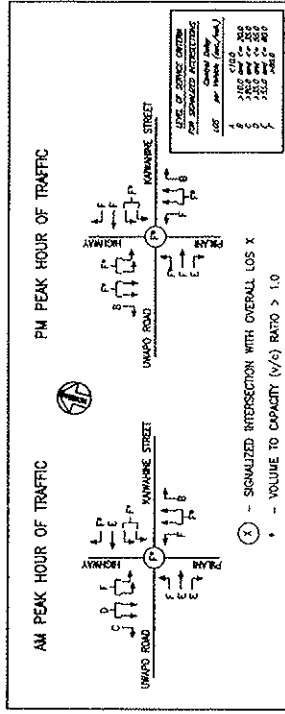
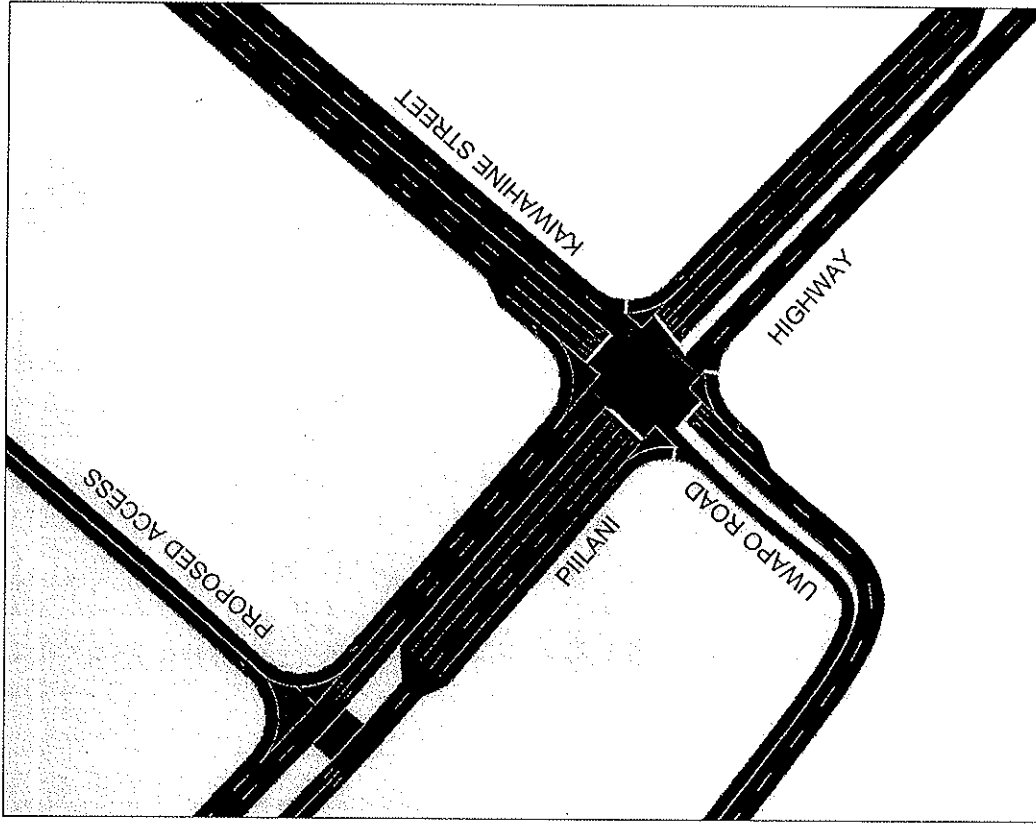


Figure 27: Year 2016 with Project and Recommended Improvements LOS at Uwapo Road/Piliani Highway/Kaiwaha Street

Figure 28 shows the recommended improvements at the Piliani Highway/Uwapo Road/Kaiwaha Street intersection. Figure 29 shows the traffic volumes and LOS at the study intersections for Year 2016 with the Project and recommended improvements. Table 4 includes a summary of the LOS analysis for Year 2016 with the Project and recommended improvements.

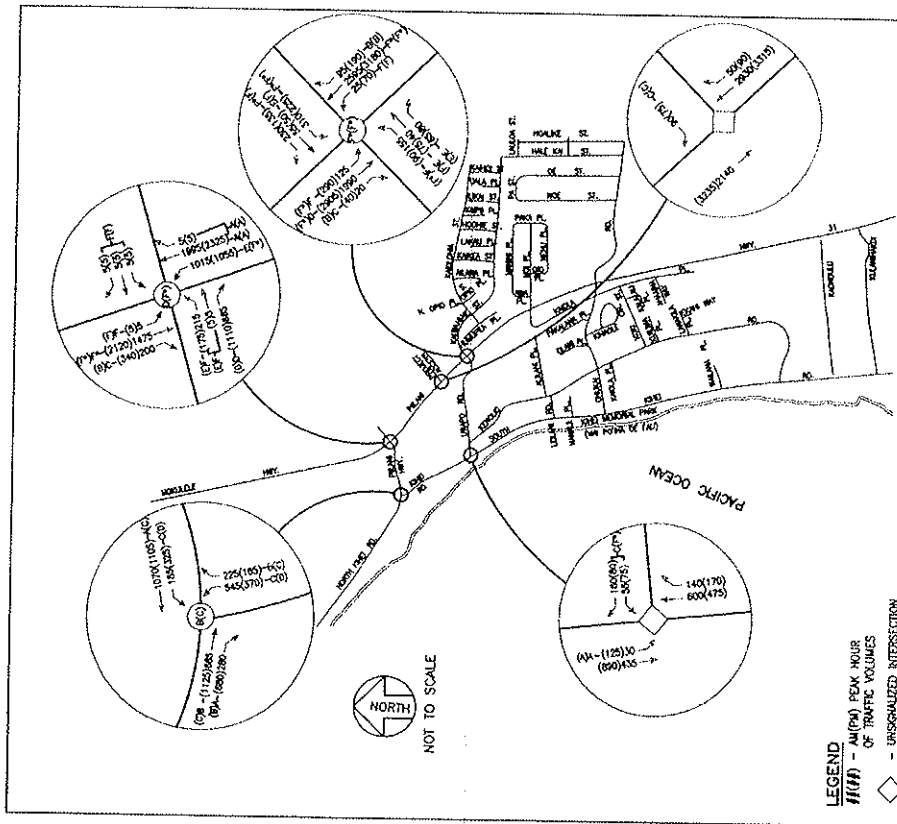


ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS
HONOLULU, HAWAII

KIHEI RESIDENTIAL PROJECT

UWAPO STREET/KAWAIIHINE STREET/PILIILANI HIGHWAY
RECOMMENDED IMPROVEMENTS

FIGURE **28**



ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS
HONOLULU, HAWAII

KIHEI RESIDENTIAL PROJECT

YEAR 2016 WITH THE PROJECT
AND RECOMMENDED IMPROVEMENTS
TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE **29**

LEGEND

AM(PM) - AM(PM) PEAK-HOUR OF TRAFFIC VOLUMES

◇ - UNSIGNALIZED INTERSECTION

○ - SIGNALIZED INTERSECTION

X(X) - AM(PM) LOS

• - VOLUME TO CAPACITY (V/C) RATIO > 1.0

NORTH

NOT TO SCALE

E. Year 2016 With the Project and With Delayed Development of Honua Ula and Makena

As discussed earlier, Honua Ula and Makena will generate approximately 1,955(3,134) vehicular trips during the AM(PM) peak hours of traffic. However, Makena is in the process of changing ownership and Honua Ula has not received approval from the Maui County Council. Therefore, although it has been assumed throughout this report that these projects would be developed as previously planned, the time frame and exact land uses/quantities are currently unknown. This section seeks to analyze and evaluate the effects of delay in development of these projects beyond Base Year 2016.

Based on this analysis, delay and resultant LOS improves at the intersections of Pili'ani Highway/Mokulele Highway and Pili'ani Highway/Uwapo Road/Kaiwahine Street. At Pili'ani Highway/Mokulele Highway, overall PM peak hour conditions improve from LOS F to E. At Pili'ani Highway/Uwapo Road/Kaiwahine Street, AM peak hour conditions improve from LOS F to E. When compared with the scenario inclusive of Honua Ula and Makena, projected overall delays will be 12.5(54.3) seconds lower at the Pili'ani Highway/Mokulele Highway intersection, and 49.1(111.2) seconds lower at the Pili'ani Highway/Uwapo Road/Kaiwahine Street intersections during the AM(PM) peak hours of traffic. The queue of vehicles traveling southbound at the Pili'ani Highway/Mokulele Highway intersection would be reduced from 100 to 65 vehicles during the PM peak hour of traffic. Furthermore, as stated earlier, the Kihai-Upcountry Bypass and/or TDM measures will provide additional reductions in traffic.

See Figures 30-34 for intersection LOS. See Table 4 for a summary of the LOS analysis. See Table 5 for a comparison between Year 2016 with Project with and without Makena and Honua Ula. Figure 30 shows the traffic volumes and LOS at the study intersections for Year 2016 with the Project and without Makena and Honua Ula.

Table 5
Level of Service Summary - Comparison of with/without Honua Ula and Makena

	Year 2016		Year 2016	
	With the Project and with Honua Ula and Makena	With the Project and with Honua Ula and Makena	With the Project and with Honua Ula and Makena	With the Project and with Honua Ula and Makena
	AM	PM	AM	PM
	LOS	LOS	LOS	LOS
North Kihai Road/South Kihai Road/Pili'ani Highway (signalized)				
EB TH	B	C	C	C
EB RT	A	B	A	B
WB LT	C	D	D	D
WB TH	A	C	A	A
NB LT	C	D	C	D
NB RT	B	C	C	D
Overall	B	C	B	C
Overall Delay	15.6	26.1	17.7	22.0
	Delay Reduction		-2.1	
South Kihai Road/Uwapo Road				
WB LT/RT	C	F*	C	F*
SB LT	A	A	A	A
Pili'ani Highway/Mokulele Highway (with realignment)				
EB LT	F	E	F	F
EB LT/TH	F	D	D	D
EB RT	F	D	F	D
WB LT/TH/RT	F	F	F	F
NB LT	E	F*	D	E
NB TH/RT	A	A	B	B
SB LT	F	F	F	F
SB TH	F*	F*	D	F*
SB RT	C	B	C	B
Overall	D	F*	D	E
Overall Delay	52.1	111.8	39.6	57.5
	Delay Reduction		12.5	
Pili'ani Highway/Uwapo Road/Kaiwahine Street				
EB LT	F	F*	F*	F
EB TH	E	F	E	F
EB RT	E	E	E	F
WB LT	F*	F*	F	F*
WB TH	E	F	E	F
WB RT	F*	F	F*	F
NB LT	F*	F*	F*	F*
NB TH	F*	F*	E*	F*
NB RT	B	B	B	B
SB LT	F	F*	F*	B
SB TH	D	F*	A	B
SB RT	C	B	A	A
Overall	F*	F*	E*	A
Overall Delay	107.8	191.8	58.7	80.6
	Delay Reduction		49.1	
Pili'ani Highway/Project Access				
WB RT	C	C	C	C
*volume to capacity (v/c) ratio > 1.0				

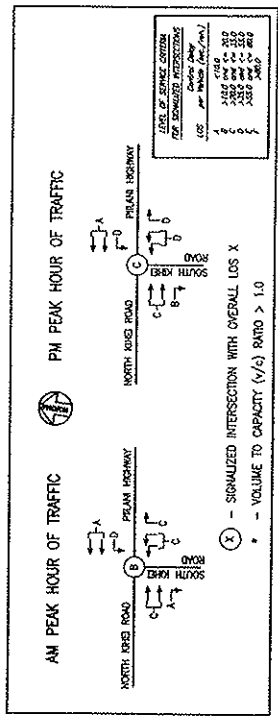


Figure 30: Year 2016 with Project and without Makena and Honua Ula
 LOS at North Kihai Road/South Kihai Road/Pilihi Highway

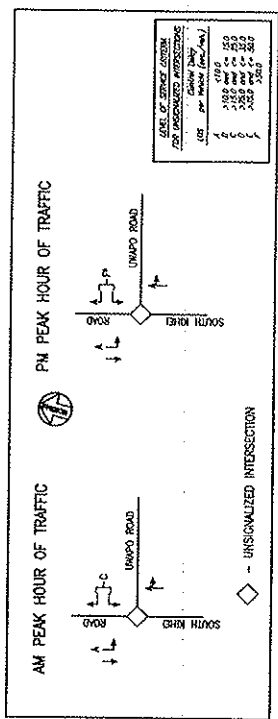


Figure 31: Year 2016 with Project and without Makena and Honua Ula
 LOS at South Kihai Road/Uwapo Road

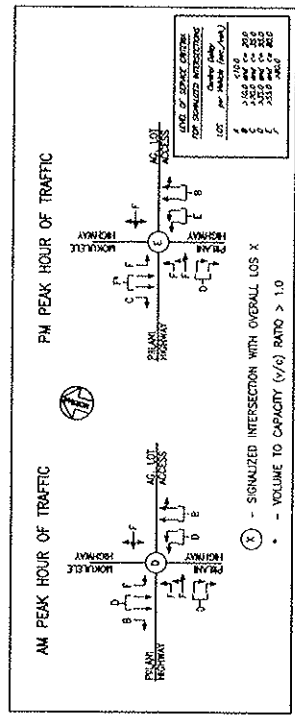


Figure 32: Year 2016 with Project and without Makena and Honua Ula
 LOS at Mokuale Highway/Pilihi Highway

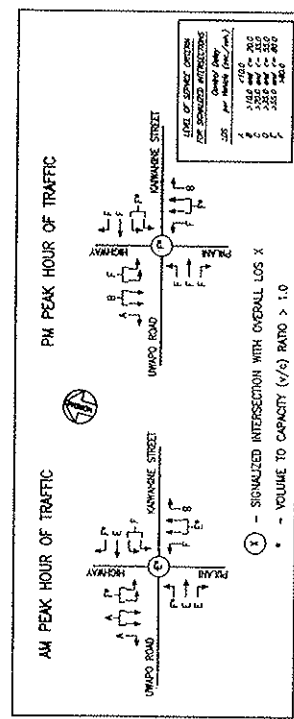


Figure 33: Year 2016 with Project and without Makena and Honua Ula
 LOS at Pilihi Highway/Uwapo Road/Kawaihine Street

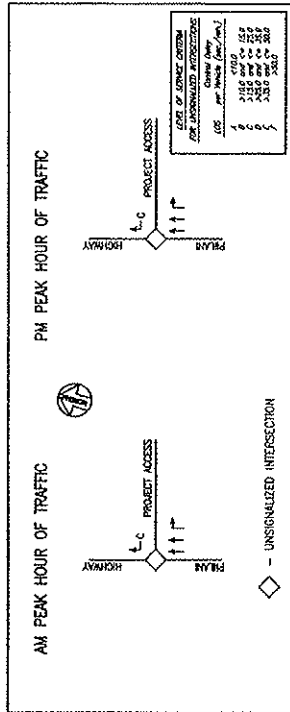
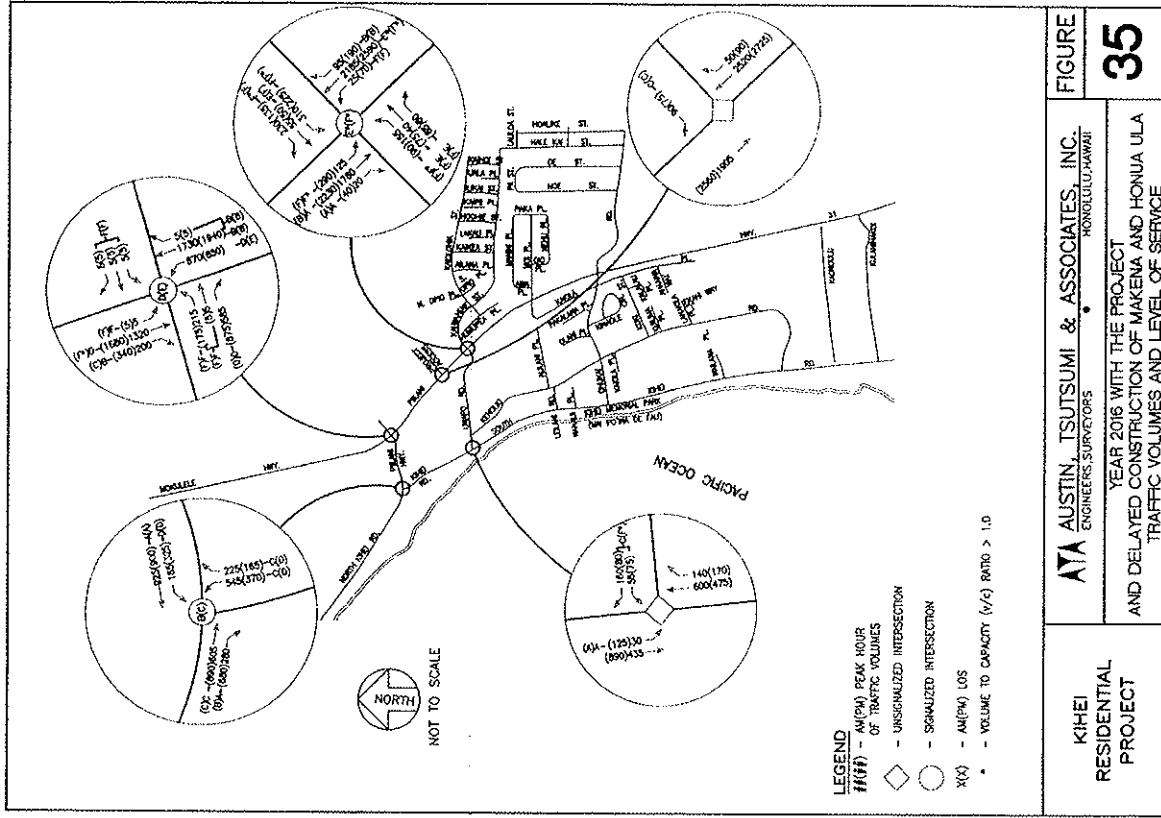


Figure 34: Year 2016 with Project and without Makena and Honua Ula
LOS at Pilihi Highway/Project Access



V. SUMMARY AND RECOMMENDATIONS

A. Summary

Existing Conditions

Currently vehicles experience long delays and/or overcapacity conditions at the study intersections along Piliāni Highway. Westbound traffic on Piliāni Highway was observed to queue from Mokulele Highway to beyond the Waiakoa Gulch Bridge during the AM peak hour of traffic. During the PM peak hour of traffic, westbound right-turn and southbound left-turn queues at the Piliāni Highway/Mokulele Highway intersection were observed to be approximately 25 vehicles long. During both the AM and PM peak hours of traffic, congestion is due to heavy traffic volumes on Piliāni Highway and Mokulele Highway. Piliāni Highway serves as the main route between Kihei and West Maui, and Mokulele Highway serves as the main route between Kihei and Kahului.

Base Year 2016

Year 2016 was selected as the buildout year for this study based on the Project schedule. Traffic volume projections were made for Base Year 2016 (without the Project) using an annual vehicular growth rate of 2 percent per year. Base year traffic projections include traffic generated by the other known new/future developments near the Project that are expected to be constructed by Year 2016 and generate significant traffic demand within the study area. Note that some of these developments are in the planning and entitlement phase and may not materialize within the 2016 time horizon. These developments and the number of vehicular trips they are expected to generate are shown in Table 1.

The improvements shown on the plans for Mokulele Highway Widening, Vicinity of Maui Humane Society to Piliāni Highway are currently being constructed and therefore were assumed to be completed by 2016. Improvements include realignment of Piliāni Highway and Mokulele Highway. In addition, the South Kihei Road/Mokulele Highway intersection will be eliminated and a traffic signal system will be installed at the North Kihei Road/South Kihei Road/Piliāni Highway Intersection.

Analysis of Base Year 2016 traffic conditions without the Project indicates some individual movements at the study intersections along Piliāni Highway will operate at LOS E or LOS F and/or be operating at overcapacity conditions during the AM and PM peak hours of traffic. At the North Kihei Road/South Kihei Road/Piliāni Highway intersection, the eastbound North Kihei Road approach should be modified to provide an additional through lane to mitigate Base Year 2016 traffic operations.

TDM measures, including carpooling incentives and increased frequency and availability of bus stops and/or the Kihei-Uppcountry Bypass are possible measures that will improve conditions.

Year 2016 with Project

The Project is proposed to consist of approximately 400 single-family detached units, approximately 200 multi-family units, a small neighborhood commercial area, and parks and open space. Approximately 40 percent of the units will be designated as affordable housing. The Project is expected to generate approximately 616 trip ends during the AM peak hour of traffic and 737 trip ends during the PM peak hour of traffic. These trips were assigned to access the Project via a proposed new right-turn in/right-turn out only intersection with acceleration and deceleration lanes on Piliāni Highway and the existing Piliāni Highway/Uwapo Road/Kaiwaha Street intersection.

Analysis of conditions for Year 2016 with the Project indicates that traffic will operate similarly to Base Year 2016 with mitigative measures. Because the Piliāni Highway/Uwapo Road/Kaiwaha Street intersection will provide access to the Project, turning movement traffic volumes at this intersection will increase. The southbound Piliāni Highway approach, which currently has a single exclusive left-turn lane, should be modified to provide double left-turn lanes. The eastbound Uwapo Street approach should be modified to provide an exclusive left-turn lane and a through lane. The westbound Kaiwaha Street approach, should be modified to provide two (2) exclusive left-turn lanes, an exclusive through lane, and an exclusive right-turn lane connecting to a northbound acceleration lane terminating north of the proposed right-turn in/right-turn out at the Waiakoa Gulch Bridge. Once these lane modifications are completed, the

traffic signal system at this intersection should be modified to provide an 8-phase signal timing configuration. Although these modifications would improve traffic conditions for Year 2016 with the Project, individual movements at the study intersections along Piliāni Highway will continue to operate at LOS E or LOS F and/or be operating at overcapacity conditions during the AM and PM peak hours of traffic due to heavy through traffic volumes on Piliāni Highway.

Honua Uia and Makena are projects that have been assumed to contribute a significant number of vehicular trips to Piliāni Highway. It is projected that they will generate approximately 1,955(3,134) vehicular trips during the AM(PM) peak hours of traffic. However, Makena is in the process of changing ownership, and Honua Uia has not yet received Maui County Council Zoning approval. Therefore, the ultimate time frame and land uses for these projects are currently unknown and current information outdated. Therefore, in the event that the development of these projects is modified or delayed, traffic projections will be significantly better than what has been assumed throughout this report. In general, although LOS E and LOS F will still occur along Piliāni Highway's major intersections, the projected overall delays will be 12.5(54.3) seconds lower at the Piliāni Highway/Mokulele Highway intersection, and 49.1(111.2) seconds lower at the Piliāni Highway/Uwapo Road/Kaiwahine Street intersections during the AM(PM) peak hours of traffic. Furthermore, the queue of vehicles traveling southbound at the Piliāni Highway/Mokulele Highway intersection would be reduced from 100 to 65 vehicles during the PM peak hour of traffic.

B. Recommendations

The following are the recommendations of the traffic study that would be needed by Year 2016 even without Project-generated traffic.

- At the North Kihei Road/South Kihei Road/Piliāni Highway intersection, modify the eastbound North Kihei Road approach to provide an additional through lane.
- Continue to pursue development of the Kihei-Upcountry Bypass and a north-south roadway parallel to Piliāni Highway.
- Pursue carpooling incentives and increased bus service.

The following are the recommendations of the traffic study with traffic generated by the Project.

- Construct the proposed right-turn in/right-turn out only Project Access on Piliāni Highway. Provide an exclusive right-turn deceleration lane on the northbound Piliāni Highway approach (continuation of Piliāni Highway/Kaiwahine Street/Uwapo Road westbound right-turn acceleration lane) and an exclusive northbound acceleration lane.
- At the Piliāni Highway/Uwapo Road/Kaiwahine Street intersection, modify the southbound Piliāni Highway approach to provide double left-turn lanes. Modify the eastbound Uwapo Street approach to provide an exclusive left-turn and through lane. Modify the westbound Kaiwahine Street approach to provide two (2) exclusive left-turn lanes; a through lane, and an exclusive westbound right-turn lane connecting to an exclusive northbound acceleration lane.

Once lane modifications at the Piliāni Highway/Uwapo Road/Kaiwahine Street intersection are completed as described above, modify the traffic signal system at this intersection to provide an 8-phase traffic signal timing configuration.

REFERENCES

1. Austin, Tsutsumi & Associates, Inc., Traffic Impact Analysis Report for the Waialea Resort, Revised Master Plan – 2005, May 23, 2005.
2. Austin, Tsutsumi & Associates, Inc., Waipuliiani Subdivision Traffic Impact Report, February 2002.
3. Institute of Transportation Engineers, Trip Generation, 7th Edition.
4. Julian Ng, Inc., Traffic Impact Analysis Report for Kaonoulu Industrial Park, March 1994.
5. Parsons Brinckerhoff Quade & Douglas, Inc., Coordinated South Maui Traffic Study, Honua Uia/Waialea 670, Waialea Resort, Makana Resort, September 2006.
6. Phillip Rowell and Associates, Traffic Impact Analysis Report for Waipuliiani Estates, revised February 4, 2003.
7. State of Hawaii, Department of Transportation, Construction Plans for Mokuule Highway Widening, Vicinity of Keala Pond Driveway to Piilani Highway, July 2005.
8. Transportation Research Board, Highway Capacity Manual – HCM 2000, Special Report 209, 2000.
9. U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2003 Edition, November 2003.

N-S Street, South Kihel
E-W Street, Uweapo
Count time: 3:00 pm to 5:30 pm
Weather: sunny

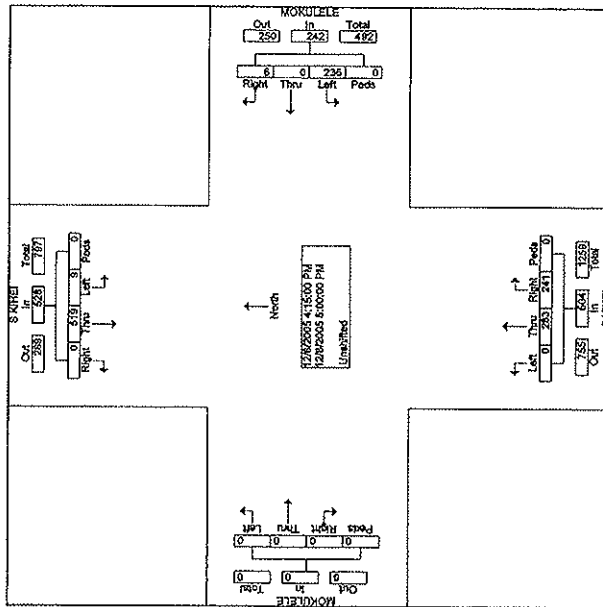
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File Name : S.Kihel.Uweapo PM
Site Code : 00000000
Start Date : 12/06/2005
Page No : 1

Start Time	S Kihel												Uweapo												S Kihel												Uweapo											
	From North						From East						From West						From South						From East						From West																	
	Rig	Thr	U	Left	Ped	App	Rig	Thr	U	Left	Ped	App	Rig	Thr	U	Left	Ped	App	Rig	Thr	U	Left	Ped	App	Rig	Thr	U	Left	Ped	App	Rig	Thr	U	Left	Ped	App												
02:45 PM	0	78	10	0	0	88	7	0	5	0	12	10	59	0	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
Total	0	78	10	0	0	88	7	0	5	0	12	10	59	0	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
03:00 PM	0	136	11	0	147	19	0	9	0	28	23	99	0	0	122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
03:15 PM	0	140	19	0	159	10	0	4	0	14	18	118	0	0	137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
03:30 PM	0	154	11	0	165	8	0	4	0	12	19	122	0	0	141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
03:45 PM	0	173	24	0	197	5	0	2	0	7	14	119	0	0	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Total	0	603	65	0	668	42	0	19	0	61	74	459	0	0	533	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
04:00 PM	0	143	18	0	161	14	0	8	0	22	15	111	0	0	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
04:15 PM	0	200	16	0	216	8	1	6	0	14	18	103	0	0	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
04:30 PM	0	138	18	0	156	11	0	10	0	21	19	127	0	0	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
04:45 PM	0	657	74	0	731	53	2	32	1	88	66	495	0	0	522	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Total	0	637	74	0	711	53	2	32	1	88	66	495	0	0	522	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
05:00 PM	0	180	27	0	207	9	0	12	0	21	16	105	0	0	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
05:15 PM	0	182	20	0	202	12	0	5	0	18	20	111	0	0	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Grand Total	0	165	188	0	353	123	2	74	1	200	186	116	0	0	1376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Approach %	0.0	89	10	0	0.0	61	1.0	37	0.5	13	66	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Total %	0.0	48	5.7	0.0	54.1	3.8	0.1	2.2	0.0	5.8	5.4	34	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										

APPENDIX A
TRAFFIC COUNT DATA

Start Time	S Kihai From North			Mokuiele From East			S Kihai From South			Mokuiele From West			Int. Total	
	Rig	Thru	Left	Rig	Thru	Left	Rig	Thru	Left	Rig	Thru	Left		
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	
Volume	0	518	9	0	528	6	0	236	0	242	241	263	0	0
Percent	0.0	98.1	1.7	0.0	100.0	1.1	0.0	45.0	0.0	47.0	52.0	0.0	0.0	0.0
Volume	0	142	1	0	143	4	0	62	0	66	63	0	0	0
High Int Peak Factor	0	142	1	0	143	4	0	70	0	74	75	0	0	0
Volume	0	142	1	0	143	4	0	62	0	66	63	0	0	0
Peak Factor	0	142	1	0	143	4	0	70	0	74	75	0	0	0



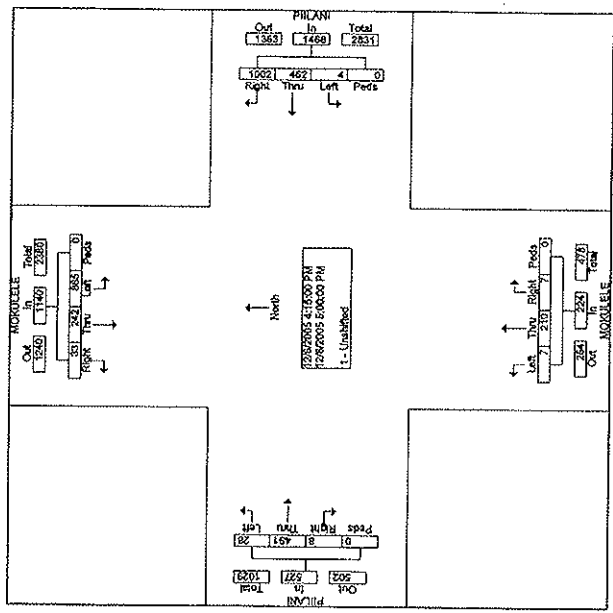
Start Time	Pillani From East			Mokuiele From South			Pillani From West			Int. Total
	Rig	Thru	Left	Rig	Thru	Left	Rig	Thru	Left	
02:30 PM	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0
Percent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volume	0	0	0	0	0	0	0	0	0	0
High Int Peak Factor	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0
Peak Factor	0	0	0	0	0	0	0	0	0	0

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File Name : Piliani-Mokulele PM
 Site Code : 00000000
 Start Date : 12/06/2005
 Page No : 2

N-S street: Mokulele
 E-W street: Piliani
 Count time: 3:00 pm to 5:30 pm
 Weather: sunny

Start Time	MOKULELE From North				PILIANI From East				MOKULELE From South				PILIANI From West				Int. Total				
	Rig	Thru	Left	u	Rig	Thru	Left	u	Rig	Thru	Left	u	Rig	Thru	Left	u					
04:15 PM to 05:00 PM - Peak 1 of 1	33	242	865	0	1140	2	462	4	0	1468	7	210	7	0	224	8	491	28	0	527	3359
Volume	33	242	865	0	1140	2	462	4	0	1468	7	210	7	0	224	8	491	28	0	527	3359
Percent	2.9	21	75	0.0	100	0.2	31	0.3	0.0	100	0.5	93	0.3	0.0	100	1.5	93	5.3	0.0	100	124
Volume Peak	13	88	215	0	314	276	109	1	0	386	3	42	1	0	48	0	113	11	0	124	870
Factor	0.4	0.4	0.2	0.0	0.3	0.6	0.2	0.0	0.0	0.3	0.1	0.2	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1	0.26
High Int. Peak	13	88	215	0	314	250	145	1	0	397	1	67	2	0	70	0	139	10	0	153	808
Factor	0.4	0.4	0.2	0.0	0.3	0.6	0.2	0.0	0.0	0.3	0.1	0.2	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1	0.26



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File Name : N Kihai-S Kihai PM
 Site Code : 00000000
 Start Date : 12/06/2005
 Page No : 1

N-S street: Piliani
 E-W street: South Kihai
 Count time: 3:00 pm to 5:30 pm
 Weather: sunny

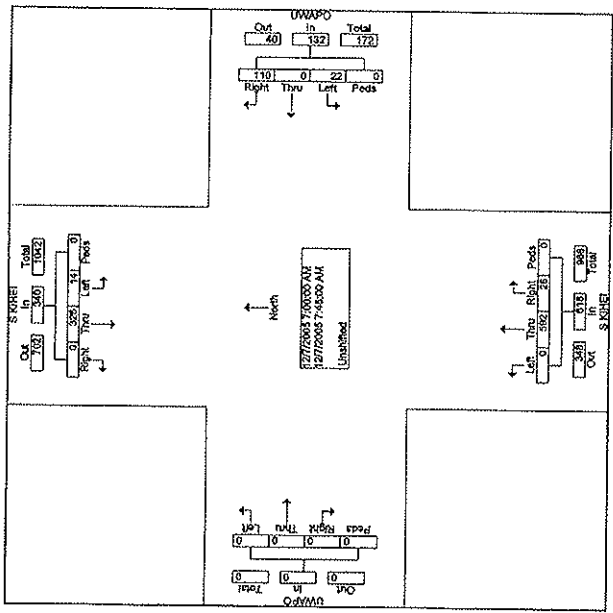
Start Time	PILIANI From North				SIKIEI From East				PILIANI From South				SIKIEI From West				Int. Total					
	Rig	Thru	Left	u	Rig	Thru	Left	u	Rig	Thru	Left	u	Rig	Thru	Left	u						
03:00 PM	75	119	0	0	394	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	341
03:15 PM	88	115	0	0	213	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	388
03:30 PM	102	91	0	0	193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	372
03:45 PM	116	130	0	0	246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	443
Total	381	455	0	0	848	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209	1544
04:00 PM	92	123	0	0	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	418
04:15 PM	124	130	0	0	254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	441
04:30 PM	104	126	1	0	230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	459
04:45 PM	138	127	0	0	267	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	459
Total	458	505	1	0	966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	1777
05:00 PM	128	127	0	0	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	431
05:15 PM	115	121	0	0	236	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	433
Grand Total	189	170	1	0	4201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	4185
Approach %	47	52	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95	0.0
Total %	28	28	0.0	0.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.8	14.0

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N-S street: South Kihel
 E-W street: Uwapo
 Count time: 6:30 am to 8:30 am
 Weather: sunny

File Name : S.Kihel-Uwapo AM
 Site Code : 00000000
 Start Date : 7/27/2005
 Page No : 2

Start Time	S Kihel From North			Uwapo From East			S Kihel From South			Uwapo From West			Int. Total
	Rig	Thru	Left	Rig	Thru	Left	Rig	Thru	Left	Rig	Thru	Left	
07:00 AM	0	325	14	0	22	0	132	28	592	0	0	0	1090
Volume	0	325	14	0	22	0	132	28	592	0	0	0	1090
Percent	0.0	95.4	4.1	0.0	16.0	0.0	4.2	95.8	0.0	0.0	0.0	0.0	0.927
Peak Hour	0	325	14	0	22	0	132	28	592	0	0	0	1090
Intersect	07:15 AM to 08:15 AM - Peak 4 of 1												
Volume	0	80	0	0	80	0	39	6	169	0	0	0	294
Percent	0	80	0	0	80	0	39	6	169	0	0	0	0.927
Peak Hour	0	80	0	0	80	0	39	6	169	0	0	0	294
Intersect	07:15 AM												
Volume	0	88	3	0	81	0	29	6	169	0	0	0	0.88
Percent	0	88	3	0	81	0	29	6	169	0	0	0	0.88
Peak Hour	0	88	3	0	81	0	29	6	169	0	0	0	0.88
Intersect	07:15 AM												
Volume	0	88	3	0	81	0	29	6	169	0	0	0	0.88
Percent	0	88	3	0	81	0	29	6	169	0	0	0	0.88
Peak Hour	0	88	3	0	81	0	29	6	169	0	0	0	0.88
Intersect	07:15 AM												



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N-S street: Mokuia
 E-W street: Pihani
 Count time: 6:30 am to 8:30 am
 Weather: sunny

File Name : Pihani-Mokuia AM
 Site Code : 00300000
 Start Date : 12/07/2005
 Page No : 1

Start Time	Moku From North			Pihani From East			Moku From South			Pihani From West			Int. Total
	Rig	Thru	Left	Rig	Thru	Left	Rig	Thru	Left	Rig	Thru	Left	
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	1	31	181	0	213	143	101	0	242	0	45	0	16
06:45 AM	4	24	159	0	187	178	141	1	330	1	70	0	68
06:59 AM	5	35	340	0	400	325	254	1	580	1	119	2	78
07:00 AM	6	39	484	0	229	204	130	0	334	1	71	5	144
07:15 AM	8	34	180	0	232	223	142	0	395	1	82	2	75
07:30 AM	9	28	213	0	248	230	145	1	376	1	80	6	72
07:45 AM	6	31	187	0	223	191	98	0	289	1	78	0	69
07:59 AM	23	130	774	0	832	848	515	1	1364	4	311	13	405
08:00 AM	5	37	178	0	221	198	111	0	309	1	74	0	59
08:15 AM	7	40	159	0	209	187	70	3	240	2	55	2	71
08:30 AM	45	282	145	0	1769	153	950	5	2493	8	559	17	584
08:45 AM	14	82	5	0	0	61	38	0	100	1	95	28	108
08:59 AM	26	159	4	0	320	27	17	1	348	10	7	42	121
Approach %	2.6	9.5	0.0	0.0	0.0	6.1	38.0	0.0	14.4	0.3	0.0	0.0	0.0
Total %	0.8	4.8	0.0	0.0	32.0	9.3	0.1	0.0	45.3	0.1	10.0	0.5	0.0

Austin, Tsutsumi & Associates, Inc.
 501 Summer Street, Suite 521
 Honolulu, Hawaii 96817
 Ph: (808) 533-3646 Fax: (808) 526-1267

N-S street: Pilihi
 E-W street: North Kihel
 Count time: 8:30 am to 8:30 am
 Weather: sunny

File Name : Pilihi-Mokulele AM
 Site Code : 00000000
 Start Date : 12/07/2005
 Page No : 2

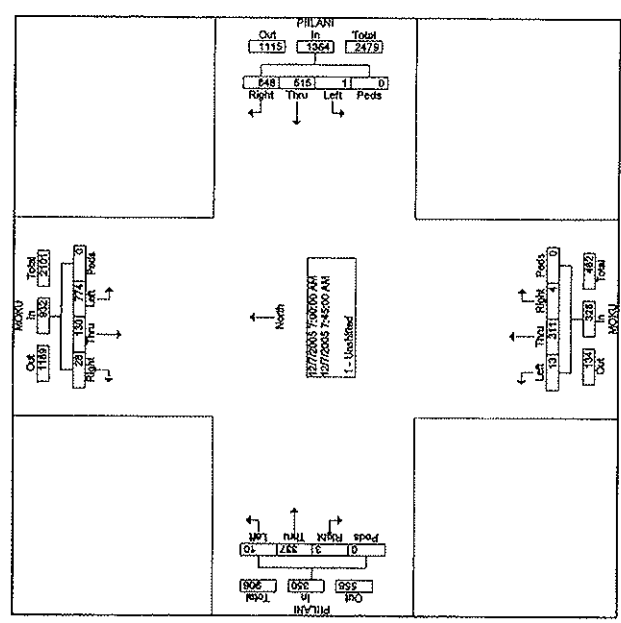
Austin, Tsutsumi & Associates, Inc.
 501 Summer Street, Suite 521
 Honolulu, Hawaii 96817
 Ph: (808) 533-3646 Fax: (808) 526-1267

N-S street: Mokulele
 E-W street: Pilihi
 Count time: 8:30 am to 8:30 am
 Weather: sunny

File Name : N.Kihel-S.Kihel AM
 Site Code : 00000000
 Start Date : 12/07/2005
 Page No : 1

Start Time	PILANI From North						KIHEI From East						PILANI From South						KIHEI From West					
	Rig	Thr	Left	App.	Ped	Total	Rig	Thr	Left	App.	Ped	Total	Rig	Thr	Left	App.	Ped	Total	Rig	Thr	Left	App.	Ped	Total
	ht	u	u	s	s	s	ht	u	u	s	s	s	ht	u	u	s	s	s	ht	u	u	s	s	s
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	18	64	0	82	0	164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	40	84	0	124	0	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	58	148	0	206	0	354	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	69	74	0	143	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	67	87	0	154	0	261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	67	111	0	178	0	348	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	44	104	0	148	0	252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	185	358	0	543	0	943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	47	100	0	147	0	247	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	48	77	0	125	0	223	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	348	681	0	1029	0	1674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	33	66	0	99	0	165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	8	2	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	12	24	0	37.1	0	73.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	MOKU From North						PILANI From East						MOKU From South						PILANI From West					
	Rig	Thr	Left	App.	Ped	Total	Rig	Thr	Left	App.	Ped	Total	Rig	Thr	Left	App.	Ped	Total	Rig	Thr	Left	App.	Ped	Total
	ht	u	u	s	s	s	ht	u	u	s	s	s	ht	u	u	s	s	s	ht	u	u	s	s	s
07:00 AM	28	130	774	0	932	0	848	515	1	0	1364	0	4	311	13	0	328	0	3	337	10	0	350	2874
07:30 AM	3	0	0	0	0	0	2	8	0	0	10	0	1	2	8	0	10	0	0.9	96	2.9	0	0	0
07:45 AM	26	213	0	249	0	489	230	145	1	0	378	0	1	80	6	0	87	0	1	94	3	0	98	809
Total	57	243	774	0	932	0	850	668	1	0	416	0	6	112	19	0	125	0	4.8	437	6.2	0	108	2874
Approach %	8	2	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	12	24	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



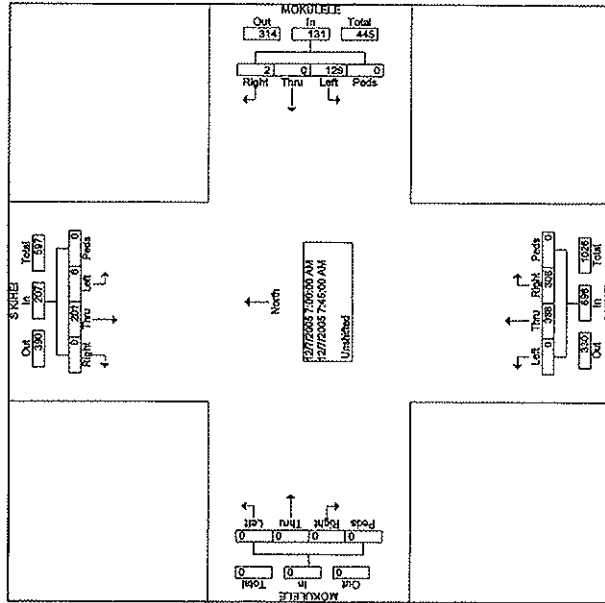
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501 Summer Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808) 533-3646 Fax: (808) 526-1267

File Name : S:\Kihel-Mokulele AM
Site Code : 00002000
Start Date : 12/07/2005
Page No : 2

N-S street: South Kihel
E-W street: Mokulele
count time: 6:30 am to 8:30 am
weather: sunny

APPENDIX B
LEVEL OF SERVICE CRITERIA

Start Time	S KIHEL From North					MOKULELE From East					S KIHEL From South					MOKULELE From West								
	Rtg	Thru	Left	Ped	App.	Rtg	Thru	Left	Ped	App.	Rtg	Thru	Left	Ped	App.	Rtg	Thru	Left	Ped	App.				
07:00 AM	0	0	6	0	207	2	0	128	0	131	308	388	0	0	688	0	0	0	0	0	0	0	1034	
Volume	0	0	97	2.9	0.0	1.5	0.0	86	0.0	0.0	44	55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.891	
Percent	0	0	1	0	52	0	0	34	0	34	89	115	0	0	204	0	0	0	0	0	0	0	290	
Volume	0	0	51	1	0	52	0	34	0	34	89	115	0	0	204	0	0	0	0	0	0	0	290	
Peak Factor																							0.891	
High Int.	07:30 AM					07:30 AM				07:15 AM					07:15 AM									
Volume	0	59	3	0	0.87	2	0	35	0	37	89	115	0	0	204	0	0	0	0	0	0	0	204	
Peak Factor										0.88					0.85									3



APPENDIX C

LEVEL OF SERVICE CALCULATIONS

APPENDIX B – LEVEL OF SERVICE (LOS) CRITERIA

LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS (HCM 2000)

Level of service for signalized intersections is directly related to delay values and is assigned on that basis. Level of Service is a measure of the acceptability of delay values to motorists at a given intersection. The criteria are given in table below.

Level of Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec./veh.)
A	< 10.0
B	>10.0 and ≤ 20.0
C	>20.0 and ≤ 35.0
D	>35.0 and ≤ 55.0
E	>55.0 and ≤ 80.0
F	> 80.0

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 2000)

The level of service criteria for unsignalized intersections is defined as the average control delay, in seconds per vehicle.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for Two-Way Stop-Controlled Intersections

Level of Service	Average Control Delay (sec./veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

HCM Unsignalized Intersection Capacity Analysis

1: North Kihei Road & Kihei Road

5/10/2007

Lane Configurations	Free	Free	Stop	Free	Stop
Sign Control	Free	Free	Stop	Free	Stop
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90
Pedestrians					
Walking Speed (ft/s)					
Right turn flare (veh)					1
Median storage (veh)					
P.X. platoon unblocked					0.70
vC1, stage 1 conf vol					
vC1, unblocked vol					385
IC, 2 stage (s)					385
pl queue free %					98
pl queue free %					0
pl queue free %					99
Volume Left	0	0	18	0	427
cSH	1700	1700	1163	1700	227
Queue Length 95th (ft)	0	0	1	0	771
Lane LOS	A	A	F	F	F
Approach LOS	F				
Average Delay	117.5				
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis

2: Mokuale Highway & South Kihei Road

5/10/2007

Lane Configurations	Free	Free	Stop	Free	Free
Sign Control	Free	Free	Stop	Free	Free
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90
Pedestrians					
Walking Speed (ft/s)					
Right turn flare (veh)					6
Median storage (veh)					
P.X. platoon unblocked					
vC1, stage 1 conf vol					
vC1, unblocked vol					688
IC, 2 stage (s)					431
pl queue free %					68
pl queue free %					100
pl queue free %					99
Volume Left	143	0	0	0	7
cSH	408	1700	1700	1700	1128
Queue Length 95th (ft)	37	0	0	0	0
Lane LOS	C	C	A	A	A
Approach LOS	C				
Average Delay	2.3				
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Road & South Kihel Road

5/10/2007



Lane Configurations	Stop	Free	Free
Sign Control	0.90	0.90	0.90
Peak Hour Factor	0.90	0.90	0.90
Pedestrians	0	0	0
Walking Speed (ft/s)	2		
Right turn lane (veh)			
Median storage (veh)			
Px Platoon unblocked			
VC1, stage 1 conf val	1066	672	687
vCu, unblocked val			
IC, 2 stage (s)	90	73	98
p0 queue free %			
Volumes Left	24	0	16
cSH	547	1700	907
Queue Length 95th (ft)	27	0	1
Lane LOS	C	A	A
Approach LOS	C		C
Average Delay		2.1	
Analysis Period (min)		15	

Timings
 4: Pillani Highway & Mokulele Highway

5/10/2007



Lane Configurations	2	6	6	3	4
Turn Type	Perm	Perm	Perm	Split	Perm
Permitted Phases	2	6	6	3	4
Switch Phase					
Minimum Split (s)	9.0	9.0	9.0	9.0	9.0
Total Split (%)	35.0%	35.0%	35.0%	27.0%	38.0%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?					
Act Effct Green (s)	30.1	30.1	30.1	21.0	31.4
v/c Ratio	0.14	0.68	0.01	0.99	0.96
Queue Delay	0.0	0.0	0.0	0.0	0.0
LOS	C	D	C	E	C
Approach LOS	D	D	D	E	E
Cycle Length, 100					
Natural Cycle, 90					
Maximum v/c Ratio, 0.99					
Intersection Capacity Utilization, 85.4%					
ICU Level of Service, E					





Lane Group Flow (vph)	11	377	1	572	360	499	505
Control Delay	31.6	36.5	25.0	72.3	31.0	64.3	25.0
Total Delay	31.6	36.5	25.0	72.3	31.0	64.3	25.0
Queue Length 95th (ft)	21	314	5	#597	#507	#304	10
Turn Bay Length (ft)	490	300				50	
Starvation Cap Reducn	0	0	0	0	0	0	0
Storage Cap Reducn	0	0	0	0	0	0	0

Queue shown is maximum after two cycles.
 Queue shown is maximum after two cycles.

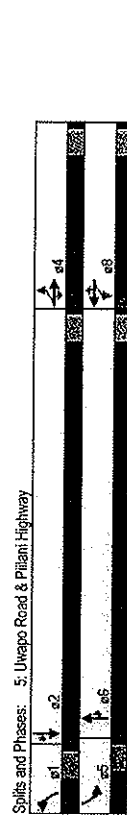


Lane Configurations								
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	0.97	
Flt Permitted	0.13	1.00	0.31	1.00	1.00	1.00	0.97	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
RTOR Reduction (vph)	0	0	0	0	490	0	0	
Turn Type	Perm	Perm	Perm	Split	Split	Perm	Split	
Permitted Phases	2	6	6	6	6	3	4	
Effective Green, g (s)	30.1	30.1	30.1	30.1	30.1	21.0	31.4	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	77	575	177	575	489	400	541	
v/s Ratio Perm	0.04	0.00	0.00	0.29	0.00	0.00	0.02	
Uniform Delay, d1	24.4	29.2	23.3	33.6	32.6	37.2	31.9	
Incremental Delay, d2	0.9	2.7	0.0	36.0	23.3	22.6	21.4	
Level of Service	C	C	C	E	E	E	C	
Approach LOS	C	C	E	E	E	D	D	
HCM Average Control Delay	54.5	HCM Level of Service						D
Accumulated Cycle Length (s)	97.5	Sum of lost time (s)						15.0
Analysis Period (min)	15							

Timings
5: Uwapo Road & Piliani Highway

5/10/2007

Lane	Perm	Perm	Perm	Perm	Prot	Perm	Prot	Perm	Prot
4	4	8	8	8	6				
Switch Phase									
Minimum Split (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Total Split (%)	27.0%	27.0%	27.0%	27.0%	10.0%	62.0%	11.0%	63.0%	63.0%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimize?									
Act Effect Green (s)	15.5	15.5	15.5	15.5	5.0	58.1	5.9	60.5	60.5
Ve Ratio	0.33	0.21	0.69	0.41	0.23	0.57	0.05	0.27	0.52
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	D	A	D	B	D	B	A	D	A
Approach LOS	C			C			B		
Cycle Length	100								
Natural Cycle	60								
Maximum Vc Ratio	0.69								
Intersection Capacity Utilization	57.1%								
ICU Level of Service B									



Queues
5: Uwapo Road & Piliani Highway

5/10/2007

Lane Group	Flow (veh)	67	155	21	1311	30	1249
Control Delay	37.8	9.9	51.9	11.9	51.5	12.0	3.0
Queue Length (ft)	75	35	155	63	38	353	15
Turn Bay Length (ft)	65	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0

HCM Signalized Intersection Capacity Analysis

5/10/2007

5: Uwabo Road & Pilihi Highway

Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.96	1.00	0.96	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Permitted	0.63	1.00	0.70	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	59	0	0	112	0	0	17	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Permitted Phases	4	4	6	8	8	6	6	6	6	6	6	6	6
Effective Green, g (s)	15.5	15.5	15.5	15.5	18	59.1	59.1	3.3	60.6	60.6	60.6	60.6	60.6
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	197	264	217	264	34	2251	1007	63	2309	1033	1033	1033	1033
v/s Ratio Perm	0.06	0.01	0.12	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Uniform Delay, d1	34.2	32.5	36.6	33.2	45.2	9.8	6.3	44.0	8.7	5.6	5.6	5.6	5.6
Incremental Delay, d2	1.0	0.1	10.6	0.3	29.0	1.1	0.1	5.6	0.9	0.0	0.0	0.0	0.0
Level of Service	D	C	D	C	E	B	A	D	A	D	A	A	A
Approach LOS	C	D	D	B	B	B	B	B	B	B	B	B	B
HCM Average Control Delay	15.0 HCM Level of Service B												
Actuated Cycle Length (s)	92.9 Sum of lost time (s) 15.0												
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis

5/10/2007

1: North Kihei Road & Kihei Road

Lane Configurations													
Sign Control	Free Free Stop												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pedestrians	0												
Walking Speed (ft/s)	3.5												
Right turn flare (veh)	1												
Median storage (veh)	0												
pX, platoon unblocked	0.00 0.00 0.00 0.00 0.00 0.00												
vC1, stage 1 conf vl	0												
vC4, unblocked vl	0												
vC, 2 stage (s)	0												
p0 queue free %	0												
Volume Left	0 0 22 0 279												
CSH	0 0 0 0 0 0												
Queue Length 95th (ft)	0 0 0 0 0 0												
Lane LOS	A A A A A A												
Approach LOS	A A A A A A												
Average Delay	0.0												
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
 2: Mokulele Highway & South Kihel Road

5/10/2007



Lane Configurations	← ↑ ↓		
Sign Control	Stop	Free	Free
Peak Hour Factor	0.90	0.90	0.90
Pedestrians			
Walking Speed (ft/s)			
Right turn flare (veh)	6		
Median storage veh			
PX, platoon unblocked			
VC1, stage 1 conf vel			
VC1, unblocked vel	889	292	292
VC, 2 stage (s)			
pl queue free %	16	99	99
Volume Left	262	0	10
cSH	319	1700	1269
Queue Length 95th (ft)	184	0	1
Lane LOS	F	A	A
Approach LOS	F		
Average Delay	10.6		
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Road & South Kihel Road

5/10/2007



Lane Configurations	← ↑ ↓		
Sign Control	Stop	Free	Free
Peak Hour Factor	0.90	0.90	0.90
Pedestrians			
Walking Speed (ft/s)			
Right turn flare (veh)	2		
Median storage veh			
PX, platoon unblocked			
VC1, stage 1 conf vel			
VC1, unblocked vel	1475	537	574
VC, 2 stage (s)			
pl queue free %	68	90	91
Volume Left	40	0	94
cSH	284	1700	999
Queue Length 95th (ft)	33	0	8
Lane LOS	D	A	A
Approach LOS	D		
Average Delay	2.2		
Analysis Period (min)	15		



Lane Configurations	31	555	4	513	241	605	625
Lane Group Flow (vph)	31	555	4	513	241	605	625
Control Delay	45.9	58.1	35.2	52.7	47.1	78.3	39.6
Total Delay	45.9	58.1	35.2	52.7	47.1	78.3	39.6
Queue Length 95th (ft)	55	70.0	13	46.16	79.1	43.36	20
Turn Bay Length (ft)	450	300	0	0	0	0	0
Starvation Cap Reduction	0	0	0	0	0	0	0
Storage Cap Reduction	0	0	0	0	0	0	0

Queue shown is maximum after two cycles.
Queue shown is maximum after two cycles.



Lane Configurations	2	6	6	3	4
Lane Group Flow (vph)	2	6	6	3	4
Control Delay	35.6%	35.6%	35.6%	20.0%	20.0%
Total Delay	35.6%	35.6%	35.6%	20.0%	20.0%
Queue Length 95th (ft)	1.0	1.0	1.0	1.0	1.0
Turn Bay Length (ft)	5.0	5.0	5.0	5.0	5.0
Starvation Cap Reduction	0	0	0	0	0
Storage Cap Reduction	0	0	0	0	0

Queue shown is maximum after two cycles.
Queue shown is maximum after two cycles.

Act Effect Green (s)	43.3	43.3	43.3	19.9	19.9	50.4	50.4
Act Effect Green (s)	43.3	43.3	43.3	19.9	19.9	50.4	50.4
v/s Ratio	0.32	0.89	0.06	0.82	1.03	0.84	0.92
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	D	E	D	D	D	E	E
Approach LOS	E	D	D	E	E	E	E
Cycle Length: 185							
Natural Cycle: 90							
Maximum v/s Ratio: 1.03							
Intersection Capacity Utilization: 89.3%							
ICU Level of Service: E							



Splits and Phases: 4: Piliani Highway & Mokuiele Highway

HCM Signalized Intersection Capacity Analysis
 4: Piliiani Highway & Mokutele Highway

5/10/2007

Lane Configurations	→		←		→		←	
Turn Type	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Permitted Phases	4		8		4		6	
Switch Phase	1							
Minimum Split (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Total Spk (%)	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.1%	70.0%
AI-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?	No							
Act Elct Green (s)	14.5	14.5	14.5	14.5	9.7	88.1	13.8	94.8
vic Ratio	0.32	0.25	0.66	0.28	0.49	0.64	0.10	0.63
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	E	B	E	B	E	B	A	E
Approach LOS	D		D		B		B	
Cycle Length: 140								
Natural Cycle: 50								
Maximum v/c Ratio: 0.66								
Intersection Capacity Utilization 67.5%								
ICU Level of Service C								
Spills and Phases: 5: Uwepo Road & Piliiani Highway								

HCM Signalized Intersection Capacity Analysis
 5: Uwepo Road & Piliiani Highway

5/10/2007

Lane Configurations	→		←		→		←	
Turn Type	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Permitted Phases	4		8		4		6	
Switch Phase	1							
Minimum Split (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Total Spk (%)	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.1%	70.0%
AI-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?	No							
Act Elct Green (s)	14.5	14.5	14.5	14.5	9.7	88.1	13.8	94.8
vic Ratio	0.32	0.25	0.66	0.28	0.49	0.64	0.10	0.63
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	E	B	E	B	E	B	A	E
Approach LOS	D		D		B		B	
Cycle Length: 140								
Natural Cycle: 50								
Maximum v/c Ratio: 0.66								
Intersection Capacity Utilization 67.5%								
ICU Level of Service C								
Spills and Phases: 5: Uwepo Road & Piliiani Highway								

Queues

5: Uwapo Road & Pilani Highway

5/10/2007

Lane Group Flow (vph)	58	98	63	1511	118	1380
Control Delay	59.3	15.7	77.9	48.7	73.4	15.2
Total Delay	59.3	15.7	77.9	48.7	73.4	15.2
Queue Length 95th (ft)	93	43	148	48	105	543
Turn Bay Length (ft)	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0

5/10/2007

Lane Configurations	4	7	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	0.96	1.00	0.95	1.00	0.95
Flt Permitted	0.88	1.00	0.73	1.00	0.95	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	53	0	0	51	0	36
Turn Type	Perm	Perm	Perm	Perm	Prot	Prot	Perm
Permitted Phases	4	4	8	8	6	6	2
Effective Green, g (s)	14.5	14.5	14.5	14.5	8.2	89.2	13.8
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	178	173	148	173	110	2382	1066
v/s Ratio Perm	0.04	0.00	<0.07	0.01			0.05
Uniform Delay, d1	54.5	52.8	56.7	53.0	60.4	12.3	7.4
Incremental Delay, d2	1.1	0.1	10.9	0.2	7.0	1.3	0.1
Level of Service	E	D	E	D	E	B	A
Approach LOS	D	E	B	E	B	A	B
HCM Average Control Delay	18.1						
Actuated Cycle Length (s)	132.5						15.0
Analysis Period (min)	15						

Existing PM
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Synchro 7 - Report
Page 8

HCM Signalized Intersection Capacity Analysis

5: Uwapo Road & Pilani Highway

5/10/2007

Lane Group Flow (vph)	58	98	63	1511	118	1380
Control Delay	59.3	15.7	77.9	48.7	73.4	15.2
Total Delay	59.3	15.7	77.9	48.7	73.4	15.2
Queue Length 95th (ft)	93	43	148	48	105	543
Turn Bay Length (ft)	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0

Lane Configurations	4	7	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	0.96	1.00	0.95	1.00	0.95
Flt Permitted	0.88	1.00	0.73	1.00	0.95	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	53	0	0	51	0	36
Turn Type	Perm	Perm	Perm	Perm	Prot	Prot	Perm
Permitted Phases	4	4	8	8	6	6	2
Effective Green, g (s)	14.5	14.5	14.5	14.5	8.2	89.2	13.8
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	178	173	148	173	110	2382	1066
v/s Ratio Perm	0.04	0.00	<0.07	0.01			0.05
Uniform Delay, d1	54.5	52.8	56.7	53.0	60.4	12.3	7.4
Incremental Delay, d2	1.1	0.1	10.9	0.2	7.0	1.3	0.1
Level of Service	E	D	E	D	E	B	A
Approach LOS	D	E	B	E	B	A	B
HCM Average Control Delay	18.1						
Actuated Cycle Length (s)	132.5						15.0
Analysis Period (min)	15						

Existing PM
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Synchro 7 - Report
Page 9

Lane Configurations	722	206	1122	583
Lane Group Flow (vph)	27.4	1.8	57.4	7.5
Control Delay	27.4	1.8	57.4	7.5
Total Delay	515	36	112	281
Queue Length 95th (ft)	375	350	500	0
Turn Bay Length (ft)	0	0	0	0
Starvation Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0

Queue shown is maximum after two cycles.

Lane Configurations	phov	Prot	Perm
Turn Type	2		
Permitted Phases			
Switch Phase			
Minimum Split (s)	21.0	9.0	21.0
Total Split (%)	53.7%	21.1%	74.7%
All-Red Time (s)	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0

Lead-Lag Optimize?

Act Effct Green (s)	47.3	71.0	14.0	65.3	18.7
v/c Ratio	0.78	0.24	0.79	0.45	0.86
Queue Delay	0.0	0.0	0.0	0.0	0.0

LOS: C A E A D A

Approach LOS: B B D

Cycle Length: 95

Onset: 28 (23%), Referenced to phase 4/EBl and 8/WST, Start of Green

Control Type: Actuated-Coordinated

Intersection Signal Delay: 22.7

Intersection LOS: C

Analysis Period (min): 15



HCM Signalized Intersection Capacity Analysis
 1: Pilliant Highway & South Kihei Road

4/20/2007



Lane Configurations	1900		1900		1900		1900	
Ideal Flow (veh/h)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
RTOR Reduction (vph)	0	50	0	0	0	201	0	
Turn Type		ptov	Prot	Perm				
Permitted Phases	2							
Effective Green, g (s)	47.3	71.0	14.0	66.3	18.7	18.7	18.7	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	928	1183	281	2470	676	312	312	
V/S Ratio Perm	0.03							
Uniform Delay, d1	19.5	3.6	39.1	6.3	36.9	31.6	31.6	
Incremental Delay, d2	6.4	0.1	14.5	0.3	11.0	0.2	0.2	
Level of Service	C	A	D	A	D	D	C	
Approach LOS	B	B	B	D	B	D	D	
HCM Average Control Delay	23.4		HCM Level of Service		C			
Actuated Cycle Length (s)	85.0							
Sum of lost time (s)	15.0							
Analysis Period (min)	15							

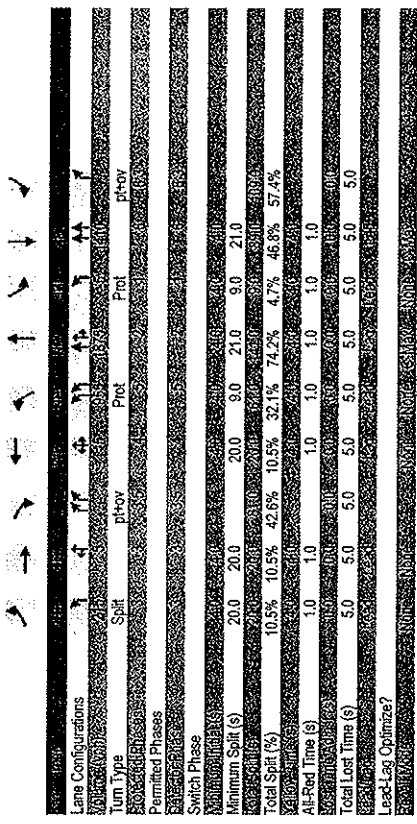
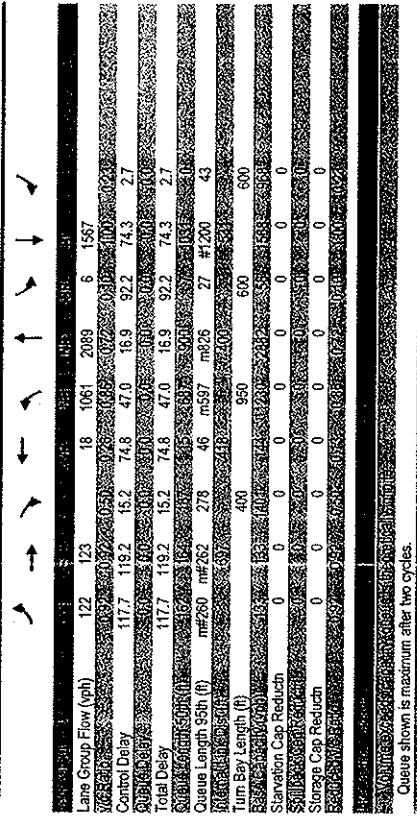
HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihei Road

4/20/2007



Lane Configurations	Stop		Free		Free	
Sign Control	Stop		Free		Free	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Pedestrians	2					
Walking Speed (ft/s)	2					
Right turn flare (veh)	2					
Median storage (veh)	0					
PX platoon unblocked	0					
vc1 stage 1 cont vol	1267					
vc1 unblocked vol	811					
vc2 stage (s)	79					
vc2 queue free %	83					
vc2 queue free %	97					
Volume Total	194	811	22	0	0	0
Volume Left	39	0	22	0	0	0
Volume Right	155	789	0	0	0	0
csh	522	1700	815	1700	0	0
Queue Length 95th (ft)	43	0	2	0	0	0
Level of Service	C	C	A	A	A	A
Approach LOS	C	C	C	C	C	C
Average Delay	2.8					
Analysis Period (min)	15					

Timings



Queue shown is maximum after two cycles.
 Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.
 Queue shown is maximum after two cycles.

Act Effct Green (s): 15.0 15.0 85.1 7.0 68.1 154.7 8.3 84.2 104.2
 v/c Ratio: 0.92 0.92 0.50 0.26 0.86 0.72 0.10 1.00 0.23
 Queue Delay: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

Act Effct Green (s): 15.0 15.0 85.1 7.0 68.1 154.7 8.3 84.2 104.2
 v/c Ratio: 0.92 0.92 0.50 0.26 0.86 0.72 0.10 1.00 0.23
 Queue Delay: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

LOS: F F B E D B F E A
 Approach LOS: D E C E
 Cycle Length: 190
 Offset: 82 (43%), Referenced to phase 2:NET and 6:SBT, Start of Green
 Control Type: Actuated-Coordinated
 Intersection Signal Delay: 41.3
 Intersection LOS: D
 Analysis Period (min): 15

LOS: F F B E D B F E A
 Approach LOS: D E C E
 Cycle Length: 190
 Offset: 82 (43%), Referenced to phase 2:NET and 6:SBT, Start of Green
 Control Type: Actuated-Coordinated
 Intersection Signal Delay: 41.3
 Intersection LOS: D
 Analysis Period (min): 15



4/20/2007
 HCM Signalized Intersection Capacity Analysis
 4. Pillani Highway & Mokulele Highway

Lane Configurations	4				4				4				4			
Ideal Flow (vph/p)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.88	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Protected	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (veh)	0	0	155	0	6	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Split	ph-ov	Split	Split	ph-ov	Split	Split	ph-ov	Split	ph-ov	Split	Split	ph-ov	Split	ph-ov	ph-ov
Permitted Phases	F				F				F				F			
Effective Green, g(s)	15.0	15.0	83.1	4.8	86.1	148.7	1.5	82.1	102.1	102.1	102.1	102.1	102.1	102.1	102.1	102.1
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	133	133	1219	44	1230	2769	14	1529	861	861	861	861	861	861	861	861
v/s Ratio Perm																
Uniform Delay, d1	88.9	88.9	37.4	80.9	56.5	11.0	93.3	54.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Incremental Delay, d2	42.1	44.0	0.2	3.4	0.6	0.2	19.7	23.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Level of Service	F	F	C	F	D	B	D	F	C	C	C	C	C	C	C	C
Approach LOS	D				F				C				E			
HCM Average Control Delay	46.4				HCM Level of Service				D							
Actuated Cycle Length (s)	190.0				Sum of lost time (s)				20.0							
Analysis Period (min)	15															

4/20/2007
 Timings
 5. Uwapo Street & Pillani Highway

Lane Configurations	4				4				4				4			
Ideal Flow (vph/p)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.88	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Protected	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (veh)	0	0	155	0	6	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Split	ph-ov	Split	Split	ph-ov	Split	Split	ph-ov	Split	ph-ov	Split	Split	ph-ov	Split	ph-ov	ph-ov
Permitted Phases	F				F				F				F			
Effective Green, g(s)	15.0	15.0	83.1	4.8	86.1	148.7	1.5	82.1	102.1	102.1	102.1	102.1	102.1	102.1	102.1	102.1
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	133	133	1219	44	1230	2769	14	1529	861	861	861	861	861	861	861	861
v/s Ratio Perm																
Uniform Delay, d1	88.9	88.9	37.4	80.9	56.5	11.0	93.3	54.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Incremental Delay, d2	42.1	44.0	0.2	3.4	0.6	0.2	19.7	23.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Level of Service	F	F	C	F	D	B	D	F	C	C	C	C	C	C	C	C
Approach LOS	D				F				C				E			
HCM Average Control Delay	46.4				HCM Level of Service				D							
Actuated Cycle Length (s)	190.0				Sum of lost time (s)				20.0							
Analysis Period (min)	15															



Queue	189	161	28	2828	33	2211
Lane Group Flow (vph)						
Control Delay	206.5	40.9	205.6	42.8	99.6	105.4
Total Delay	206.5	40.9	205.6	42.8	99.6	105.4
Queue Length 95th (%)	m#71	m#16	#415	181	73	#2310
Turn Bay Length (ft)	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0

Queue shown is maximum after two cycles.
 Queue shown is maximum after two cycles.

Permitted Phases	4	4	8	8	6	6
Effective Green, g (s)	35.0	35.0	35.0	35.0	7.4	131.1
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	154	292	133	292	69	2442
vis Ratio Perm	0.23	0.04	0.22	0.06	0.03	0.01
Uniform Delay, d1	77.5	65.6	77.5	67.5	89.2	29.5
Incremental Delay, d2	148.4	0.3	148.4	0.7	3.9	78.2
Level of Service	F	E	F	E	F	F
Approach LOS	F	F	F	F	F	F

HCM Average Control Delay: 72.6
 HCM Level of Service: E
 Actuated Cycle Length (s): 190.0
 Sum of lost time (s): 15.0
 Analysis Period (min): 15

Timings

Queues



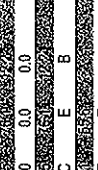
Lane Group Flow (vph)	1183	361	1172	389
% of Right Turn	0.6%	0.6%	0.4%	0.3%
Control Delay	87.0	9.3	157.2	27.5
Queue Length	30.0	5.0	100.0	12.2
Total Delay	87.0	9.3	157.2	27.5
Queue Length 50m (ft)	#1347	319	#378	m983
Turn Bay Length (ft)	375	350	500	54
Starvation Cap Reduction	0	0	0	0
Storage Cap Reduction	0	0	0	0

Lane Configurations	T T T T			
Turn Type	Thru	Thru	Thru	Perm
Permitted Phases	2			
Switch Phase	7			
Minimum Split (s)	21.0	9.0	21.0	21.0
Total Split (%)	61.6%	78.4%	21.6%	83.2%
All-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?	No			
Act Effct Green (s)	72.0	93.0	22.0	99.0
v/c Ratio	1.10	0.61	1.16	0.42
Queue Delay	0.0	0.0	0.0	0.0
LOS	F	A	F	C
Approach LOS	E	E	E	E

Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.

Cycle Length: 125
Offset: 0 (0%), Referenced to phase 4&EBT and 8&WBT, Start of Green
Control Type: Actuated-Coordinated
Intersection Signal Delay: 57.3
Intersection LOS: E
Analysis Period (min): 15



HCM Signalized Intersection Capacity Analysis
 1: Piliant Highway & South Kihei Road

5/4/2007



Lane Configurations	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97
Flt Prohibited	1.00	1.00	0.95	1.00	0.95
Flt Permitted	1.00	1.00	0.95	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	18	0	0	0
Turn Type	phov	prot	perm		
Permitted Phases	2				
Effective Green, g (s)	72.0	83.0	22.0	99.0	16.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1073	1178	312	2803	439
vis Ratio Perm	0.01				
Uniform Delay, d1	26.5	7.5	51.5	4.0	53.5
Incremental Delay, d2	60.0	0.9	100.0	0.0	18.8
Level of Service	F	A	F	C	E
Approach LOS	E	E	E	E	E

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihei Road

4/20/2007



Lane Configurations	1833	511	694
Volume (vph)	1833	511	694
Stop	0.90	0.90	0.90
Peak Hour Factor	0.90	0.90	0.90
Pedestrians	15	86	87
Walking Speed (ft/s)	2		
Right turn flare (veh)	2		
Median storage (veh)	0		
PX, platoon unblocked	0		
vC1, stage 1 cont. vel	0		
vC1, unblocked vol	1833	511	694
C, 2 stage (s)	15	86	87
PO queue free %	61	0	117
Volume Left	61	0	117
CSH	142	1700	901
Queue Length 95th (ft)	153	0	11
Lane LOS	F	A	A
Approach LOS	F	F	F
Average Delay	8.0		
Analysis Period (min)	15		

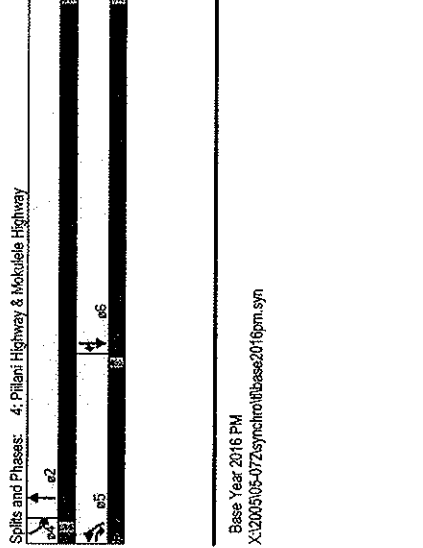
Timings



Lane Group Flow (vph)	99	101	18	1117	2478	6	2217
Control Delay	119.2	119.3	27.6	101.1	135.6	16.7	124.4
Queue Length 50th (ft)	m172	m169	m172	m172	m172	m172	m172
Queue Length 95th (ft)	m621	m589	m621	m621	m621	m621	m621
Turn Bay Length (ft)	400	950	600	600	600	600	600
Starvation Cap Reduction	0	0	16	0	0	252	0
Storage Cap Reduction	0	0	0	0	0	0	0

Lane Configurations	1	4	1	1	1	1	1
Turn Type	Thru	Thru	Thru	Thru	Thru	Thru	Thru
Permitted Phases	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Switch Phase	1	2	3	4	5	6	7
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	12.4%	12.4%	39.6%	8.0%	27.2%	76.0%	3.6%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lost-Lag Optimize?							
Act Eff Green (s)	26.0	26.0	102.9	7.4	74.9	200.9	6.5
Wt Ratio	0.57	0.57	0.93	0.31	1.09	0.87	0.13
Queue Delay	0.0	0.0	0.9	0.0	0.0	2.5	0.0
LOS	F	F	C	F	F	B	F
Approach LOS	D	F	F	E	F	F	F
Cycle Length	250	250	250	250	250	250	250
Offset: 4 (2%)	Referenced to phase 2/NB1 and 6/SB1. Start of Green						
Control Type	Actuated-Coordinated						
Intersection Signal Delay	82.5						
Analysis Period (mm)	15						

Queue shown is maximum after two cycles.
Queue shown is maximum after two cycles.



4/20/2007
 HCM Signalized Intersection Capacity Analysis
 4: Piliani Highway & Mokualele Highway

Lane Configurations	4		4		4		4		4		4	
Effective Green (s)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Flow Ratio	0.95	0.95	0.98	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Lane Util. Factor	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Protected	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Permitted	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	110	0	6	0	0	0	0	0	0	76
RTOR Reduction (vphpl)	0	0	110	0	6	0	0	0	0	0	0	76
Turn Type	Split	phov	Split	Prot	phov	Split	Prot	phov	Split	Prot	phov	Split
Permitted Phases	F											
Effective Green (s)	26.0	26.0	100.9	5.1	74.9	185.9	3.0	124.0	155.0	3.0	124.0	155.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Gp. Cap (vphl)	175	176	1725	36	1029	2772	21	1755	981	21	1755	981
W's Ratio Perm	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Uniform Delay, d1	106.6	106.7	71.6	120.8	87.5	19.5	122.4	63.0	22.3	63.0	22.3	22.3
Incremental Delay, d2	1.3	1.5	5.8	5.5	40.4	0.5	7.4	123.2	0.2	123.2	0.2	0.2
Level of Service	F	F	C	F	F	B	F	F	F	F	F	C
Approach LOS	D											
HCM Average Control Delay	92.2											
HCM Level of Service	F											
Actuated Cycle Length (s)	250.0											
Sum of lost time (s)	20.0											
Analysis Period (min)	15											

4/20/2007
 Timings
 5: Uwapo Street & Piliani Highway

Lane Configurations	4		4		4		4		4		4	
Effective Green (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Ideal Flow (vphpl)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Flow Ratio	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%
Lane Util. Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Flt Protected	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flt Permitted	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Peak-hour factor, PHF	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
RTOR Reduction (vph)	0	0	110	0	6	0	0	0	0	0	0	76
RTOR Reduction (vphpl)	0	0	110	0	6	0	0	0	0	0	0	76
Turn Type	Split	phov	Split	Prot	phov	Split	Prot	phov	Split	Prot	phov	Split
Permitted Phases	F											
Effective Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Clearance Time (s)	1.23	0.34	1.30	0.31	0.76	1.28	0.09	1.04	1.19	0.04	1.19	0.04
Lane Gp. Cap (vphl)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W's Ratio Perm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uniform Delay, d1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay, d2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Level of Service	F	F	E	F	E	F	E	F	F	A	F	F
Approach LOS	F											
HCM Average Control Delay	0.0											
HCM Level of Service	F											
Actuated Cycle Length (s)	230											
Sum of lost time (s)	20.0											
Analysis Period (min)	15											

4/20/2007
5: Uwapo Street & Piilani Highway

4/20/2007
Queues
5: Uwapo Street & Piilani Highway



Lane Group	100	78	3433	117	3228
Control Delay	232.7	57.0	275.7	57.0	154.9
Total Delay	232.7	57.0	275.7	57.0	154.9
Queue Length 95th (ft)	#437	m#19	#367	115	#217
Queue Length (ft)	65	50	400	400	300
Storage Cap Reduction	0	0	0	0	0
Storage Cap Reduction	0	0	0	0	0
Queue shown is maximum after two cycles.					
Queue shown is maximum after two cycles.					

Lane Configurations	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	0.96	1.00	0.95
Flt Permitted	0.52	1.00	0.36	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	27	0	29	0
Turn Type	Perm	Perm	Perm	Prot	Perm
Permitted Phases	4	4	8	8	6
Effective Green (s)	29.0	29.0	29.0	14.5	190.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0
Lane Cap (vph)	113	184	77	184	103
Vis Ratio Perm	0.14	0.03	0.15	0.02	0.06
Uniform Delay, d1	110.5	100.6	110.5	100.1	115.0
Incremental Delay, d2	157.7	0.7	202.0	0.6	267.3
Level of Service	F	F	F	F	F
Approach LOS	F	F	F	F	F
HCM Average Control Delay	131.8				
Actuated Cycle Length (s)	250.0				
Analysis Period (min)	15				

Lane Configurations	←←	→	←	→
Volume (veh)	100	100	100	100
Turn Type	plcy	Prot	Perm	Perm
Permitted Phases	2			
Switch Phase				
Minimum Split (s)	21.0	9.0	21.0	21.0
Total Split (%)	40.0%	72.6%	27.4%	67.4%
Alt-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?				
Act Effct Green (s)	41.3	68.0	62.3	22.7
v/c Ratio	0.47	0.24	0.69	0.48
Queue Delay	0.0	0.0	0.0	0.0
LOS	C	A	D	A
Approach LOS	B			
Cycle Length S5				
Offset 62 (65%), Referenced to phase 4EET and 8:WBT, Start of Green				
Control Type: Actuated-Coordinated				
Intersection Signal Delay: 17.5				
Analysis Period (min) 15				

Lane Group Flow (vph)	722	206	1122	583
Control Delay	21.9	1.2	47.4	5.3
Total Delay	21.9	1.2	47.4	5.3
Queue Length 95th (ft)	245	24	111	154
Turn Bay Length (ft)	375	350	500	500
Starvation Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0

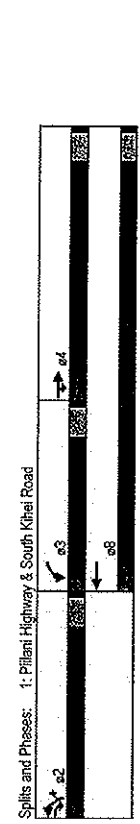
Minimum Split (s)	21.0	9.0	21.0	21.0
Total Split (%)	40.0%	72.6%	27.4%	67.4%
Alt-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?				
Act Effct Green (s)	41.3	68.0	62.3	22.7
v/c Ratio	0.47	0.24	0.69	0.48
Queue Delay	0.0	0.0	0.0	0.0
LOS	C	A	D	A
Approach LOS	B			
Cycle Length S5				
Offset 62 (65%), Referenced to phase 4EET and 8:WBT, Start of Green				
Control Type: Actuated-Coordinated				
Intersection Signal Delay: 17.5				
Analysis Period (min) 15				



Lane Configurations	←←	→	←	→
Volume (veh)	100	100	100	100
Turn Type	plcy	Prot	Perm	Perm
Permitted Phases	2			
Switch Phase				
Minimum Split (s)	21.0	9.0	21.0	21.0
Total Split (%)	40.0%	72.6%	27.4%	67.4%
Alt-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?				
Act Effct Green (s)	41.3	68.0	62.3	22.7
v/c Ratio	0.47	0.24	0.69	0.48
Queue Delay	0.0	0.0	0.0	0.0
LOS	C	A	D	A
Approach LOS	B			
Cycle Length S5				
Offset 62 (65%), Referenced to phase 4EET and 8:WBT, Start of Green				
Control Type: Actuated-Coordinated				
Intersection Signal Delay: 17.5				
Analysis Period (min) 15				

Lane Group Flow (vph)	722	206	1122	583
Control Delay	21.9	1.2	47.4	5.3
Total Delay	21.9	1.2	47.4	5.3
Queue Length 95th (ft)	245	24	111	154
Turn Bay Length (ft)	375	350	500	500
Starvation Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0

Minimum Split (s)	21.0	9.0	21.0	21.0
Total Split (%)	40.0%	72.6%	27.4%	67.4%
Alt-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?				
Act Effct Green (s)	41.3	68.0	62.3	22.7
v/c Ratio	0.47	0.24	0.69	0.48
Queue Delay	0.0	0.0	0.0	0.0
LOS	C	A	D	A
Approach LOS	B			
Cycle Length S5				
Offset 62 (65%), Referenced to phase 4EET and 8:WBT, Start of Green				
Control Type: Actuated-Coordinated				
Intersection Signal Delay: 17.5				
Analysis Period (min) 15				



HCM Signalized Intersection Capacity Analysis
 1: Pilliani Highway & South Kihei Road

4/20/2007

Lane Configurations	← ← ← → → →			
Ideal Flow (veh/pl)	1900	1900	1900	1900
Lane Util. Factor	0.95	1.00	1.00	0.97
Flt Protected	1.00	1.00	0.95	1.00
Flt Permitted	1.00	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	82	0	0
Turn Type	plow	Prot	Perm	Perm
Permitted Phases	2			
Effective Green, g (s)	41.3	63.0	62.3	22.7
Clearance Time (s)	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1539	1150	298	820
Vol Ratio Perm	0.04			
Uniform Delay, d1	19.1	4.1	37.2	33.1
Incremental Delay, d2	1.0	0.1	6.7	0.4
Level of Service	C	A	D	C
Approach LOS	B	B	C	C
HCM Average Control Delay	18.4			HCM Level of Service B
Actuated Cycle Length (s)	95.0			
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihei Road

4/20/2007

Lane Configurations	← ← ← → → →			
Sign Control	Stop	Free	Free	Free
Peak Hour Factor	0.90	0.90	0.90	0.90
Pedestrians	2			
Walking Speed (ft/s)	2			
Right turn flare (veh)	2			
Median storage (veh)	2			
px, rdatoon unlocked	2			
vc1, stage 1 conf vol	1287			
vcu, unblocked vol	739			
vc, 2 stage (s)	811			
p0 queue free %	79			
p0 queue free %	63			
p0 queue free %	97			
Volume Left	39			
cSH	522			
Queue Length 50th (ft)	43			
Lane LOS	C	C	A	A
Approach LOS	C			
Average Delay	2.8			
Analysis Period (min)	15			

Queues

5: Uwapo Street & Piliani Highway

4/20/2007

Item	Value	Unit
Lane Group Flow (vph)	189	
Control Delay	206.2	40.4
Total Delay	206.2	40.4
Queue Length 95th (ft)	#471	117
Turn Bay Length (ft)	65	
Starvation Cap Reducth	0	
Storage Cap Reducth	0	

Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Uwapo Street & Piliani Highway

4/20/2007

Item	Value	Unit
Lane Configurations	4	
Ideal Flow (vphpl)	1900	
Lane Util. Factor	1.00	
Flt Protected	0.96	
Flt Permitted	0.45	
Peak-hour factor, PHF	0.90	
RTOR Reduction (vph)	0	
Turn Type	Perm	
Permitted Phases	4	
Effective Green, g (s)	35.0	
Clearance Time, (s)	5.0	
Lane Grp Cap (vph)	154	
vs Ratio Perm	0.23	
Uniform Delay, d1	77.5	
Incremental Delay, d2	146.4	
Level of Service	F	
Approach LOS	F	
HCM Average Control Delay	72.7	
Accumulated Cycle Length (s)	190.0	
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
 1: Pillani Highway & South Kihei Road

5/4/2007

Lane Configurations	← ← ↑ ↑ → →			
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Util. Factor	0.95	1.00	1.00	0.97
Flt Protected	1.00	1.00	0.95	1.00
Flt Permitted	1.00	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
RTOR Reduction (veh)	0	71	0	0
Turn Type	pt	ow	Prot	Perm
Permitted Phases	2			
Effective Green, g (s)	60.5	84.8	30.2	95.7
Clearance Time (s)	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1713	1074	428	2709
Via Ratio Perm	0.02			
Uniform Delay, d1	25.0	11.1	45.1	50.4
Incremental Delay, d2	2.3	1.1	13.8	0.0
Level of Service	C	B	D	E
Approach LOS	C	B	C	D
HCM Average Control Delay	25.4 HCM Level of Service C			
Actuated Cycle Length (s)	125.0 Sum of lost time (s) 15.0			
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihei Road

4/20/2007

Lane Configurations	← ↑ → ↑			
Sign Control	Stop	Free	Free	Free
Peak Hour Factor	0.90	0.90	0.90	0.90
Pedestrians	2			
Walking Speed (ft/s)	2			
Right turn lane (veh)	2			
Median storage (veh)	0			
PX platoon unblocked	0			
VC1 stage 1 conf vel	0			
VCu unblocked vel	1833	611	694	694
IC 2 stage (s)	0			
P0 queue free %	15	86	87	87
Volume Left	61	0	117	0
sSH	142	1700	901	1700
Queue Length 95th (%)	153	0	11	0
Lane LOS	F	F	A	A
Approach LOS	F			
Average Delay	8.0			
Analysis Period (min)	15			

Queues



Lane Group Flow (vph)	99	101	18	1117	2478	6	2217
Control Delay	162.3	162.6	46.6	101.1	135.6	16.7	124.4
Total Delay	162.3	162.6	46.9	101.1	135.6	19.2	124.4
Queue Length 95th (ft)	261	269	#573	56	m521	32	#2461
Turn Bay Length (ft)	400	950	500	600	500	600	500
Starvation Cap Reductn	0	0	6	0	0	252	0
Storage Cap Reductn	0	0	0	0	0	0	0

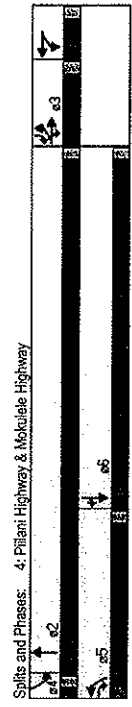
Queue shown is maximum after two cycles.
 Queue shown is maximum after two cycles.

Timings



Lane Configurations	Split	pbw	Prot	pbw
Turn Type	Split	pbw	Prot	pbw
Permitted Phases				
Switch Phase				
Minimum Split (s)	20.0	20.0	9.0	21.0
Total Split (%)	12.4%	39.6%	8.0%	27.2%
All-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimize?				
Act Effct Green (s)	26.0	102.9	7.4	74.9
v/c Ratio	0.57	0.93	0.31	1.09
Queue Delay	0.0	0.0	0.0	0.0
LOS	F	F	D	F
Approach LOS	E	F	E	F

Cycle Length: 250
 Offset: 80 (20%), Referenced to phase 2(NBT and SSBT, Start of Green)
 Control Type: Actuated-Coordinated
 Intersection Signal Delay: 86.5
 Analysis Period (min): 15



Site and Phases: 4: Pillani Highway & Mokulele Highway

4/20/2007
 HCM Signalized Intersection Capacity Analysis
 4: Piliani Highway & Mokulele Highway

Lane Configurations	← 4 →				← 4 →				← 4 →				← 4 →			
Ideal Flow (vph/p)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.98	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Flt Protected	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flt Permitted	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (veh)	0	0	110	0	6	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Split		p-hov		Split		Prot		Prot		Prot		p-hov		p-hov	
Permitted Phases	F				E				F				F			
Effective Green, g (s)	26.0	26.0	100.9	5.1	74.9	195.9	3.0	124.0	155.0	155.0	155.0	155.0	155.0	155.0	155.0	155.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	175	176	1125	36	1029	2772	21	1755	981	981	981	981	981	981	981	981
Via Ratio Perm																
Uniform Delay, d1	106.6	106.7	71.6	120.8	87.5	18.5	122.4	63.0	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Incremental Delay, d2	3.4	3.7	12.5	5.5	40.4	0.5	7.4	123.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Level of Service	F	F	E	F	F	F	B	F	F	F	F	F	F	F	F	F
Approach LOS	E				F				E				F			
HCM Average Control Delay	96.9				HCM Level of Service				F				F			
Actuated Cycle Length (s)	250.0				Sum of lost time (s)				20.0				20.0			
Analysis Period (min)	15															

4/20/2007
 Timings
 5: Uwapo Street & Piliani Highway

Lane Configurations	← 4 →				← 4 →				← 4 →				← 4 →			
Ideal Flow (vph/p)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.98	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Flt Protected	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flt Permitted	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (veh)	0	0	110	0	6	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Split		p-hov		Split		Prot		Prot		Prot		p-hov		p-hov	
Permitted Phases	F				E				F				F			
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%	13.6%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag, On/Off																
Act Effect Green (s)	29.0	29.0	29.0	29.0	29.0	29.0	14.5	190.0	181.5	181.5	181.5	181.5	181.5	181.5	181.5	181.5
Via Ratio	1.23	0.94	1.30	0.94	1.30	0.94	0.76	1.28	0.09	1.04	1.19	1.04	1.04	1.19	1.04	1.04
Queues Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	F	F	E	F	F	E	F	F	F	F	F	F	F	F	F	F
Approach LOS	F				F				F				F			
Cycle Length (250)																
Offset: 16 (6%), Referenced to phase 2-SBT and 6-NBT, Start of Green																
Control Type: Actuated-Coordinated																
Intersection Signal Delay: 135.1																
Intersection LOS: F																
Analysis Period (min) 15																

HCM Signalized Intersection Capacity Analysis
 5. Uwapo Street & Piliiani Highway

4/20/2007



Lane Group Flow (vph)	139	78	3433	117	3228
Control Delay	236.6	63.2	275.7	57.0	155.9
Queue Length (ft)	#463	m127	#367	115	#217
Queue Length 95th (ft)	236.6	63.2	275.7	57.0	155.9
Storage Length (ft)	300	300	300	300	300
Turn Bay Length (ft)	65	50	400	400	300
Starvation Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0

Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 5. Uwapo Street & Piliiani Highway

4/20/2007



Lane Configurations	4	4	8	6	2
Ideal Flow (vph)	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	0.96	1.00	1.00
Flt Permitted	0.52	1.00	0.36	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	27	0	29	0
Turn Type	Permitted	Permitted	Permitted	Permitted	Permitted
Permitted Phases	4	4	8	6	2
Effective Green, g (s)	29.0	29.0	29.0	14.5	190.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	113	184	77	184	103
v/s Ratio Perm	0.14	0.93	0.15	0.02	0.06
Uniform Delay, d1	110.5	100.6	110.5	100.1	116.0
Incremental Delay, d2	158.2	0.7	202.9	0.6	267.3
Level of Service	F	F	F	F	F
Approach LOS	F	F	F	F	F

HCM Average Control Delay: 131.9 HCM Level of Service: F

Accumulated Cycles Length (s): 250.0 Sum of lost time (s): 15.0

Analysis Period (min): 15

Queues

5. Uwapo Street & Piliiani Highway

4/20/2007

Lane Group Flow (vph)	139	78	3433	117	3228
Control Delay	236.6	63.2	275.7	57.0	155.9
Queue Length (ft)	#463	m127	#367	115	#217
Queue Length 95th (ft)	236.6	63.2	275.7	57.0	155.9
Storage Length (ft)	300	300	300	300	300
Turn Bay Length (ft)	65	50	400	400	300
Starvation Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0

Queue shown is maximum after two cycles.

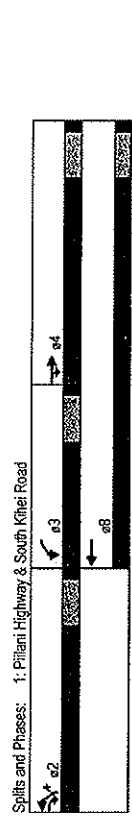
Queue shown is maximum after two cycles.

Timings
1: Piliani Highway & South Kihei Road

4/20/2007



Lane Configurations	↔	↔	↔	↔
Turn Type	Thru	Thru	Thru	Thru
Permitted Phases	2			
Switch Phase	2			
Minimum Split (s)	21.0	9.0	21.0	21.0
Total Split (%)	38.3%	73.3%	26.7%	65.0%
All-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag: Optimize?				
Act Effct Green (s)	19.8	39.8	40.2	35.0
v/c Ratio	0.65	0.27	0.68	0.58
Queue Delay	0.0	0.0	0.0	0.0
LOS	C	A	D	A
Approach LOS	B	B	B	B
Cycle Length	60			
Offset	9 (0%), Referenced to phase 4EBT and 8WBT, Start of Green			
Control Type	Actuated-Coordinated			
Intersection Signal Delay	15.7			
Analysis Period (min)	15			



Queues
1: Piliani Highway & South Kihei Road

4/20/2007



Lane Group Flow (vph)	761	206	1189	606
Control Delay	21.1	1.7	36.2	9.5
Total Delay	21.1	1.7	36.2	9.5
Queue Length 95th (ft)	194	28	146	182
Turn Bay Length (ft)	375	390	500	500
Starvation Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Pillani Highway & South Kihai Road

4/20/2007

Lane Configurations	← ← ← → → →		
Ideal Flow (vphpl)	1900	1900	1900
Lane Util. Factor	0.95	1.00	0.95
Flt Protected	1.00	1.00	0.95
Flt Permitted	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90
RTOR Reduction (vph)	0	85	0
Turn Type	ptov	Prot	Perm
Permitted Phases	2		
Effective Green, g (s)	19.8	38.8	35.0
Clearance Time (s)	5.0	5.0	5.0
Lane Grp Cap (vph)	1188	301	2064
vis Ratio Perm	0.04		
Uniform Delay, d1	17.2	4.0	23.4
Incremental Delay, d2	2.8	0.1	6.3
Level of Service	B	A	C
Approach LOS	B	B	C
HCM Average Control Delay	15.6		
Actuated Cycle Length (s)	80.0		
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihai Road

4/20/2007

Lane Configurations	← → ← →		
Sign Control	Stop	Free	Free
Peak Hour Factor	0.90	0.90	0.90
Pedestrians	0	0	0
Walking Speed (ft/s)	2		
Right turn flare (veh)	2		
Median storage (veh)	0		
pX platoon unblocked	0		
vC1, stage 1 Conf vel	1284		
vC1, stage 2 Conf vel	822		
IC, 2 stage (s)	64		
90 queue free %	57		
Volume Left	61	0	33
cSH	557	1700	607
Queue Length 95th (ft)	53	0	3
Lane LOS	C	A	A
Approach LOS	C		
Average Delay	3.9		
Analysis Period (min)	15		

Queues

5: Uwapo Street & Piliani Highway

4/20/2007

Lane Group Flow (vph)	216	405	28	2883	139	2211
Control Delay	2244.9	41.3	1411.7	79.9	93.5	141.2
Total Delay	2244.9	41.3	1411.7	79.9	93.5	141.2
Queue Length 85th (ft)	#535	114	#1095	#397	70	#2303
Turn Bay Length (ft)	65	30	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0

Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Uwapo Street & Piliani Highway

4/20/2007

Lane Configurations	4		4		4		4		4	
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph/s)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.96	1.00	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	0.12	1.00	0.31	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Peak-hour factor, P-HF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Sat. Flow (veh/mn)	276	155	553	553	720	720	553	720	553	553
RTOR Reduction (vph)	0	0	30	0	0	38	0	0	24	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Permitted Phases	4	4	8	8	8	8	6	6	6	6
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0	7.2	118.3	118.3	157
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	37	273	100	273	71	2326	1040	154	2493	1115
v/s Ratio Perm	0.10	0.04	0.70	0.14	0.05	0.05	0.05	0.05	0.05	0.05
Uniform Delay, d1	74.5	64.1	74.5	71.5	84.3	30.9	11.2	81.4	21.0	8.0
Incremental Delay, d2	2234.2	0.4	1396.0	14.9	3.6	111.6	0.1	24.0	2.2	0.0
Level of Service	F	E	F	F	F	F	F	F	F	A
Approach Delay (s)	163.3	33.3	163.3	163.3	163.3	163.3	163.3	163.3	163.3	163.3
Approach LOS	F	F	F	F	F	F	F	F	F	B
HCM Average Control Delay	247.5									F
Actuated Cycle Length (s)	180.0									150
Analysis Period (min)	15									

14: Project Access & Pillani Highway

4/20/2007



Lane Configurations	Stop	Free	Free
Sign Control	0.90	0.90	0.90
Peak Hour Factor	0.90	0.90	0.90
Pedestrians			
Walking Speed (ft/s)			
Right turn lane (veh)			
Median storage (veh)			
Pk, Platoon unblocked	0.35	0.35	0.35
vc1, stage 1 conf vol			
vcu, unblocked vol	7180	0	3896
IC, 2 stage (s)			
q0 queue free %	100	73	100
Volume Left	0	0	0
CSH	376	1700	1700
Queue Length 95th (ft)	26	0	0
Lane LOS	C	C	C
Approach LOS	C	C	C
Average Delay			0.3
Analysis Period (min)			15

Timings

4/20/2007

1: Pillani Highway & South Kihei Road



Lane Configurations	Proct	Perm
Turn Type		
Permitted Phases	2	
Switch Phase		
Minimum Split (s)	21.0	9.0
Total Split (%)	47.8%	71.1%
All-Red Time (s)	1.0	1.0
Total Lost Time (s)	5.0	5.0
Lead-Lag Optimize?		
Act Effct Green (s)	39.2	59.7
v/c Ratio	0.81	0.69
Queue Delay	0.0	0.0
LOS	C	C
Approach LOS	C	C
Cycle Length: 90		
Offset: 19 (21%), Referenced to phase 4 EB1 and 8 WB1 Start of Green		
Control Type: Actuated-Coordinated		
Intersection Signal Delay: 26.3		
Intersection LOS: C		
Analysis Period (min): 15		

Splits and Phases: 1: Pillani Highway & South Kihei Road



Queues
1: Pillani Highway & South Kihei Road

4/20/2007

Lane Group Flow (vph)	1250	361	1228	411
Control Delay	27.9	11.6	55.5	22.2
Total Delay	416	325	189	m514
Queue Length 95th (ft)	37.5	350	500	
Starvation Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0

HCM Signalized Intersection Capacity Analysis
1: Pillani Highway & South Kihei Road

4/20/2007

Lane Configurations	→	←	←	←	←	
Ideal Flow (vph/s)	1900	1900	1900	1900	1900	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	
Flt Permitted	1.00	1.00	0.95	1.00	0.95	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	
RTOR Reduction (vph)	0	48	0	0	151	
Turn Type	p h w Prct Perm					
Permitted Phases	2					
Effective Green, g (s)	39.2	59.7	20.3	64.5	15.5	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	1541	1050	398	2536	591	
v/s Ratio Perm	0.02					
Uniform Delay, d1	22.2	9.2	33.9	5.5	35.0	
Incremental Delay, d2	4.8	1.7	22.9	0.1	3.6	
Level of Service	C	B	D	C	D	
Approach LOS	C					
HCM Average Control Delay	26.2				HCM Level of Service	C
Actuated Cycle Length (s)	90.0				Sum of lost time (s)	10.0
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihei Road

4/20/2007



Lane Configurations	Stop	Free	Free
Sign Control	Stop	Free	Free
Peak Hour Factor	0.90	0.90	0.90
Pedestrians	2		
Walking Speed (ft/s)			
Right turn flare (feet)			
Median storage (veh)			
Pk. platoon unblocked			
vC1, stage 1 conf vol	1889	622	717
vC1, unblocked vol			
IC, 2 stage (s)			
p0 queue free %	0	82	84
Volume Left	83	0	139
CSH	122	1700	884
Queue Length 95th (ft)	294	0	14
Lane LOS	F	F	A
Approach LOS	F	F	F
Average Delay			25.7
Analysis Period (min)			15

Timings
 4: Pilihi Highway & Mokuia Highway

4/20/2007



Lane Configurations	Split	phov	Prot	phov
Turn Type	Split	phov	Prot	phov
Permitted Phases				
Switch Phase				
Minimum Split (s)	20.0	20.0	9.0	21.0
Total Split (%)	14.4%	39.4%	11.1%	25.0%
All-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-in Optimize?				
Act Effct Green (s)	21.0	21.0	75.3	69
v/c Ratio	0.51	0.51	0.93	0.25
Queue Delay	0.0	0.0	1.4	0.0
LOS	E	E	C	F
Approach LOS	D	E	E	F
Cycle Length: 180				
Offset: 76 (42%), Referenced to phase 2-NBT and 6-SBT, Start of Green				
Control Type: Actuated, Coordinated				
Intersection Signal Delay: 102.7				
Analysis Period (min) 15				



4/20/2007
 Queues
 4: Pillani Highway & Mokulele Highway

Lane Group Flow (vph)	99	101	18	1172	2559	6	2356
Control Delay	78.1	78.4	31.2	70.3	126.9	24.4	85.8
Total Delay	78.1	78.4	32.6	70.3	126.9	24.4	85.8
Queue Length 95th (ft)	m162	m166	#559	45	m634	m717	26
Turn Bay Length (ft)	400	350	600	600	600	600	600
Starvation Cap Replugh	0	0	25	0	0	0	0
Storage Cap Replugh	0	0	0	0	0	0	0

Queue shown is maximum after two cycles.
 Queue shown is maximum after two cycles.

4/20/2007
 HCM Signalized Intersection Capacity Analysis
 4: Pillani Highway & Mokulele Highway

Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Initial Flow (vph)	500	500	500	500	500	500	500	500	500	500
Initial Delay (s)	0.95	0.95	0.88	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	0.95	0.96	1.00	0.96	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	0.96	1.00	0.96	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	0.95	0.96	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Signal Cycle Length (s)	120	120	120	120	120	120	120	120	120	120
RTOR Reduction (vph)	0	0	158	0	6	0	0	0	0	0
Lane Group Flow (vph)	196	197	1135	46	967	2610	15	1612	950	1612
US Road Perm	196	197	1135	46	967	2610	15	1612	950	1612
Uniform Delay, d1	74.6	74.7	51.5	86.0	63.8	23.1	88.8	49.0	17.2	17.2
Incremental Delay, d2	1.3	1.4	11.0	3.1	80.1	3.3	16.6	211.2	0.2	0.2
Level of Service	E	E	D	F	F	C	F	C	F	F
Approach LOS	D	D	F	F	E	E	F	E	F	F
HCM Average Control Delay	117.0 HCM Level of Service F									
Actuated Cycle Length (s)	180.0 Sum of lost time (s) 20.0									
Analysis Period (min)	15									

Timings
5: Uwapo Street & Piliiani Highway

4/20/2007



Lane	Flow (vph)	306	76	3533	322	3228
Lane Group Flow (vph)	183	306	76	3533	322	3228
Control Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Total Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Turn Bay Length (ft)	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Queue shown is maximum after two cycles.						
Queue shown is maximum after two cycles.						

Queues
5: Uwapo Street & Piliiani Highway

4/20/2007



Lane	Flow (vph)	306	76	3533	322	3228
Lane Group Flow (vph)	183	306	76	3533	322	3228
Control Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Total Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Turn Bay Length (ft)	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Queue shown is maximum after two cycles.						
Queue shown is maximum after two cycles.						

Timings
5: Uwapo Street & Piliiani Highway

4/20/2007



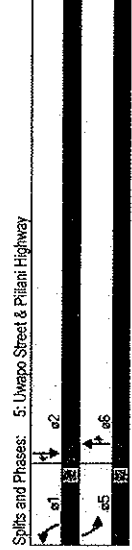
Lane	Flow (vph)	306	76	3533	322	3228
Lane Group Flow (vph)	183	306	76	3533	322	3228
Control Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Total Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Turn Bay Length (ft)	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Queue shown is maximum after two cycles.						
Queue shown is maximum after two cycles.						

Timings
5: Uwapo Street & Piliiani Highway

4/20/2007



Lane	Flow (vph)	306	76	3533	322	3228
Lane Group Flow (vph)	183	306	76	3533	322	3228
Control Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Total Delay	2198.5	48.1	2598.2	80.7	401.4	204.7
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Queue Length (ft)	m#574	m#902	#241	153	#2966	52
Turn Bay Length (ft)	65	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Queue shown is maximum after two cycles.						
Queue shown is maximum after two cycles.						



HCM Signalized Intersection Capacity Analysis
 5: Uwapo Street & Piliiani Highway

4/20/2007

Lane Configurations	4		F		F		F		F		F	
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Flow Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.97	1.00	0.96	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Flt Permitted	0.15	1.00	0.22	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	28	0	0	29	0	0	39	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Permitted Phases	4	4	8	8	3	3	6	6	6	6	6	6
Effective Green, g (s)	20.0	20.0	20.0	20.0	12.8	129.0	129.0	16.0	132.2	132.2	132.2	132.2
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	32	176	46	176	126	2836	1134	157	2599	1163	2599	1163
Vs Ratio Perm	0.64	0.03	0.74	0.08	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Uniform Delay, d1	80.0	73.1	80.0	77.0	81.2	26.5	8.1	82.0	23.9	6.5	82.0	23.9
Incremental Delay, d2	2187.3	0.7	2588.7	10.5	8.7	179.4	0.3	474.3	109.2	0.0	474.3	109.2
Level of Service	F	E	F	F	F	F	F	A	F	F	A	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
HCM Average Control Delay	313.9		HCM Level of Service		F		F		F		F	
Actuated Cycle Length (s)	160.0		Sum of lost time (s)		20.0		20.0		20.0		20.0	
Analysis Period (min)	15		15		15		15		15		15	

HCM Unsignalized Intersection Capacity Analysis
 14: Project Access & Piliiani Highway

4/20/2007

Lane Configurations	3		F		F		F		F		F	
Volume (vph)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Flow Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Flt Permitted	0.29	1.00	0.29	1.00	0.29	1.00	0.29	1.00	0.29	1.00	0.29	0.29
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	28	0	0	29	0	0	39	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Permitted Phases	4	4	8	8	3	3	6	6	6	6	6	6
Effective Green, g (s)	20.0	20.0	20.0	20.0	12.8	129.0	129.0	16.0	132.2	132.2	132.2	132.2
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	32	176	46	176	126	2836	1134	157	2599	1163	2599	1163
Vs Ratio Perm	0.64	0.03	0.74	0.08	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Uniform Delay, d1	80.0	73.1	80.0	77.0	81.2	26.5	8.1	82.0	23.9	6.5	82.0	23.9
Incremental Delay, d2	2187.3	0.7	2588.7	10.5	8.7	179.4	0.3	474.3	109.2	0.0	474.3	109.2
Level of Service	F	E	F	F	F	F	F	A	F	F	A	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
HCM Average Control Delay	313.9		HCM Level of Service		F		F		F		F	
Actuated Cycle Length (s)	160.0		Sum of lost time (s)		20.0		20.0		20.0		20.0	
Analysis Period (min)	15		15		15		15		15		15	

Timings

Queues



Lane Configurations	4 4	4 4	4 4	4 4	4 4
Volume (vph)	185	185	185	185	185
Turn Type	Thru	Thru	Thru	Thru	Thru
Permitted Phases	2	2	2	2	2
Switch Phase	2	2	2	2	2
Minimum Split (s)	21.0	9.0	21.0	21.0	21.0
Total Split (%)	40.0%	75.0%	25.0%	65.0%	35.0%
Alt. Red Time (s)	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimize?					
Act. Effct Green (s)	20.3	40.3	9.7	35.0	15.0
vc Ratio	0.63	0.27	0.72	0.58	0.71
Queue Delay	0.0	0.0	0.0	0.0	0.0
LOS	C	A	D	A	C
Approach LOS	B	B	B	B	B
Cycle Length: 60					
Offset: 0 (0%), Referenced to phase 4:EBT and 5:WBT, Start of Green					
Control Type: Actuated-Coordinated					
Intersection Signal Delay: 15.8					
Analysis Period (min): 15					

Lane Group Flow (vph)	761	206	1189	606
Control Delay	20.2	2.0	40.7	9.5
Total Delay	20.2	2.0	40.7	9.5
Queue Length 95th (ft)	178	31	#158	182
Turn Bay Length (ft)	375	350	500	500
Starvation Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0

Queue shown is maximum after two cycles.



Splits and Phases: 1: Pilihi Highway & South Kihei Road

HCM Signalized Intersection Capacity Analysis
 1: Piliiani Highway & South Kihel Road

5/2/2007

Lane Configurations	← ↑ →		← ↑ →	
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Util. Factor	0.95	1.00	0.95	0.97
Fit Protected	1.00	1.00	0.95	1.00
Fit Permitted	1.00	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	71	0	0
Turn Type		pt-ov	Prot	Perm
Permitted Phases	2			
Effective Green, g (s)	20.3	40.3	9.7	35.0
Clearance Time, (s)	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1197	1063	286	2084
vis Ratio Perm	0.04			
Uniform Delay, d1	16.7	3.8	23.9	7.8
Incremental Delay, d2	2.6	0.1	8.6	1.2
Level of Service	B	A	C	A
Approach LOS	B	B	B	C
HCM Average Control Delay	15.6		HCM Level of Service	
Actuated Cycle Length (s)	60.0		Sum of lost time (s)	
Analysis Period (min)	15		15	

HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihel Road

5/2/2007

Lane Configurations	← ↑ →		← ↑ →	
Sign Control	Stop	Free	Free	Free
Peak Hour Factor	0.90	0.90	0.90	0.90
Pedestrians	2			
Walking Speed (ft/s)	2			
Right turn flare (veh)	2			
Median storage (veh)	2			
pX platoon unblocked	2			
vC1, stage 1 cont vol	1294			
vC4, unblocked vol	714			
C, 2 stages (s)	64			
p0 queue free %	57			
Volume (veh)	61	0	33	0
Volume Left	57	1700	807	1700
CSH	53	0	3	0
Queue Length 95th (ft)	64	0	97	0
Lane LOS	C	C	A	A
Approach LOS	C	C	C	C
Average Delay	3.9		3.9	
Analysis Period (min)	15		15	

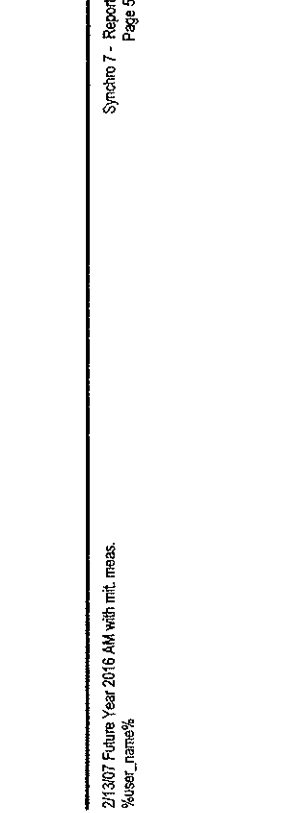


Lane Configurations	Split	Prot	Prot	Prot	ptov
Lane Group Flow (veh)	122	123	18	1128	2223
Control Delay	127.3	127.2	19.7	70.3	65.4
Total Delay	127.3	127.2	19.7	70.3	65.4
Queue Length 95th (ft)	#290	#294	247	45	m503
Turn Bay Length (ft)	400	950	600	600	600
Starvation Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0

Minimum Split (s)	20.0	20.0	9.0	21.0	9.0	21.0
Total Split (%)	11.1%	11.1%	42.8%	11.1%	31.7%	72.8%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Act Effct Green (s)	15.0	15.0	81.3	6.9	64.3	144.8	6.3	76.0	98.0
v/c Ratio	0.87	0.87	0.52	0.25	0.92	0.78	0.10	1.07	0.23
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	F	F	B	E	E	A	F	F	A
Approach LOS	D	E	C	F	F	F	F	F	F

Cycle Length: 180
 Offset: 68 (38%), Referenced to phase 2: NBT and 6: SBT, Start of Green
 Control Type: Actuated-Coordinated
 Intersection Signal Delay: 45.4
 Intersection LOS: D
 Analysis Period (min): 15

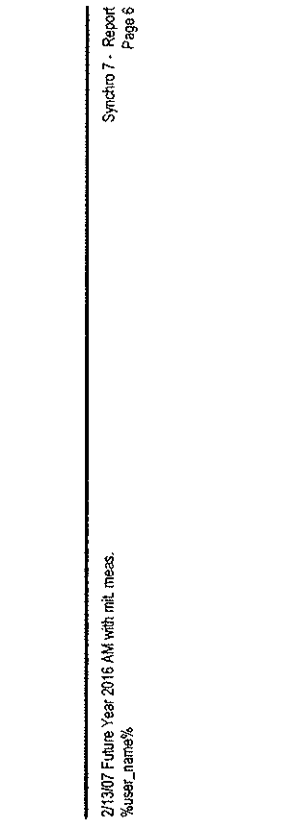


Lane Configurations	Split	Prot	Prot	Prot	ptov
Lane Group Flow (veh)	122	123	18	1128	2223
Control Delay	127.3	127.2	19.7	70.3	65.4
Total Delay	127.3	127.2	19.7	70.3	65.4
Queue Length 95th (ft)	#290	#294	247	45	m503
Turn Bay Length (ft)	400	950	600	600	600
Starvation Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0

Minimum Split (s)	20.0	20.0	9.0	21.0	9.0	21.0
Total Split (%)	11.1%	11.1%	42.8%	11.1%	31.7%	72.8%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Act Effct Green (s)	15.0	15.0	81.3	6.9	64.3	144.8	6.3	76.0	98.0
v/c Ratio	0.87	0.87	0.52	0.25	0.92	0.78	0.10	1.07	0.23
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	F	F	B	E	E	A	F	F	A
Approach LOS	D	E	C	F	F	F	F	F	F

Cycle Length: 180
 Offset: 68 (38%), Referenced to phase 2: NBT and 6: SBT, Start of Green
 Control Type: Actuated-Coordinated
 Intersection Signal Delay: 45.4
 Intersection LOS: D
 Analysis Period (min): 15



HCM Signalized Intersection Capacity Analysis
 4: Piilani Highway & Mokulele Highway

5/22/2007

Lane Configurations	← → ← → ← → ← → ← → ← → ← → ← → ← →			
Ideal Flow (veh/pl)	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.98	1.00
Flt Permitted	0.95	0.95	1.00	0.95
Flt Protected	0.95	0.95	1.00	0.95
Flt Permitted	0.95	0.95	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
RTOR Reduction (veh)	0	0	0	0
Turn Type	Split	ptov	Split	ptov
Permitted Phases	F F F F F F F F F F F F F F F F			
Effective Green, g (s)	15.0	15.0	79.3	4.7
Clearance Time (s)	5.0	5.0	5.0	5.0
Lane Grp Cap (veh)	140	141	1228	46
vis Ratio Perm	0.00	0.00	0.00	0.00
Uniform Delay, d1	81.5	81.5	35.5	86.0
Incremental Delay, d2	40.6	40.5	0.3	3.1
Level of Service	F	F	D	F
Approach LOS	E	F	C	F
HCM Average Control Delay	52.1	HCM Level of Service		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)		
Analysis Period (min)	15	20.0		

Timings
 5: Uwapo Street & Piilani Highway

5/22/2007

Lane Configurations	← → ← → ← → ← → ← → ← → ← → ← → ← →			
Ideal Flow (veh/pl)	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.98	1.00
Flt Permitted	0.95	0.95	1.00	0.95
Flt Protected	0.95	0.95	1.00	0.95
Flt Permitted	0.95	0.95	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
RTOR Reduction (veh)	0	0	0	0
Turn Type	Split	ptov	Split	ptov
Permitted Phases	F F F F F F F F F F F F F F F F			
Effective Green, g (s)	14.0	16.0	18.0	20.0
Clearance Time (s)	5.0	5.0	5.0	5.0
Lane Grp Cap (veh)	140	141	1228	46
vis Ratio Perm	0.00	0.00	0.00	0.00
Uniform Delay, d1	81.5	81.5	35.5	86.0
Incremental Delay, d2	40.6	40.5	0.3	3.1
Level of Service	F	F	D	F
Approach LOS	E	F	C	F
HCM Average Control Delay	52.1	HCM Level of Service		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)		
Analysis Period (min)	15	20.0		



Lane Group Flow (vph)	172	44	344	61	28	2883	139	2211
Control Delay	219.3	81.0	57.4	127.6	77.7	200.1	225.2	128.2
Total Delay	219.3	81.0	57.4	127.6	77.7	200.1	225.2	128.2
Queue Length 95th (ft)	#421	87	126	#528	120	#542	#111	#2265
Turn Bay Length (ft)		65	200		50	400	400	300
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0

Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.

Lane Configurations												
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	33	0	28	0	24	0	0	24	0	0
Turn Type			Perm		Prot		Perm		Prot	Perm		Prot
Permitted Phases			4		8		6		2			2
Effective Green, g (s)	14.0	16.0	16.0	18.0	20.0	20.0	3.0	121.0	121.0	5.0	123.0	123.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	138	166	141	343	207	176	30	2379	1064	95	2418	1082
v/s Ratio Perm			0.04		e0.14					0.05		
Unburnt Delay, d1	83.0	76.5	77.5	81.0	73.5	80.0	88.4	29.5	10.2	87.5	24.1	9.1
Incremental Delay, d2	157.4	0.9	1.8	48.3	0.8	167.4	135.3	98.5	0.1	231.2	3.1	0.0
Level of Service	F	E	E	F	E	F	F	F	F	F	B	F
Approach LOS		F		F		F		F		F		E
HCM Average Control Delay			107.8									F
Accrued Cycle Length (s)			180.0									20.0
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 14: Protect Access & Pillani Highway

5/2/2007



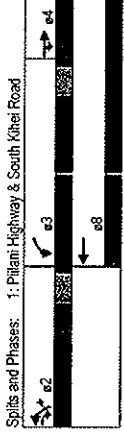
Lane Configurations	Stop	Free	Free
Sign Control	0.90	0.90	0.90
Peak Hour Factor	0.90	0.90	0.90
Pedestrians			
Walking Speed (ft/s)			
Right turn flare (veh)			
Median storage (veh)			
Max. platoon unblocked	0.33	0.33	0.33
vC1, stage 1 conf vol			
vOU unblocked vol	7348	0	3937
IC, 2 stage (s)			
p0 queue free %	100	72	100
Volume Left	0	0	0
cSH	360	1700	1700
Queue Length 95th (ft)	28	0	0
Lane LOS	C	C	C
Approach LOS	C	C	C
Average Delay		0.3	
Analysis Period (min)		15	

Timings
 1: Pillani Highway & South Kihei Road

5/2/2007



Lane Configurations	Prot	Prot	Prot
Turn Type	Prot	Prot	Prot
Permitted Phases	2		
Switch Phase			
Minimum Split (s)	21.0	21.0	21.0
Total Split (%)	46.7%	30.0%	23.3%
All-Red Time (s)	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0
Lead-Lag Optimize?			
Act Effect Green (s)	38.6	20.9	84.5
v/c Ratio	0.82	0.69	0.48
Queue Delay	0.0	0.0	0.0
LOS	C	B	D
Approach LOS	C	C	C
Cycle Length (s)			
Offset: 19 (21%), Referenced to phase 4:EBT and 8:WBT Start of Green			
Control Type: Actuated-Coordinated			
Intersection Signal Delay: 26.3			
Analysis Period (min): 15			




Lane Group Flow (vph)	1250	361	1228	411
Control Delay	29.0	11.8	52.0	22.5
Total Delay	29.0	11.8	52.0	22.5
Queue Length 95th (ft)	#425	331	186	m527
Turn Bay Length (ft)	375	350	500	500
Starvation Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0

Queue shown is maximum after two cycles.


Lane Configurations	↔	↔	↔	↔
Ideal Flow (vph)	1900	1900	1900	1900
Lane Util. Factor	0.95	1.00	1.00	0.97
Flt Protected	1.00	1.00	0.95	1.00
Flt Permitted	1.00	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	54	0	0
Turn Type	pt-ov	Prot	Perm	Perm
Permitted Phases	2			
Effective Green, g (s)	38.6	59.1	20.9	64.5
Clearance Time, (s)	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1518	1040	411	2536
v/s Ratio Perm	0.02			
Uniform Delay, d1	22.7	9.5	33.3	5.5
Incremental Delay, d2	5.2	1.7	18.3	0.1
Level of Service	C	B	D	C
Approach LOS	C	C	C	D
HCM Average Control Delay	26.1			
Actuated Cycle Length (s)	90.0			
Analysis Period (min)	15			
Sum of lost time (s)	10.0			
HCM Level of Service	C			

5/2/2007
 HCM Unsignalized Intersection Capacity Analysis
 3: Uwapo Street & South Kihnei Road



Lane Configurations	Stop	Free	Free
Sign Control	Stop	Free	Free
Peak Hour Factor	0.90	0.90	0.90
Pedestrians			
Walking Speed (ft/s)			
Right turn lane (veh)	2		
Median storage (veh)			
PX platoon unblocked			
vC1, stage 1 conf vol			
vC1, unblocked vol	1839	622	717
IC, 2 stage (s)			
p0 queue free %	0	82	84
Volume Left	83	0	139
cSH	122	1700	884
Queue Length 85th (ft)	294	0	14
Lane LOS	F	F	A
Approach LOS	F	F	F
Average Delay		26.7	
Analysis Period (min)			15

5/2/2007
 Timings
 4: Piliani Highway & Mokulele Highway



Lane Configurations	Split	Prot	Prot	phov	phov
Turn Type	Split	Prot	Prot	phov	phov
Permitted Phases					
Switch Phase					
Minimum Split (s)	20.0	20.0	9.0	21.0	9.0
Total Split (%)	14.4%	14.4%	39.4%	11.1%	25.0%
AI-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimase?					
Act Elct Green (s)	21.0	21.0	75.3	6.9	52.3
v/c Ratio	0.51	0.51	0.83	0.25	1.18
Queue Delay	0.0	0.0	1.5	0.0	0.0
LOS	E	E	C	E	F
Approach LOS	D	E	D	D	F
Cycle Length	180				
Offset: 75 (42%), Referenced to phase 2:NBT and 6:SBT, Start of Green					
Control Type: Actuated, Coordinated					
Intersection Signal Delay: 98.9					
Analysis Period (min): 15					



4: Piliani Highway & Mokuiele Highway



Lane Group Flow (vph)	89	101	18	172	2589	6	2356
Control Delay	78.4	78.6	30.9	70.3	138.7	7.5	86.8
Total Delay	78.4	78.6	32.4	70.3	138.7	7.5	86.8
Queue Length 95th (%)	m161	m164	#580	#45	m494	m287	#2080
Turn Bay Length (ft)		400		950		600	
Starvation Cap Reductn	0	0	26	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0

Queue shown is maximum after two cycles.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Piliani Highway & Mokuiele Highway



Lane Configurations	FF	FF	FF	FF	FF	FF	FF
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.88	1.00	0.97	0.95	1.00
Flt Protected	0.95	0.96	1.00	0.98	0.95	1.00	0.95
Flt Permitted	0.95	0.96	1.00	0.98	0.95	1.00	0.95
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	158	0	6	0	0
Turn Type		Split	pt-ov	Split	Prot	pt-ov	pt-ov
Permitted Phases							
Effective Green, g (s)	21.0	21.0	73.3	4.7	52.3	132.8	1.5
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	196	197	1135	46	997	2610	15
v/s Ratio Perm							
Uniform Delay, d1	74.6	74.7	51.5	86.0	63.8	23.1	88.8
Incremental Delay, d2	1.3	1.4	10.8	3.1	80.1	3.8	16.6
Level of Service	E	E	D	F	F	A	F
Approach LOS		D		F	D		F
HCM Average Control Delay		111.8					F
Actual Cycle Length (s)		180.0					20.0
Analysis Period (min)			15				

Timings
5: Uwapo Street & Piliani Highway

5/2/2007

Lane Configurations	Prot	Perm	Prot	Perm	Prot	Perm
Turn Type						
Permitted Phases	4	8	6	6	2	2
Switch Phase						
Minimum Split (s)	8.0	21.0	8.0	21.0	8.0	21.0
Total Split (%)	7.2%	11.7%	7.2%	11.7%	6.1%	71.7%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimizes?						
Act Elctd Green (s)	8.0	14.0	8.0	14.0	8.0	124.0
v/c Ratio	1.27	0.57	0.43	1.63	0.38	0.85
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
LOS	F	F	D	F	F	F
Approach LOS	F	F	F	F	F	F
Cycle Length: 180						
Offset: 0 (0%) Referenced to phase 2-SBT and 6-NBT, Start of Green						
Control Type: Actuated-Coordinated						
Intersection Signal Delay: 186.3						
Analysis Period (min): 15						



Queues
5: Uwapo Street & Piliani Highway

5/2/2007

Lane Group Flow (vph)	100	83	250	56	78	3533	322	3228
Control Delay	249.5	94.8	38.3	398.4	85.9	84.8	176.5	230.6
Total Delay	249.5	94.8	38.3	398.4	85.9	84.8	176.5	230.6
Queue Length 95th (ft)	m#269	m#147	m#72	#518	116	#224	#243	#3029
Turn Bay Length (ft)		65	50	400	400	300	300	300
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Queue shown is maximum after two cycles.								
Queue shown is maximum after two cycles.								



HCM Signalized Intersection Capacity Analysis
 5: Uwapo Street & Piliani Highway

5/2/2007

Lane Configurations												
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	45	0	0	54	0	0	39	0	0	7
Turn Type	Prot	Parm	Prot	Parm	Prot	Parm	Prot	Parm	Prot	Parm	Prot	Parm
Permitted Phases	4 8 6											
Effective Green, g (s)	8.0	14.0	14.0	8.0	14.0	14.0	8.0	124.0	124.0	14.0	130.0	130.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	79	145	123	153	145	123	79	2438	1091	267	2556	1143
v/s Ratio Parm	0.02 c0.06 0.11											
Uniform Delay, d1	86.0	80.1	77.9	86.0	78.9	81.5	85.9	28.0	9.8	83.0	25.0	7.1
Incremental Delay, d2	185.8	5.2	0.9	312.9	1.7	25.9	96.2	204.5	0.3	96.1	118.6	0.0
Level of Service	F	F	F	F	F	F	F	F	F	F	F	F
Approach LOS	F F F F F F F F F F F F											
HCM Average Control Delay	191.8 HCM Level of Service F											
Actuated Cycle Length (s)	180.0 Sum of lost time (s) 25.0											
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 14: Project Access & Piliani Highway

5/2/2007

Lane Configurations												
Sign Control	Stop Free Free											
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pedestrians												
Waiting Speed (ft/s)												
Right turn flare (veh)												
Median storage (veh)												
PX platform unblocked	0.32	0.32										
vC1 stage 1 conf int												
vCu unblocked vol	10861	0										
vC2 stage (s)												
pD queue free %	100	76										
vL volume												
Volume Left	0	0	0	0	0	0	0	0	0	0	0	0
cSH	342	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Queue Length 50th (ft)	23	0	0	0	0	0	0	0	0	0	0	0
Level of Service	C C C C C C C C C C C C											
Approach LOS	C C C C C C C C C C C C											
Average Delay	0.2											
Analysis Period (min)	15											

Lane Configurations	ptov	Prct	Perm
2			
Turn Type			
Purified Phases			
Switch Phase			
Minimum Split (s)	21.0	9.0	21.0
Total Split (%)	37.8%	27.2%	34.4%
All-Red Time (s)	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0
Lead-Lag Optimize?			
Act Effect Green (s)	37.1	64.6	15.4
Wt Ratio	0.46	0.25	0.68
Queue Delay	0.0	0.0	0.0
LOS	C	A	D
Approach LOS	B	B	C
Cycle Length: 90			
Offset: 61 (68%), Referenced to phase 4-EST and 8-WBT, Start of Green			
Control Type: Actuated-Coordinated			
Intersection Signal Delay: 18.9			
Intersection LOS: B			
Analysis Period (min): 15			

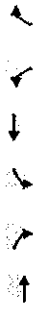


Lane Group Flow (vph)	672	206	1028	606
Control Delay	22.1	44.5	4.5	35.1
Total Delay	22.1	44.5	4.5	35.1
Queue Length 95th (ft)	22.4	24	105	182
Turn Bay Length (ft)	375	350	500	500
Starvation Cap Reduction	0	0	0	0
Storage Cap Reduction	0	0	0	0

HCM Signalized Intersection Capacity Analysis

1: Piliani Highway & South Kihnei Road

5/9/2007



Lane Configurations	← ←		← ←		← ←		← ←	
Ideal Flow (vph)	1900	1900	1800	1900	1900	1900	1900	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
RTOR Reduction (vph)	0	88	0	0	0	187	0	
Turn Type			pt	hov	Prot	Perm		
Permitted Phases	2							
Effective Green, g (s)	37.0	64.6	15.4	57.4	22.6	22.6		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		
Lane Grp Cap (vph)	1485	1136	303	2257	862	998		
v/s Ratio Perm	0.04							
Uniform Delay, d1	19.3	4.2	35.0	8.3	30.6	26.3		
Incremental Delay, d2	1.1	0.1	5.9	0.4	2.6	0.2		
Level of Service	C	A	D	A	C	C		
Approach LOS	B		B		C			
HCM Average Control Delay	-17.7							
Actual Cycle Length (s)	80.0							
Sum of lost time (s)	15							
Analysis Period (min)	15							

HCM Unsignalized Intersection Capacity Analysis

3: Uwapo Street & South Kihnei Road

5/9/2007



Lane Configurations	← ←		← ←		← ←		← ←	
Sign Control	Stop		Free		Free		Free	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Pedestrians	2							
Walking Speed (ft/s)	2							
Right turn flare (veh)	2							
Median storage (veh)	2							
Pk. Pedon Unbuffered	2							
vC1, stage 1 conf vol	1284							
vC1, unbuffered vol	744							
vC, 2 stage (s)	64							
90 queue free %	57							
Volume Left	61		0		33		0	
Volume Right	557		1700		807		1700	
Queue Length 95th (ft)	53		0		3		0	
Lane LOS	C		C		A		A	
Approach LOS	C		C		C		C	
Average Delay	3.9							
Analysis Period (min)	15							

Timings

4: Piliiani Highway & Mokulele Highway

5/9/2007

Lane	Configuration	Split	Prot	Phov	Prot	Phov
Lane Group Flow (vph)	122	123	18	967	1928	6
Control Delay	110.8	110.9	18.6	70.3	46.7	15.9
Total Delay	110.8	110.9	18.6	70.3	46.7	15.9
Queue Length (ft)	#281	#284	301	45	m553	m798
Turn Bay Length (ft)	400	950	600	600	600	600
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0

Minimum Split (s)	20.0	20.0	20.0	9.0	21.0	9.0	21.0
Total Split (%)	11.1%	11.1%	42.8%	11.1%	31.7%	72.8%	5.0%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Act Effct Green (s)	15.0	15.0	75.2	6.9	58.2	144.8	6.3	84.1	104.1
v/c Ratio	0.87	0.87	0.49	0.25	0.87	0.68	0.10	0.89	0.72
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOS	F	F	B	E	D	B	F	D	A
Approach LOS	D	E	C	D	D	D	D	D	D

Cycle Length	180
Offset: 1 (1%), Referenced to phase 2/NBT and 5/SBT, Start of Green	
Control Type: Actuated-Coordinated	
Intersection Signal Delay: 35.2	
Intersection LOS: D	
Analysis Period (min): 15	



Queues

4: Piliiani Highway & Mokulele Highway

5/9/2007

Lane	Configuration	Split	Prot	Phov	Prot	Phov
Lane Group Flow (vph)	122	123	18	967	1928	6
Control Delay	110.8	110.9	18.6	70.3	46.7	15.9
Total Delay	110.8	110.9	18.6	70.3	46.7	15.9
Queue Length (ft)	#281	#284	301	45	m553	m798
Turn Bay Length (ft)	400	950	600	600	600	600
Starvation Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0

Minimum Split (s)	20.0	20.0	20.0	9.0	21.0	9.0	21.0
Total Split (%)	11.1%	11.1%	42.8%	11.1%	31.7%	72.8%	5.0%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Act Effct Green (s)	15.0	15.0	75.2	6.9	58.2	144.8	6.3	84.1	104.1
v/c Ratio	0.87	0.87	0.49	0.25	0.87	0.68	0.10	0.89	0.72
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOS	F	F	B	E	D	B	F	D	A
Approach LOS	D	E	C	D	D	D	D	D	D

Cycle Length	180
Offset: 1 (1%), Referenced to phase 2/NBT and 5/SBT, Start of Green	
Control Type: Actuated-Coordinated	
Intersection Signal Delay: 35.2	
Intersection LOS: D	
Analysis Period (min): 15	

Queue shown is maximum after two cycles.

4: Piliani Highway & Mokulele Highway

5/9/2007

Lane Configurations	4				4				4				4			
Volume (vph)	1900				1900				1900				1900			
Ideal Flow (vphpl)	1900				1900				1900				1900			
Flow Ratio	0.95				0.95				0.95				0.95			
Line Util. Factor	0.95				0.98				1.00				0.95			
Flow (vph)	1805				1862				1900				1805			
Flow (vphpl)	1805				1862				1900				1805			
Flt Protected	0.95				0.98				0.95				1.00			
Flt Permitted	0.95				0.98				0.95				1.00			
Peak-hour factor, PHF	0.90				0.90				0.90				0.90			
RTOR Reduction (vph)	0				177				0				0			
Turn Type	Split				p/rov				Split				p/rov			
Permitted Phases																
Effective Green, g (s)	15.0				15.0				4.7				58.2			
Clearance Time (s)	5.0				5.0				5.0				5.0			
W/S Ratio Perm	140				141				133				46			
Uniform Delay, d1	81.5				81.5				38.2				86.0			
Incremental Delay, d2	38.0				38.0				0.2				3.1			
Level of Service	F				F				D				D			
Approach LOS	E				F				C				D			
HCM Average Control Delay	396				396				HCM Level of Service				D			
Actuated Cycle Length (s)	180.0				180.0				Sum of lost time (s)				20.0			
Analysis Period (min)	15				15				15				15			

5: Uwapo Street & Piliani Highway

5/9/2007

Lane Configurations	4				4				4				4			
Volume (vph)	1900				1900				1900				1900			
Ideal Flow (vphpl)	1900				1900				1900				1900			
Flow Ratio	0.95				0.95				0.95				0.95			
Line Util. Factor	0.95				0.98				1.00				0.95			
Flow (vph)	1805				1862				1900				1805			
Flow (vphpl)	1805				1862				1900				1805			
Flt Protected	0.95				0.98				0.95				1.00			
Flt Permitted	0.95				0.98				0.95				1.00			
Peak-hour factor, PHF	0.90				0.90				0.90				0.90			
RTOR Reduction (vph)	0				177				0				0			
Turn Type	Split				p/rov				Split				p/rov			
Permitted Phases																
Effective Green, g (s)	15.0				15.0				19.0				19.0			
Clearance Time (s)	5.0				5.0				5.0				5.0			
W/S Ratio Perm	140				141				133				46			
Uniform Delay, d1	81.5				81.5				38.2				86.0			
Incremental Delay, d2	38.0				38.0				0.2				3.1			
Level of Service	F				F				D				D			
Approach LOS	E				F				C				D			
HCM Average Control Delay	396				396				HCM Level of Service				D			
Actuated Cycle Length (s)	180.0				180.0				Sum of lost time (s)				20.0			
Analysis Period (min)	15				15				15				15			

5/9/2007
 HCM Signalized Intersection Capacity Analysis
 5: Uwapo Street & Pillani Highway

Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Peak-hour-factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	65	0	0	62	0	0	28	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Permitted Phases	4				8				6				2							
Effective Green, g (s)	16.0	16.0	16.0	19.0	19.0	19.0	5.6	118.0	118.0	7.0	119.4	119.4	119.4	119.4	119.4	119.4	119.4	119.4	119.4	119.4
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	157	168	141	362	197	167	55	2320	1038	134	2346	1050	1050	1050	1050	1050	1050	1050	1050	1050
v/s Ratio Perm	0.02				0.12				0.05				0.01							
Uniform Delay, d1	82.0	76.5	75.9	80.0	74.4	80.5	86.8	31.0	11.2	86.5	22.8	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Incremental Delay, d2	99.7	0.9	0.6	34.4	0.9	120.4	7.2	32.3	0.1	71.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Level of Service	F	E	E	F	E	F	F	E	F	F	E	B	F	A	A	A	A	A	A	A
Approach LOS	F				F				E				B							
HCM Average Control Delay	58.7				HCM Level of Service				E											
Actuated Cycle Length (s)	180.0				Sum of lost time (s)				20.0											
Analysis Period (min)	15																			

5/9/2007
 Queues
 5: Uwapo Street & Pillani Highway

Lane Group	Flow (vph)	172	44	344	61	28	2428	139	1956
Control Delay	170.7	82.2	30.0	114.6	79.1	144.0	103.9	62.8	3.4
Total Delay	170.7	82.2	30.0	114.6	79.1	144.0	103.9	62.8	3.4
Queue Length 95th (ft)	#400	97	83	#315	121	#170	72	#1738	34
Turn Bay Length (ft)		65	200	34	50	400	400	300	300
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0

HCM Unsignalized Intersection Capacity Analysis
 14: Project Access & Piliiani Highway

5/9/2007

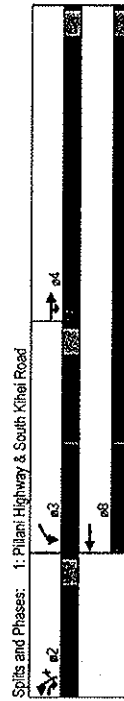
Lane Configurations	↔ ↔	↔ ↔	↔ ↔	↔ ↔
Sign Control	Stop	Free	Free	Free
Peak Hour Factor	0.90	0.90	0.90	0.90
Walking Speed (ft/s)				
Right turn flare (veh)				
Median storage (veh)				
Pk. platoon unblocked	0.35	0.35		0.35
vC1, stage 1 conf. vol.				
vC1, unblocked vol.	5460	0		2936
p0 queue free %	100	74		100
Volume Left	0	0	0	0
cSH	378	1700	1700	1700
Queue Length 95th (ft)	26	0	0	0
Lane LOS	C	C	C	C
Approach LOS	C	C	C	C
Average Delay				0.4
Analysis Period (min)				15

Timings

1: Piliiani Highway & South Kihei Road

5/9/2007

Lane Configurations	↔ ↔	↔ ↔	↔ ↔	↔ ↔
Turn Type	ptov	Prct		Perm
Permitted Phases	2			
Switch Phase				
Minimum Split (s)	21.0	9.0	21.0	21.0
Total Split (%)	45.7%	65.7%	33.3%	79.0%
All-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimize?				
Act Effc Green (s)	47.9	69.5	25.5	76.4
v/c Ratio	0.61	0.68	0.84	0.76
Queue Delay	0.0	0.0	0.0	0.0
LOS	C	B	D	A
Approach LOS	B	B	B	D
Cycle Length	105			
Onset: 37 (35%), Referenced to phase 4EBT and 8:WB T, Start of Green				
Control Type: Actuated-Coordinated				
Intersection Signal Delay: 21.7				
Intersection LOS: C				
Analysis Period (min) 15				





Lane Group Flow (vph)	980	361	1000	411
Control Delay	24.6	11.9	48.3	6.4
Total Delay	24.6	11.9	48.3	6.4
Queue Length 95th (%)	354	378	194	295
Turn Bay Length (ft)	375	350	500	
Station Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0



Lane Configurations	T T T T T T T T			
Vehicle Flow (vph)	1900	1900	1900	1900
Ideal Flow (vph)	1900	1900	1900	1900
Lane Util. Factor	0.95	1.00	1.00	0.97
Flt Protected	1.00	1.00	0.95	1.00
Flt Permitted	1.00	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	71	0	0
Turn Type	ptov	Prot	Perm	Perm
Permitted Phases	2			
Effective Green, g (s)	47.9	69.5	25.5	78.4
Clearance Time (s)	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1614	1048	430	2642
v/s Ratio Perm	0.02			
Uniform Delay, d1	21.5	10.6	37.8	4.7
Incremental Delay, d2	1.7	1.5	13.1	0.2
Level of Service	C	B	D	A
Approach LOS	B	B	B	D
HCM Average Control Delay	22.0			HCM Level of Service
Actual Cycle Length (s)	105.0			Sum of lost time (s)
Analysis Period (min)	15			15.0

3. Uwapo Street & South Kihei Road

5/9/2007



Lane Configurations	Stop	Free	Free
Sign Control	0.90	0.90	0.90
Peak Hour Factor	0.90	0.90	0.90
Pedestrians	2		
Walking Speed (ft/s)			
Right turn flare (veh)			
Median storage (veh)			
PX, Platoon unlocked			
vC1, stage 1 conf.vol	1889	622	717
vC1, unlocked vol			
IC, 2 stage (s)			
q0 queue free %	0	82	84
Volume Left	83	0	139
cSH	122	1700	884
Queue Length 95th (ft)	294	0	14
Lane LOS	F	F	A
Approach LOS	F		
Average Delay			25.7
Analysis Period (min)			15

4. Pilihi Highway & Mokulele Highway

5/9/2007



Lane Configurations	Split	pl+ev	Prot	ptrov
Turn Type				
Permitted Phases				
Switch Phase				
Minimum Split (s)	20.0	20.0	9.0	21.0
Total Split (%)	11.4%	39.0%	9.5%	27.5%
All-Red Time (s)	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead-Lag Optimize?				
Act Effct Green (s)	19.0	19.0	65.1	170.5
v/c Ratio	0.65	0.66	0.76	0.89
Queue Delay	0.0	0.0	0.0	0.0
LOS	F	F	F	F
Approach LOS	D	F	C	F
Cycle Length: 210				
Control: 04 (40%), Referenced to phase Z/NBT and 6/SBT. Start of Green				
Control Type: Actuated-Coordinated				
Intersection Signal Delay: 51.2				
Analysis Period (min): 15				

Queues
4: Piliani Highway & Mokulele Highway

5/9/2007



Lane Group Flow (vph)	99	101	18	944	2182	6	1887
Control Delay	95.9	95.7	33.5	83.4	72.4	14.9	103.0
100th Percentile Delay	95.9	95.7	33.5	83.4	72.4	14.9	103.0
Total Delay	95.9	95.7	33.5	83.4	72.4	14.9	103.0
Queue Length 95th (ft)	226	229	907	50	m807	m864	29
Turn Bay Length (ft)			400	950		600	
Stavention Cap Reductn	0	0	20	0	0	127	0
Storage Cap Reductn	0	0	0	0	0	0	0

Queues shown is maximum after two cycles.
Queues shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Piliani Highway & Mokulele Highway

5/9/2007



Lane Configurations												
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Effective Green, g (s)	50	50	50	50	50	50	50	50	50	50	50	50
Lane Util. Factor	0.95	0.95	0.88	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Protected	0.95	0.95	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Permitted	0.95	0.95	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	137	0	6	0	0	0	0	0	0	0
Turn Type	Split		p/hov		Split		Prot		Prot		p/hov	
Permitted Phases	E, G, Y, G, Y, G, Y, G, Y, G, Y, G, Y											
Effective Green, g (s)	19.0	19.0	84.1	4.9	65.1	164.6	1.5	101.0	125.0	1.5	101.0	125.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	152	153	1116	41	1084	2773	13	1702	942	13	1702	942
v/s Ratio Perm	0.08, 0.08, 0.08, 0.08, 0.08, 0.08, 0.08, 0.08, 0.08, 0.08, 0.08, 0.08, 0.08											
Uniform Delay, d1	92.3	92.4	53.9	100.9	69.0	12.6	100.8	54.5	20.9	100.8	54.5	20.9
Incremental Delay, d2	7.9	8.4	2.3	4.0	0.9	0.2	23.8	53.4	0.2	23.8	53.4	0.2
Level of Service	F	F	D	F	E	B	F	F	F	F	F	F
Approach LOS	D		F		C		F		F		F	
HCM Average Control Delay	57.5 HCM Level of Service E											
Actuated Cycle Length (s)	210.0 Sum of lost time (s) 20.0											
Analysis Period (min)	15											

Timings

5: Uwapo Street & Pillani Highway

5/9/2007



Lane Configurations	Prot	Perm	Prot	Perm	Prot	Perm
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm
Permitted Phases	4	8	8	6	6	2
Switch Phase						
Minimum Split (s)	8.0	21.0	21.0	8.0	21.0	21.0
Total Split (%)	8.1%	10.0%	10.0%	7.1%	71.9%	10.0%
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lead-Lag Optimize?

Act Effr Green (s)	12.0	13.7	13.7	12.9	13.7	11.3	148.0	148.0	18.3	153.0	153.0
v/c Ratio	0.99	0.68	0.46	1.28	0.46	0.83	0.92	1.17	0.18	1.08	0.96
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
LOS	F	F	D	F	F	E	F	F	A	F	B
Approach LOS	F	F	F	F	F	F	F	F	F	F	C

Cycle Length: 210
 Onset: 72.34%, Referenced to phase ZSBI and RNBI, Start of Green
 Control Type: Actuated-Coordinated
 Intersection Signal Delay: 77.3
 Intersection LOS: E
 Analysis Period (min): 15

Splits and Phases: 5: Uwapo Street & Pillani Highway



Queues

5: Uwapo Street & Pillani Highway

5/9/2007



Lane Group Flow (vph)	100	83	250	56	78	2878	322	2478
Control Delay	177.3	121.6	35.7	227.6	106.2	77.2	144.8	112.0
Total Delay	177.3	121.6	35.7	227.6	106.2	77.2	144.8	112.0
Queue Length 95th (ft)	m#281	m178	m72	#330	132	#210	#234	#2-543
Queue Length 95th (m)	m#281	m178	m72	#330	132	#210	#234	#2-543
Turn Bay Length (ft)	65	200	50	400	400	300	300	300
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0

Queue shown is maximum after two cycles.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 5: Uwapo Street & Pillani Highway

5/9/2007

Lane Configurations	← → ← → ← → ← →				← → ← → ← → ← →			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
RTOR Reduction (vph)	0	0	54	0	0	77	0	0
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Permitted Phases	4				8			
Effective Green, G (s)	12.0	13.7	12.0	13.7	11.3	11.3	146.0	163.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	101	122	103	196	122	103	95	2469
WS Ratio Perm	0.01	0.01	0.01	0.01	0.05	0.11	0.02	0.02
Uniform Delay, d1	98.9	96.0	92.8	99.0	94.6	96.2	98.3	32.0
Incremental Delay, d2	85.0	14.1	0.8	157.5	2.7	20.7	41.0	81.2
Level of Service	F	F	F	F	F	F	F	F
Approach LOS	F				F			
HCM Average Control Delay	80.6				HCM Level of Service			
Actuated Cycle Length (s)	210.0				Sum of lost time (s)			
Analysis Period (min)	15				20.0			

HCM Unsignalized Intersection Capacity Analysis
 14: Project Access & Pillani Highway

5/9/2007

Lane Configurations	← → ← → ← → ← →				← → ← → ← → ← →			
Sign Control	Stop				Free			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pedestrians	0				0			
Walking Speed (ft/s)	3.0				3.0			
Right turn flare (veh)	0				0			
Median storage (veh)	0				0			
Pk. platoon unblocked	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
vC1, stage 1 conf vol	0				3414			
vCn, unblocked vol	7659				0			
vC, 2 stage (s)	100				75			
platoon free %	100				100			
Volume	0				0			
Volume Left	0				0			
cSH	335	1700	1700	1700	1700	1700	1700	1700
Queue Length 95th (ft)	24				0			
Lane LOS	C				C			
Approach LOS	C				C			
Average Delay	0.3				0.3			
Analysis Period (min)	15				15			

**APPENDIX D – GLOSSARY
(AS DEFINED BY THE HIGHWAY CAPACITY MANUAL, 2000 EDITION)**

**APPENDIX D
GLOSSARY**

Arterial – A signalized street that primarily serves through-traffic and that secondarily provides access to abutting properties, with signal spacings of 2.0 miles or less.

Capacity – The maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of a lane or roadway during a specified time period under given roadway, geometric, traffic, environmental, and control conditions; usually expressed as vehicles per hour, passenger cars per hour, or persons per hour.

Collector Street – A surface street providing land access and traffic circulation within residential, commercial, and industrial areas.

Control Delay – The component of delay that results when a control signal causes a lane group to reduce speed or stop; it is measured by comparison with the uncontrolled condition.

Corridor – A set of essentially parallel transportation facilities designed for travel between two points. A corridor contains several subsystems, such as freeways, rural (or two-lane) highways, arterials, transit, and pedestrian and bicycle facilities.

Cycle – A complete sequence of signal indications

Delay – The additional travel time experienced by a driver, passenger, or pedestrian.

Demand – The number of users desiring service on the highway system, usually expressed as vehicles per hour or passenger cars per hour.

Green time – The duration, in seconds of the green indication for a given movement at a signalized intersection.

Peak Hour – The hourly volume during the maximum-volume hour of the day.

Queue – A line of vehicles, bicycles, or persons waiting to be served by the system in which the flow rate from the front of the queue determines the average speed within the queue. Slowly moving vehicles or people joining the rear of the queue are usually considered part of the queue. The internal queue dynamics can involve starts and stops. A faster moving line of vehicles is often referred to as a moving queue or platoon.

Residual queue – The unmet demand at the end of an analysis period, resulting from operation while demand exceeded capacity.

Volume – The number of persons or vehicles passing a point on a line, roadway, or other traffic-way during some time interval, often 1 hour, expressed in vehicles, bicycles, or persons per hour.

Volume to Capacity Ratio – The ratio of flow rate to the capacity for a transportation facility.

APPENDIX FG.

Preliminary Engineering Report

FINAL

Kihei Residential Project Preliminary Engineering Report

MAY 2007

Prepared For:

A&B Properties, Inc.
822 Bishop Street
Honolulu, Hawaii 96813



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FINAL

Kihei Residential Project

Preliminary Engineering Report

May 2007

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Prepared By:

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ATTACHMENTS

Attachment 1 – Wastewater System Calculations

Attachment 2 – Water System Calculations

Attachment 3 – Conceptual Construction Cost Estimate

1.0 INTRODUCTION

A&B Properties, Inc. (A&B) is proposing the development of a property in North Kihei, on the island of Maui, for multi-family and single-family residential uses, a small neighborhood commercial site, parks and open space. The property, approximately 94 acres in size, is located near the intersection of Mokelele and Piilani Highways, adjacent and to the north of the existing Hale Piilani residential subdivision.

The purpose of this report is to study the roadways, wastewater, water and utility (electric, telephone and CATV) systems as follows:

- Describe and assess the existing systems within the project vicinity and adjacent areas
- Determine the needs for the proposed development
- Identify system capacity issues or constraints which could impact the proposed development
- Describe new system improvements which will be needed to support the proposed development
- Prepare budgetary construction cost estimates for the system improvements which will be needed to support the proposed development

2.0 ROADWAYS

2.1 Existing Conditions

The project area is bounded on the west by Piilani Highway, on the north and east by Waiakoa Gulch, and on the south by the Hale Piilani residential subdivision. The existing access to the project area is via a dirt road intersecting with Kaiwahine Street near Piilani Highway. Kaiwahine Street is also one of the access points for the Hale Piilani subdivision.

2.2 Proposed Conditions

Planned vehicular access points for the proposed development include the following:

- A limited access (right in/right out) from Piilani Highway
- Full access from Kaiwahine Street
- Future connectors to the south via adjacent properties

The roadways within the proposed development will consist of collector roads (56-foot minimum width right-of-way) and minor streets (44-foot minimum width right-of-way).

3.0 WASTEWATER SYSTEM

3.1 Existing Conditions

The Kihei area is currently serviced by a wastewater collection, treatment and disposal system owned and operated by the County of Maui.

3.1.1 Collection System

Flow from the Hale Piilani subdivision, adjacent to the proposed development, is carried by an existing 12-inch PVC gravity sewer across Piilani Highway and along Uwapo Road to PS #2 on South Kihei Road. The slope of the existing 12-inch sewer varies from 0.905% to 3.82%, and the capacity of the existing 12-inch sewer varies from 2.59 to 5.32 million gallons per day (mgd). Based on conversations with County of Maui Wastewater Planning staff, the 12-inch sewer carries flow generated in the Hale Piilani subdivision only.

The flow from the Hale Piilani subdivision was estimated to be as follows:

Dry Weather Flow	0.148 mgd
Peak Wet Weather Flow	0.725 mgd

Based on the above, there is approximately 1.86 mgd (2.59 mgd capacity - 0.73 mgd flow from Hale Piilani) of available capacity in the existing 12-inch sewer.

Flow is transported by wastewater pump stations PS #2, PS#3, PS #4, PS #5 and PS #6 to the Kihei Wastewater Reclamation Facility (WWRF). According to conversations with County of Maui Wastewater Planning staff:

- A capacity analysis of each pump station is triggered when dry weather flow exceeds 50% of capacity
- PS #2 has exceeded the 50% trigger; PS #4 and PS #5 are nearing the 50% trigger; PS #3 & PS #6 are not near the 50% trigger
- Capacity and Dry Weather Flows at PS #2, PS #4 & PS #5 are shown in the following table (The existing flows do not include any current applications for future connections)

WWPS	Capacity (mgd)	Existing Dry Weather Flow (mgd)	Percent Capacity
PS #2	1.15	0.59	51.3%
PS #4	4.40	1.48	33.6%
PS #5	4.61	1.66	36.0%

Because PS #2 has exceeded the 50% trigger, a capacity analysis of PS #2 will be done internally by the County this fiscal year, with a preliminary engineering report to be done the following year (1 year duration), and design (2 year duration) and construction (2 year duration) to follow; based on this tentative schedule, capacity at PS #2 will be increased around the year 2012

- If the proposed development goes on-line before 2012, the developer will need to work with the County to address the capacity issue at PS #2; potential arrangements include the developer including the expansion of PS #2 as part of the work for the development, or for the developer to provide some funding for the County to do the work (cost share)

3.1.2 Treatment

Wastewater generated in the Kihei area is treated at the Kihei WWRF. The capacity of the plant is 8.0 mgd; current dry weather flow into the plant is 4.7 mgd (not including current applications for future connection). The plant is currently operating at 59% of capacity; a capacity analysis of the WWTP is triggered when dry weather flow exceeds 75% of capacity.

The Kihei WWRF provides filtration and disinfection treatment to produce recycled water at the R-1 level by the Hawaii State Department of Health standards. R-1 recycled water is the highest quality of recycled water and is safe for use on lawns, golf courses, parks, and other places that people frequent. Between 40 and 50 percent of the recycled water from the Kihei WWRF is reclaimed for industrial use, fire protection and irrigation. The remaining recycled water is discharged into injection wells located at the plant site.

3.2 Projected Wastewater Flows

The projected wastewater flows for the proposed development are as follows:

Base Flow	0.191 mgd
Dry Weather I/I	0.012 mgd
Average Dry Weather Flow	0.203 mgd
Maximum Flow Factor	4.2
Maximum Dry Weather Flow	0.818 mgd
Wet Weather I/I	0.117 mgd
Peak Wet Weather Flow	0.935 mgd

The projections listed above are based on the following:

- Concept Land Plan (July 24, 2006)
- Base wastewater flow generation rates listed in the County of Maui Wastewater Flow Standards (February 2, 2000)
- Other design flow criteria presented in the City and County of Honolulu Design Standards of the (former) Department of Wastewater Management (July 1993)

3.3 Proposed Wastewater System Improvements

The existing 12-inch PVC sewer which serves the Hale Piilani subdivision has an estimated 1.86 mgd of available capacity, which is sufficient to accommodate the estimated peak wet weather flow 0.934 mgd from the proposed development. A likely connection point to the existing 12-inch PVC sewer is at a sewer manhole located on Kaiwahine Street approximately 120 feet away from the centerline of Piilani Highway. The invert elevation at this manhole is 27.66 feet above mean sea level.

There is an existing 60-inch storm drain running parallel to the existing 12-inch sewer; the existing storm drain is located between the existing sewer and the proposed development. The 60-inch storm drain may prevent a gravity connection from the on-site sewer system to the existing 12-inch sewer, in which case a pump station will be required to pump into a forcemain crossing over the storm drain. It is also possible that the majority of the sewer system for the proposed development can connect directly to the existing 12-inch sewer, and a pump station will be required for only the lower portions of the proposed development site.

The proposed development is estimated to generate a dry weather flow of 0.203 mgd. This additional flow, when added to the County's wastewater system, will require coordination with the County's

planned expansion of PS #2. As described previously in Section 3.1.1, possible options may include cost sharing with the County for the capacity increase of PS #2, or inclusion of the work to increase the capacity of PS #2 with the proposed Kihei Residential Development.

Based on information provided by the County, the other County wastewater facilities located downstream of the proposed development (PS #3, PS #4, PS #5, PS #6 and the Kihei WWTP) appear to have sufficient capacity to accommodate the additional dry weather flow.

4.0 WATER SYSTEM

4.1 Existing Conditions

The Kihei area is served by the Department of Water Supply (DWS) of the County of Maui. The existing water mains in the area are:

- 12-inch ductile iron (DI) distribution main along Kaiwahine Street
- 8-inch DI distribution main along Kaiolohia Street
- 18-inch cast iron (CI) transmission main adjacent to and crossing Piilani Highway
- 36-inch reinforced concrete cylinder pipe transmission main (Central Maui Transmission System) crossing the subject property in a north/south direction approximately midway through the site

The Makai Heights (Ohukai) Reservoir provides storage for the north Kihei area. The reservoir has a capacity of 2.0 million gallons, with a bottom elevation of 222.0 feet and a top elevation of 240.5 feet.

4.2 Projected Water Demands

The water demand rates used to calculate the average daily demand for the Kihei area are:

<u>Zoning Designation</u>	<u>Average Daily Demand</u>
Single Family or Duplex	1,000 gallons per unit
Multi-Family	560 gallons per unit
Commercial	6,000 gallons per acre
Parks	1,700 gallons per acre

The water demand rates listed above are consistent with Table 100-18 of the DWS Design Standards, with one exception; during consultation with DWS, it was learned that to account for the drier climate in the Kihei area, DWS uses a water demand rate of 1,000 gallons per unit for single family zoning.

Based on the water demand rates listed above, and also on the Concept Land Plan (July 24, 2006) and unit counts provided by A&B, the projected water demands for the proposed development are:

Average Daily Demand	0.53 million gallons per day (mgd)
Maximum Daily Demand	0.79 mgd (1.5 x Average Daily Demand)
Peak Hour Demand	1.58 mgd (3.0 x Average Daily Demand)
Fire Flow Demand	2,553 gallons per minute (gpm) (Max. Daily Demand + Fire Flow)

4.3 Proposed Water System Improvements

Based on discussions with the DWS, it is likely that the DWS will require A&B to develop a potable water source and storage tank in the Central Maui area to service the proposed development, and to dedicate those facilities to the County of Maui. The water system for the proposed development will be interconnected with the existing DWS water system and the Makai Heights (Ohukai) Reservoir.

The required size for the storage tank was estimated based on the following criteria:

- Meet maximum daily consumption, reservoir full at beginning of 24-hour period, with no source input to reservoir
- Meet maximum day flow + fire flow for duration of the fire, reservoir 3/4 full at start of fire, with incoming pump flow

To meet the two sizing criteria, the estimated minimum size requirement for the storage tank is 800,000 gallons. According to DWS, the remaining capacity of the Makai Heights Reservoir, not considering the potential future needs of other pending projects in the area, is 339,000 gallons.

It is possible that DWS may allow A&B to utilize some or all of the remaining capacity of the Makai Heights Reservoir to service some of the lower portion of the proposed development. Further consultation with DWS will be required during the design phase of this project to determine whether any of the available storage capacity of the Makai Heights Reservoir can be used for this project.

Assuming A&B is required to provide storage for the entire development, the required storage tank elevation and pipe sizing is based on the following criteria:

- Maximum daily flow plus fire flow with residual pressure of 20 pounds per square inch (psi)
- Peak hour flow with minimum residual pressure of 40 psi
- Maximum velocity of 6 feet per second (fps) in distribution mains without fire flow
- Maximum velocity of 10 fps in distribution mains with maximum daily flow plus fire flow

To meet the above criteria, the required water surface elevation (WSE) at the storage tank is 355 feet. Assuming a tank height of 10 feet, the required ground elevation at the storage tank is 345 feet.

In order for the proposed water system to interconnect with the existing DWS pressure zones and tank elevations of the Makai Heights Reservoir, which has a WSE of 240.5 feet, a pressure reducing valve (PRV) will be required for the interconnection between the existing and proposed water systems.

The recommended pipe size from the storage tank to the upper area of the subdivision is 12 inches. The pipe network within the subdivision is expected to be a system of pipes ranging in size from 8 to 12 inches. An interconnection with the County water system can be made on the 12-inch DI distribution main on Kaiwahine Street near Piilani Highway.

5.0 UTILITY SYSTEMS

The utility companies who service the Kihei area, Maui Electric Company (MECO), Hawaiian Telcom and Oceanic Time Warner Cable, were consulted with regards to the proposed project. A summary of the discussions follows:

- All utilities have their sources available in the area, but will require extension of facilities and additions.
- All entry to the proposed subdivision by the utilities will be from Piilani Highway.
- No alternate routes were provided by any of the utilities. However, future routes may become available as new connector roads are built for adjoining parcels.
- No ballpark estimates or figures were provided by MECO for the difference in cost between providing underground and overhead services; that cost difference will be the responsibility of the developer.

More detailed descriptions of the utility systems are provided in the following sections.

5.1 Maui Electric Company

A MECO drawing for Hale Piilani Subdivision shows electrical facilities along Piilani Highway. It is the preference of MECO that the route of entry into the proposed subdivision be from Piilani Highway; this access can be through the subdivision access road. A&B will be required to construct underground ducts and structures throughout the subdivision. MECO is unable to estimate charges and cost to service this project without detailed plans.

5.2 Hawaiian Telcom

Hawaiian Telcom's existing telephone plant serving this area will need to be upgraded for this proposed residential project. Pair gain equipment will need to be installed to provide telecommunication services to this project. The pair gain equipment will be fed by a fiber cable and act as a hub for the distribution of all Hawaiian Telcom's telecommunication services within this proposed subdivision. The pair gain equipment is contained within cabinets which are typically located in an accessible area close to an entrance to the subdivision within an easement on private property. A building for the pair gain equipment will not be required.

Underground telephone support structures will be provided and installed at A&B's expense. Design of the underground support structures will be dependent on the easement location, with entry into the proposed development through Piilani Highway. Telephone cables will be installed at Hawaiian Telcom's expense with customers responsible for service connections and monthly rental fees.

5.3 Oceanic Time Warner Cable

Oceanic has service on the existing poles on Piilani Highway. The entry point of the cable system would be from Piilani Highway. Oceanic would prefer 3-inch conduit on the main streets and 2-inch conduit for street crossings. Two power supply pads would be required. The construction of the cable infrastructure will be at A&B's expense while the installation of the cables will be done at Oceanic's cost.

6.0 ESTIMATED CONSTRUCTION COSTS

The conceptual estimated construction cost for the required infrastructure for the proposed development is as follows:

	<u>Offsite</u>	<u>Onsite</u>	<u>Total</u>
Roadways	\$3.6 million	\$ 9.3 million	\$12.9 million
Water System	\$4.2 million	\$ 4.1 million	\$ 8.3 million
Wastewater System		\$ 6.9 million	\$ 6.9 million
Utility Systems		\$11.3 million	\$11.3 million
TOTAL	\$7.8 million	\$31.6 million	\$39.4 million

ATTACHMENT A

WASTEWATER SYSTEM
CALCULATIONS

Kihel Residential Project																	
Sewer Demands																	
A&B																	
5/11/07																	
Land Use	Total Area (ac.)	Units	Capita per Unit	Capita per Acre	Other Capita	Total Capita	Average Flow per Unit (gpcd)	Average Flow per Cap. (mgd)	Max Flow Factor	Max Flow (mgd)	Dry /l/ Rate (gpcd)	Dry /l/ (mgd)	Design Average Flow (mgd)	Design Max Flow (mgd)	Wet /l/ Rate (gpd)	Wet /l/ (mgd)	Design Peak Flow (mgd)
Detached Single Family (R-1)	25.7	100	4.0			400	350	0.035	5.0	0.175	5	0.002	0.037	0.177	1,250	0.092	0.209
Detached Single Family (A-1)	48.5	300	4.0			1,200	350	0.105	4.8	0.506	5	0.006	0.111	0.512	1,250	0.061	0.573
Multi-Family (A-2)	13.7	200	2.5			500	255	0.051	5.0	0.255	5	0.003	0.054	0.258	1,250	0.017	0.275
Neighborhood Commercial	1.4				40	56	80	0.000	5.0	0.000	5	0.000	0.000	0.000	1,250	0.002	0.002
Park	4.3				40	172	25	0.000	5.0	0.000	5	0.001	0.001	0.001	1,250	0.005	0.006
Roads					0	0		0.000									
Total	93.6					2,328		0.191	4.2	0.807		0.012	0.203	0.818		0.117	0.935
Hale Pillani - Single Family	64.0	400	4.0			1,600	350		4.6	0.637	5	0.008	0.148	0.645	1,250	0.080	0.725

ATTACHMENT B

WATER SYSTEM
CALCULATIONS

**Kihei Residential Project
Water Requirements
5/11/07**

DEMAND CRITERIA

	Average Daily Demand	
	Per Acre gals/acre	Per Unit gals/unit
Single Family Residential	3,000	1000
Multiple Family Residential	5,000	560
Commercial	6,000	
Light Industry	6,000	
Parks	1,700	
Schools	1,700	60
Agricultural	5,000	

Increased to 1000 gpd/unit, per DWS

Max. Daily Demand Factor 1.5
Peak Hour Factor 3.0

DEMAND CALCULATIONS

Land Use	Area (ac.)	Number of Units	Water Demand Rate	Avg. Daily Demand (gal/day)	Max. Daily Demand (gal/day)	Peak Hour Flow (gal/day)
Single Family Detached (R-1)	25.7	100	1,000	100,000	150,000	300,000
Single Family Detached (A-1)	48.5	300	1,000	300,000	450,000	900,000
Multi-Family (A-2)	13.7	200	560	112,000	168,000	336,000
Neighborhood Commercial (B-2)	1.9		6,000	11,400	17,100	34,200
Park (A-1)	4.3		1,700	7,306	10,959	21,917
Roads	0.0		0	0	0	0
TOTAL	94.1			530,706	796,059	1,592,117

FIRE FLOW CRITERIA

	Fire Flow Requirements		
	Flow gpm	Duration Hours	FH Spacing Feet
Agricultural	500	2	500
Rural	1,000	2	500
Single Family	1,000	2	350
Duplex	1,250	2	350
Multi-Family A-1	1,500	2	250
Multi-Family A-2	2,000	2	250
Schools, neighborhood bus., small shopping centers, high rise	2,000	2	250
Light industry, downtown bus., large shopping centers, hospitals	2,000	2	250
Heavy industry, hotels	2,500	2	250

FIRE FLOW CALCULATIONS

	Max Day gpm	Fire Flow gpm	Max + Fire gpm
Single Family Detached (R-1)	104	1,000	1,104
Single Family Detached (A-1)	313	1,000	1,313
Multi-Family (A-2)	117	2,000	2,117
Neighborhood Commercial (B-2)	12	2,000	2,012
TOTAL	553	2,000	2,553

PIPELINE SIZING CRITERIA

1. Maximum daily flow plus fire flow with residual pressure of 20 psi at critical FH.

2. Peak hour flow with minimum residual pressure of 40 psi.

3. Hazen Williams C Factor:

4", 6"	C = 100
8", 12"	C = 110
16", 20"	C = 120
24" and larger	C = 130

4. Maximum velocity:

Distribution Mains, Without Fire Flow	6 fps
Distribution Mains, Max Day + Fire Flow	10 fps
Transmission Mains, Without water services or Fire Flow	20 fps
Fire Lines	13 fps

5. Maximum static or pumping pressure, whichever is greater, shall not exceed 125 psi.

RESERVOIR CAPACITY DETERMINATION CRITERIA

1. Meet Max. Day consumption. Reservoir full at beginning of 24-hour period with no source input to reservoir.

Reservoir size required	796,059 gallons
-------------------------	-----------------

2. Meet Max. Day + Fire Flow for duration of fire, reservoir 3/4 full at start of fire, w/credit for incoming pump flow.

Highest Fire Flow in project	2,000 gpm	(Multi-Family A-2 and Schools)
------------------------------	-----------	--------------------------------

Duration of Fire Flow	2 hours
-----------------------	---------

Volume of Water Required During Fire

Max. Day Flow	66,338 gallons
---------------	----------------

Fire Flow	240,000 gallons
-----------	-----------------

Total	306,338 gallons
-------	-----------------

Volume Required	408,451 gallons	To account for reservoir starting 3/4 full
-----------------	-----------------	--

Even if there is no incoming pump flow, the volume required for the fire flow is less than the volume required to meet max. day consumption

A minimum reservoir volume of 800,000 gallons is required

ELEVATION REQUIRED FOR STORAGE RESERVOIR

Peak Hour Flow

Static Head	230 ft	Ground elev. at top of subdivision
Residual pressure	92 ft	40 psi @ peak hour flow
Headloss from tank to top of subd.	17 ft	See calcs below
<u>Total</u>	<u>339 ft</u>	

Max. Day + Fire Flow

Static Head	230 ft	Ground elev. at top of subdivision
Residual pressure	46 ft	20 psi @ peak hour flow
Headloss from tank to top of subd.	79 ft	See calcs below
<u>Total</u>	<u>355 ft</u>	

Friction Loss Tank to Top of subdivision

Scenario	Dist (ft)	Flow (gpm)	Dia (in)	Velocity (fps)	C	HL (ft)
Peak Hour Flow	4000	1106	12	3.14	110	16.76
Max. Day + Fire Flow	4000	2553	12	7.25	110	78.79

Approximate Water Surface Elevation of 355 feet is required at the reservoir

ATTACHMENT C

CONCEPTUAL CONSTRUCTION
COST ESTIMATE

Kihei Residential Project
Conceptual Cost Estimate (2006 Dollars)
5/11/07

Item	Quantity	Unit Cost	Total Cost
ROADWAYS			
Offsite:			
Intersection at Piilani Hwy	1 LS	\$2,300,000	\$2,300,000
Intersection at Kaiwahine Street	1 LS	\$1,300,000	\$1,300,000
		SUBTOTAL OFFSITE	\$3,600,000
Onsite:			
56' ROW Incl. Curb, Gutter, Sidewalk, Median	16,600 LF	\$385	\$6,391,000
44' ROW Incl. Curb, Gutter, Sidewalk, Median	10,100 LF	\$290	\$2,929,000
Subtotal Road Length	26,700	SUBTOTAL	\$9,320,000
	TOTAL ROADWAYS		\$12,920,000
POTABLE WATER SYSTEM			
Offsite:			
Additional Potable Well Source	2 EA	\$810,000	\$1,620,000
Reservoirs (2)	0.80 MG	\$2,000,000	\$1,600,000
Reservoir Access Roads	4,000 LF	\$70	\$280,000
12-inch DI Main to Reservoir	4,000 LF	\$170	\$680,000
		SUBTOTAL OFFSITE	\$4,180,000
Onsite:			
12-inch DI Main	9,200 LF	\$170	\$1,564,000
8-inch DI Main	17,500 LF	\$145	\$2,537,500
		SUBTOTAL ONSITE	\$4,101,500
	TOTAL POTABLE WATER SYSTEM		\$8,281,500
SEWER SYSTEM			
Onsite:			
8-inch Gravity Sewer	23,500 LF	\$95	\$2,232,500
12-inch Gravity Sewer	3,200 LF	\$205	\$656,000
1.0 MGD Sewer Pump Station	1 LS	\$4,000,000	\$4,000,000
		SUBTOTAL ONSITE	\$6,888,500
	TOTAL SEWER SYSTEM		\$6,888,500
ELECTRICAL AND COMMUNICATION SYSTEMS			
Order-of-magnitude estimate (by ECM, attached)	1 LS	\$11,300,000	\$11,300,000
		SUBTOTAL ONSITE	\$11,300,000
	TOTAL ELEC & COMM SYSTEMS		\$11,300,000
TOTAL ESTIMATED CONSTRUCTION COST			
	TOTAL OFFSITE		\$7,780,000
	TOTAL ONSITE		\$31,610,000
	TOTAL		\$39,390,000

Kihei Residential Project
Roadway Cost Determination
05/11/07

Individual unit costs are in 2002 dollars. Escalation factor from 2002 to 2006: 1.5

56' Row			thickness		width	quan			
			in	ft	ft	per LF	unit \$	cost	
clearing	Clearing and grubbing	acre			56.0	0.00129	1000	1.3	
	Mass excavation	yd3		1.0	56.0	2.07	6.25	13.0	
sidewalk	Std, C.&C. 4" thick concrete sidewalk	ft2	4.0	0.3	8.0	8.0	3.0	24.0	
	6" select fill	yd3	6.0	0.5	16.0	0.3	40.0	11.9	
	Std, C.&C. reinforced curb and gutter	LF				2.0	19.0	38.0	
road	2.5" thick AC pavement	yd2	2.5	0.2	36.0	4.0	8.3	33.2	
	6" base course	yd2	6.0	0.5	36.0	4.0	13.0	52.0	
	6" select borrow subbase course	yd3	6.0	0.5	44.0	0.8	27.0	22.0	
	6" select borrow subbase course	yd3	6.0	0.5	43.0	0.8	27.0	21.5	
	landscaping & Irrigation	LF						40.0	
TOTAL (2002)								\$256.80	
ESCALATED TO 2006)								\$385.20	

44' Row			thickness		width	quan			
			in	ft	ft	per LF	unit \$	cost	
clearing	Clearing and grubbing	acre			44.0	0.00101	1000	1.0	
	Mass excavation	yd3		1.0	44.0	1.63	6.25	10.2	
sidewalk	Std, C.&C. 4" thick concrete sidewalk	ft2	4.0	0.3	8.0	8.00	3.0	24.0	
	6" select fill	yd3	6.0	0.5	16.0	0.3	40.0	11.9	
	Rolled curb	LF				2.0	16.5	33.0	
road	2" thick AC pavement	yd2	2.5	0.2	24.0	2.7	8.0	21.3	
	6" base course	yd2	6.0	0.5	24.0	2.7	13.0	34.7	
	6" select borrow subbase course	yd3	6.0	0.5	33.0	0.6	27.0	16.5	
	6" select borrow subbase course	yd3	6.0	0.5	31.0	0.6	27.0	15.5	
	landscaping & Irrigation	LF						25.0	
TOTAL (2002)								\$193.05	
ESCALATED TO 2006)								\$289.57	

Date: 2/7/07

RE: **Kihei Residential Project (Revised Rough Cost Estimate)**
ECM Job # 26055

Breakdown noted in "blue".

Utility boxes	2,146,813
(29) 6'x11' HH @ \$18,750/bx	
(50) 4'x 6' HH @ \$8,500/bx	
(93) 3'x 5' HH @ \$5,250/bx	
(549) 2'x 4' PB @ \$1,250/bx	
(19) 436T meter box @ \$188/bx	
Conduits	1,501,000
(17,000 lf) 5" conduits @ \$17.50/lf	
(53,000 lf) 4" conduits @ \$12.88/lf	
(22,000 lf) 3" conduit @ \$10.25/lf	
(43,000 lf) 2" conduits @ \$6.88/lf	
Switchgear & transformer pads	56,750
(6) PME pads @ \$5,375/pd	
(49) transformer pads @ \$500/pd	
Street light bases	56,875
(35) street light bases @ \$1,625/base	
Trenching	4,800,000
32,000 linear feet @ \$150/lf	
Concrete jacket	871,250
4,100 cubic yards @ \$212.50/cy	
Riser pole connection	3,000
(4) risers @ \$750ea.	
Contingencies	1,415,353
4.17% G.E.T.	452,488
TOTAL	11,303,529

All utility company charges are not included in the figure above. A more accurate cost can be provided when a complete subdivision plan is available.

APPENDIX GH.

Preliminary Drainage and Erosion Control Report

FINAL

Kihei Residential Project Preliminary Drainage and Erosion Control Report

MAY 2007

Prepared For:

A&B Properties, Inc.
822 Bishop Street
Honolulu, Hawaii 96813



R. M. TOWILL CORPORATION
SINCE 1930

420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941
(808) 842-1133 • Fax: (808) 842-1937
(RMITC Ref: 1-20833-0-E)

FINAL

Kihei Residential Project

Preliminary Drainage and Erosion Control Report

May 2007

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Prepared By:

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420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817

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ATTACHMENTS

Attachment 1 – Drainage Calculations

Attachment 2 – Construction Cost Estimate for the Conceptual Drainage System

Attachment 3 – Storm Water Quality Control Calculations

1.0 INTRODUCTION

A&B Properties, Inc. (A&B) is proposing the development of a property in North Kihei, on the island of Maui, for multi-family and single-family residential uses, a small neighborhood commercial site, parks and open space. The property, approximately 94 acres in size, is located near the intersection of Mokulele and Piilani Highways, adjacent and to the north of the existing Hale Piilani residential subdivision.

The purpose of this report is to study the drainage and erosion control measures as follows:

- Describe and assess the existing drainage facilities within the project vicinity and adjacent areas, with the exception of Waiakoa Gulch, which is being analyzed in a separate study
- Calculate the volume of existing storm water flows which pass through the existing property, and the estimated increase in storm water flows which would result from the proposed project development
- Identify proposed erosion control measures and best management practices
- Identify proposed water quality control measures
- Prepare preliminary calculations

2.0 DRAINAGE SYSTEM

2.1 Criteria and Methodology

The hydrologic criteria and methodology used in this study meets or exceeds the requirements in the County Drainage Standards:

Rules for the Design of Storm Drainage Facilities by the Department of Public Works and Environmental Management, County of Maui, 1995

The design storm used for this study was a 50-year recurrence interval, 1-hour duration storm.

The Rational Method was used to compute peak runoff.

The WinTR-55 computer program, developed by the National Resources Conservation Service, was used to compute the volume of runoff.

The drainage calculations are presented in **Attachment 1**.

2.2 Existing Conditions

The project area is bounded on the west by Piilani Highway, on the north and east by Waiakoa Gulch, and on the south by the Hale Piilani residential subdivision. The existing site is gently sloped, with an average slope of approximately 3%. The land use of the existing site is in agriculture and pasture. Based on a site visit in August 2006 much of the lower portion of the site is currently fallow.

An estimation of the land usage is as follows:

Fallow fields (bare soil)	30.7 Acres
Woods/grass	12.4 Acres
Pasture	51.0 Acres
TOTAL	94.1 Acres

Runoff from the existing site generally flows in a westerly direction toward Piilani Highway. Dual 48-inch culverts carry the drainage beneath Piilani Highway.

The estimated peak rate and volume of runoff from the existing undeveloped site are approximately 93 cubic feet per second (cfs) and 62 acre-feet.

2.3 Proposed Conditions

The proposed development consists of:

Open/Park	16.0 Acres
Roads	31.5 Acres
Business / Commercial	1.9 Acres
Multi-Family	8.6 Acres (not including open space and roads)
Single-Family	36.1 Acres (not including open space and roads)
TOTAL	94.1 Acres

The estimated peak rate and volume of runoff from the developed site are approximately 189 cfs and 67 acre-feet. The development would result in an increase of peak rate of runoff by 96 cfs and volume of runoff by 5 acre-feet.

It is proposed that one or several retention basins be constructed within the site to accommodate the estimated increase in runoff volume of 5 acre-feet. These basins could be incorporated into the design of the parks and open spaces planned for the development.

The drainage system within the proposed subdivision is expected to include a system of pipes ranging in size from 18 to 54 inches and box culverts ranging in size from 6 feet by 5 feet to 12 feet by 9 feet. A berm along the mauka boundary of the property will also be required to direct the offsite runoff into Waiakoa Gulch.

The construction cost estimate for the pipes and culverts proposed for the conceptual drainage system is \$7.7 million. The construction cost estimate is provided in **Attachment 2**.

3.0 EROSION CONTROL

3.1 References

The erosion control measures are based on the County Drainage Standards and Chapter 20.08 of the Maui County Code, "Soil Erosion and Sedimentation Control."

3.2 Proposed Erosion Control Measures and BMPs

Recommended Best Management Practices (BMPs) for erosion and sedimentation control during construction include:

- Constructing of detention basins to capture sedimentation to minimize the quantity of sediment leaving the site
- Staging construction
- Protecting of natural vegetation
- Stockpiling topsoil, and covering or stabilizing of the soil stockpiles
- Using wind erosion control
- Intercepting runoff above disturbed slopes
- Constructing benches, terraces or ditches at regular intervals to intercept runoff on long or man-made slopes
- Providing linings or other method to prevent erosion of storm channels
- Using seeding and fertilizing or other soil erosion control
- Providing vehicle wheel wash-down facilities
- Using stabilized construction entrances
- Using vegetated filter strips

4.0 STORM WATER QUALITY CONTROL

4.1 Criteria and Methodology

The criteria and methodology used in this study meets or exceeds the requirements in the County Drainage Standards and Chapter 20.08 of the Maui County Code, "Soil Erosion and Sedimentation Control."

4.2 Calculations

Because retention basins were proposed to accommodate the increase in runoff volume, it is recommended that detention-based water quality control be implemented, and that the retention basins be designed to also function as detention basins.

The preliminary water quality control calculations are presented in **Attachment 3**. A summary of the preliminary calculations is as follows:

Design Volume for Detention-Based Water Quality Control	4.91 acre-feet
Flow Rate for Flow-Through-Based Water Quality Control	264 cfs

5.0 CONCLUSION

No adverse impacts to downstream properties will result from the proposed development.

ATTACHMENT 1

DRAINAGE
CALCULATIONS

1. Information from Erosion and Sediment Control, Soil Conservation Service, March 1981

A. Table 14 - Soil Properties

Soil Series	Waiakoa
Erodibility Factor (K)	0.10 to 0.17
Hydrologic Classification	C
Erosion Resistant Group	II
Tolerance Value (T)	
t/A/yr	2.0
t/ha/yr	4.4

B. Table 25 - Runoff Curve Numbers

Given Hydrologic Classification C from Table 14

Cultivated land	
w/o conservation treatment	88
w/ conservation treatment	78
Pasture or range land	
poor condition	86
good condition	74

C. 24-Hour Rainfall (Inches)

2-Year Recurrence Interval (RI)	3.
5-Year RI	5.
10-Year RI	6.
25-Year RI	6.5
50-Year RI	7.5
100-Year RI	10.

2. Existing Site

A. Existing Slope

Elevation Difference	200 ft
Distance, top to bottom	7000 ft
Slope	0.029 ft/ft

B. Existing Land Use

Bare soil	30.7 Acres
Woods/grass, fair	12.4 Acres
Pasture, fair	51.0 Acres
<u>TOTAL</u>	<u>94.1 Acres</u>

3. Proposed Site

A. Proposed Land Use - Summary

Type	SF	Ac		
Open/Park	698,567	16.0	0	0
Roads	1,374,000	31.5	1	31.5427
Business / Commercial	81,457	1.9	0.8	1.496
Multi-Family (Lots only)	375,008	8.6	0.5	4.304495
Single-Family (Lots only)	1,571,010	36.1	0.5	18.03271
TOTAL	4,100,041	94.1	55.37591	0.588329

B. Proposed Land Use - Calcs

i. Open/Park

Description	SF	Ac
Park in A-1	101,799	2.3
Open space in A-1	20,149	0.5
Open space in A-1	99,609	2.3
Open space in A-1	51,010	1.2
30' buffer adjacent to Hale Piilani subdivision	286,000	6.6
Open space in R-1	140,000	3.2
TOTAL	698,567	16.0

ii. Roads

Description	LF	SF	Ac
56' ROW Incl. Curb, Gutter, Sidewalk, Median	16,600	929,600	21.3
44' ROW Incl. Curb, Gutter, Sidewalk, Median	10,100	444,400	10.2
TOTAL		1,374,000	31.5

iii. Business / Commercial

Description	SF	Ac
B-2 Zoning adjacent to Piilani Hwy	81,457	1.9

iv. Multi-Family

Description	SF	Ac
Total (A-2 zoning)	597,208	13.7
Roads (Included with Roads category above)	173,200	4.0
Open (Included with Open category above)	49,000	1.1
Lots Only	375,008	8.6

v. Single-Family

Description	SF	Ac
Total (R-1 and A-1 zoning)	3,421,377	78.5
Roads (Included with Roads category above)	1,200,800	27.6
Open (Included with Open category above)	649,567	14.9
Lots Only	1,571,010	36.1

Peak Runoff (Rational Method)

Q=CIA Q = Flow Rate (cfs)
C = Runoff Coefficient
I = I (Rainfall Intensity)
A = Area (ac)

1. Weighted Runoff Coefficient

A. Existing Site

Type	Ac	C
Bare soil	30.7	0.36
Woods/grass, fair	12.4	0.30
Pasture, fair	51.0	0.32
TOTAL	94.1	

Weighted C 0.33

B. Proposed Site

Type	Ac	C
Open/Park	16.0	0.30
Roads	31.5	0.95
Business / Commercial	1.9	0.80
Multi-Family (Lots only)	8.6	0.70
Single-Family (Lots only)	36.1	0.57
TOTAL	94.1	

Weighted C 0.67

2. Time of Concentration

Tc = 26 minutes (Plate 3)

3. Rainfall Intensity

a. 50-yr, 1-hour rainfall 2 inches (Plate 7)

b. I = 3 inches / hour (Plate 2)

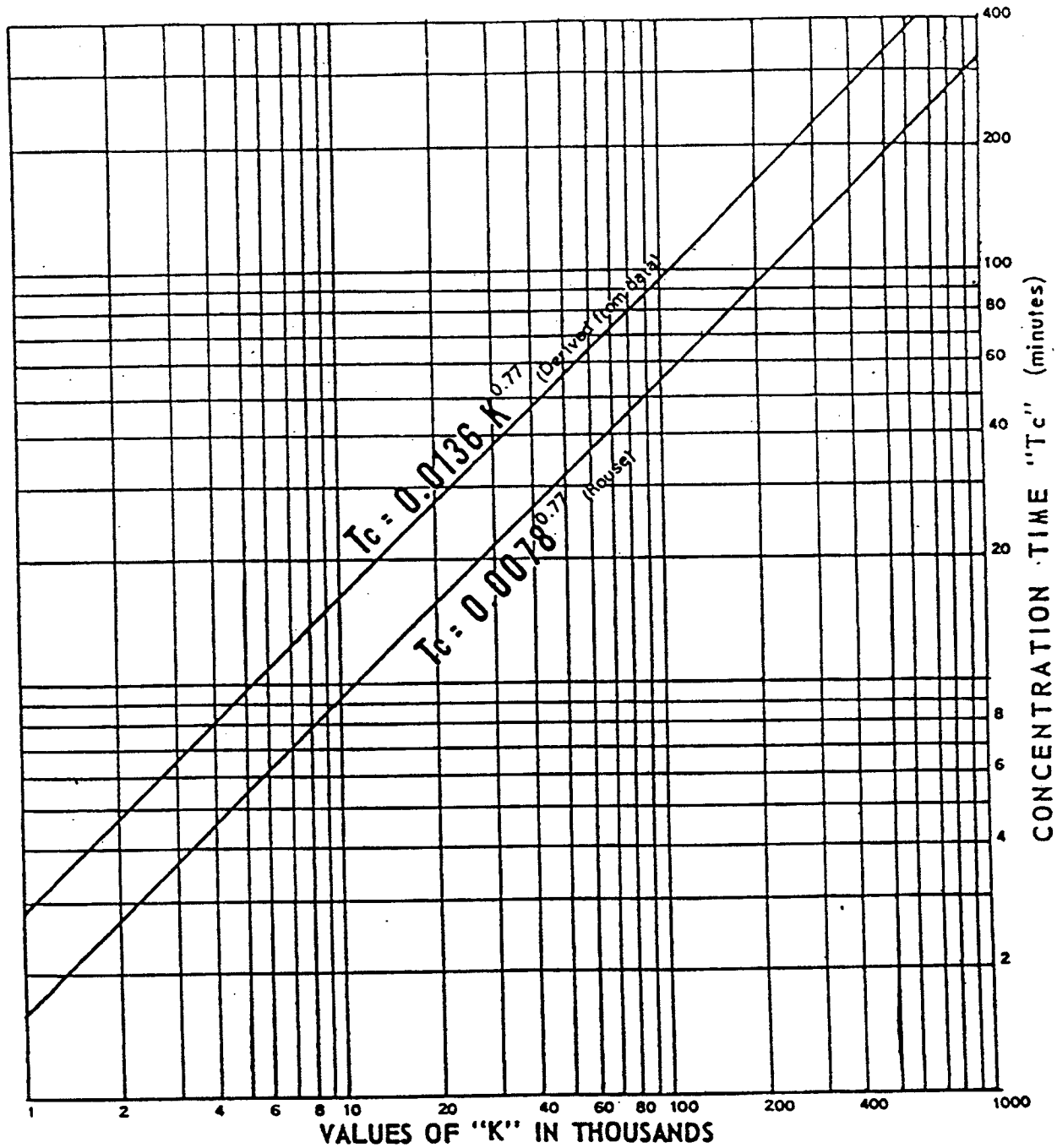
4. Results

	C	I	A (ac)	Q (cfs)
Existing	0.33	3	94.1	93.3
Proposed	0.67	3	94.1	188.5
Increase				95.2

Runoff Volume (TR-55 Method) * Values based on 100-Year, 24-Hour Storm

	Area (ac)	Runoff Volume (ac-ft)
Existing	94.1	61.96
Proposed	94.1	66.90
Increase		4.93

See attached output



- L = Maximum length of travel in feet
- H = Difference in elevation between most remote point and outlet in feet.
- S = Slope H/L

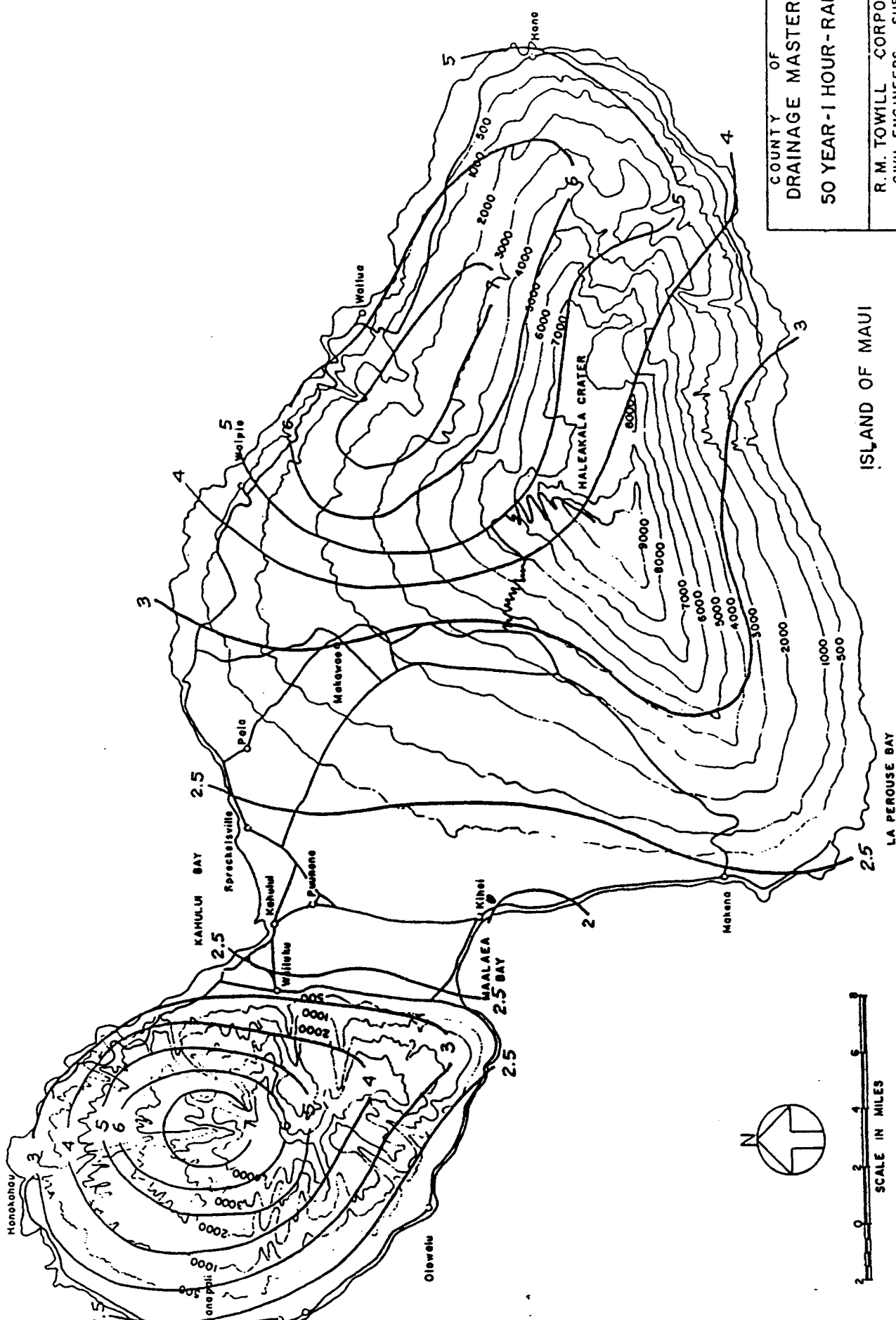
$$K = \frac{L}{\sqrt{S}} = \sqrt{\frac{L^3}{H}} = \sqrt{\frac{7000^3}{200}} = 41,912 \Rightarrow T_c = 26$$

Use upper curve for well forested areas
 Use lower curve for areas with little or no cover.

Plate 3

Time of Concentration

(OF SMALL AGRICULTURAL DRAINAGE BASIN)



COUNTY OF MAUI
 DRAINAGE MASTER PLAN
 50 YEAR - 1 HOUR - RAINFALL
 R. M. TOWILL CORPORATION
 CIVIL ENGINEERS - SURVEYORS

ISLAND OF MAUI

LA PEROUSE BAY

PLATE 7

D I A G R A M

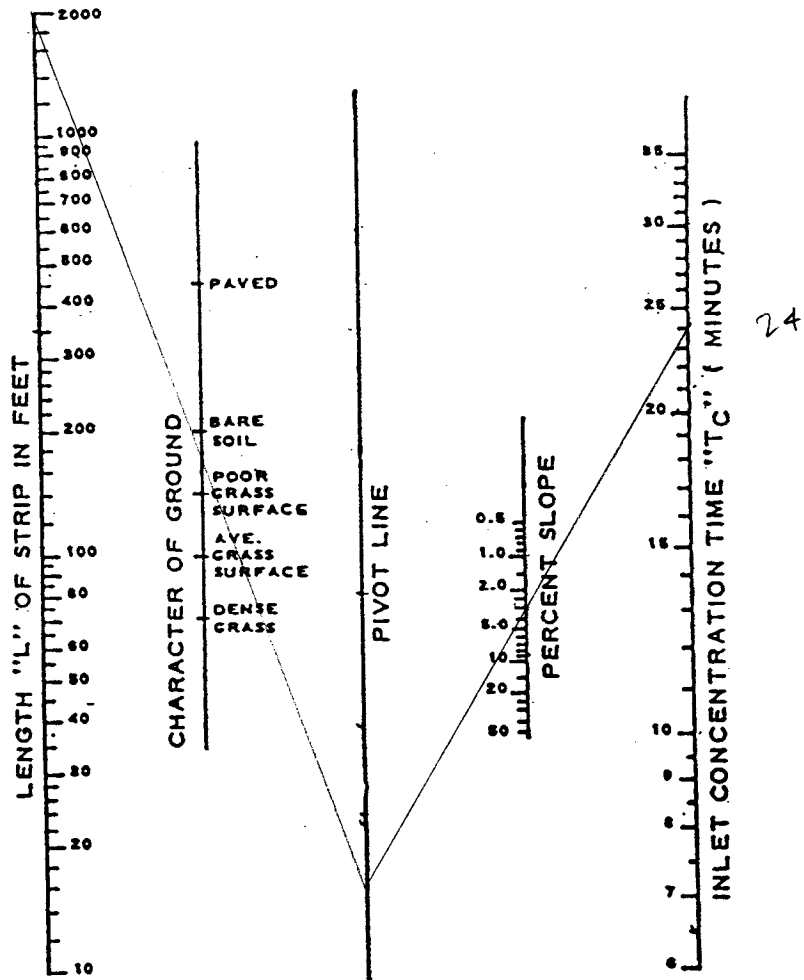
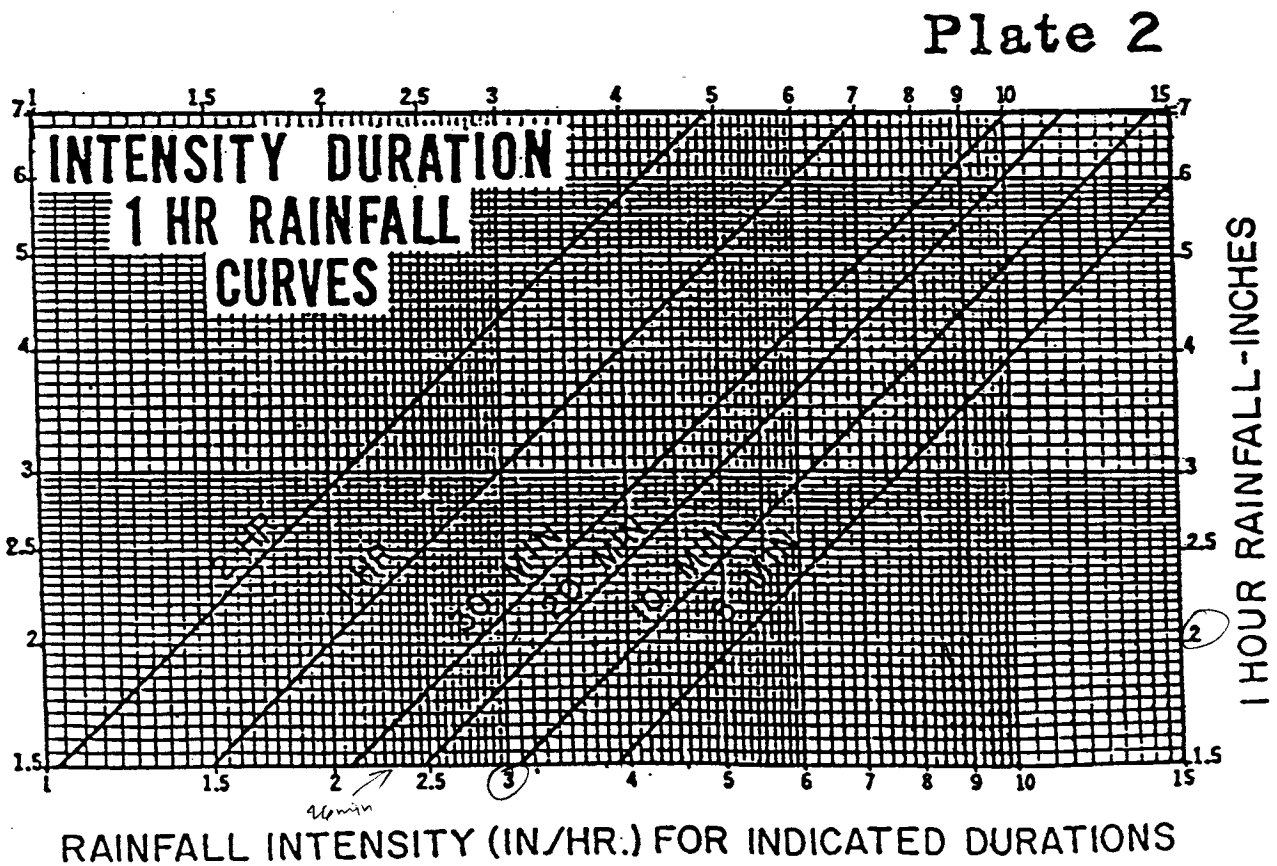


Plate 1
Overland
Flow
Chart



TR-55 Output - Existing Conditions

WinTR-55 Current Data Description

--- Identification Data ---

User: RMTC Date: 12/6/2006
 Project: Kihei Residential Units: English
 SubTitle: Existing Areal Units: Acres
 State: Hawaii
 County: Maui
 Filename: K:\study\20833 - Kihei Residential\calcs\Drainage\Kihei Residential - Existing.w55

--- Sub-Area Data ---

Name	Description	Reach	Area (ac)	RCN	Tc
Existing		Outlet	94.1	83	0.696

Total area: 94.10 (ac)

--- Storm Data ---

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.0	5.0	6.0	6.5	7.5	10.0	.0

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type I
 Dimensionless Unit Hydrograph: <standard>

RMTC

Kihei Residential
Existing
Maui County, Hawaii

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.0	5.0	6.0	6.5	7.5	10.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

RMTC

Kihei Residential
Existing
Maui County, Hawaii

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period			
	2-Yr (cfs)	10-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)

SUBAREAS				
Existing	50.52	153.19	206.54	296.45
REACHES				
OUTLET	50.52	153.19	206.54	296.45

RMTC

Kihei Residential
Existing
Maui County, Hawaii

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period			
	2-Yr (cfs) (hr)	10-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)

SUBAREAS				
Existing	50.52	153.19	206.54	296.45
	10.33	10.30	10.28	10.29

REACHES

OUTLET	50.52	153.19	206.54	296.45
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RMTC

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Existing
Maui County, Hawaii

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
Existing	94.10	0.696	83	Outlet	

Total Area:	94.10 (ac)				

RMTC

Kihei Residential
Existing
Maui County, Hawaii

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Existing SHALLOW	7000	0.0300	3				0.696
						Time of Concentration	0.696 =====

RMTC

Kihei Residential
Existing
Maui County, Hawaii

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Existing	Fallow Bare soil	C	30.7	91
	Pasture, grassland or range	(fair) C	51	79
	Woods - grass combination	(fair) C	12.4	76
	Total Area / Weighted Curve Number		94.1	83
			====	==

WinTR-20: Version 1.0 0 0 0.05
Kihei Residential
Existing

SUB-AREA:
Existing Outlet .14703 83. .696

STREAM REACH:

STORM ANALYSIS:
2-Yr 3.0 Type I 2
10-Yr 6.0 Type I 2
50-Yr 7.5 Type I 2
100-Yr 10.0 Type I 2

STRUCTURE RATING:

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYN

Kihei Residential
Existing

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STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
Existing	0.147		1.446		10.33	50.52	343.63

Line Start Time (hr)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	Flow (cfs)	Rate (cfs)
6.898	0.06	0.08	0.11	0.13	0.16	0.19
7.206	0.26	0.30	0.34	0.38	0.42	0.46
7.514	0.55	0.59	0.64	0.69	0.73	0.78
7.821	0.87	0.92	0.97	1.02	1.06	1.11
8.129	1.21	1.27	1.32	1.38	1.44	1.51
8.437	1.67	1.76	1.86	1.97	2.09	2.21
8.744	2.49	2.64	2.80	2.96	3.13	3.31
9.052	3.69	3.89	4.09	4.31	4.54	4.79
9.360	5.32	5.61	5.93	6.26	6.62	7.02
9.668	8.06	8.77	9.72	10.99	12.74	15.16
9.975	22.22	26.82	31.92	37.09	41.85	45.81
10.283	50.15	50.52	49.87	48.45	46.40	43.85
10.591	38.30	35.67	33.25	31.13	29.23	27.49
10.898	24.46	23.15	21.96	20.91	19.96	19.10
11.206	17.63	17.01	16.45	15.94	15.48	15.07
11.514	14.36	14.06	13.78	13.54	13.31	13.10
11.821	12.72	12.54	12.36	12.20	12.04	11.89
12.129	11.61	11.48	11.36	11.24	11.12	11.01
12.437	10.80	10.70	10.61	10.51	10.43	10.34
12.745	10.17	10.09	10.01	9.93	9.85	9.77
13.052	9.62	9.54	9.46	9.39	9.31	9.23
13.360	9.07	9.00	8.92	8.84	8.76	8.68
13.668	8.52	8.44	8.36	8.28	8.20	8.11
13.975	7.95	7.87	7.79	7.70	7.62	7.54
14.283	7.39	7.32	7.26	7.20	7.14	7.09
14.591	7.00	6.97	6.94	6.91	6.88	6.85
14.899	6.81	6.79	6.77	6.75	6.73	6.71
15.206	6.68	6.66	6.65	6.63	6.62	6.60
15.514	6.57	6.56	6.54	6.53	6.51	6.50
15.822	6.47	6.46	6.44	6.43	6.41	6.40
16.129	6.37	6.35	6.34	6.32	6.31	6.30
16.437	6.27	6.25	6.24	6.22	6.20	6.19
16.745	6.16	6.14	6.13	6.11	6.10	6.08
17.052	6.05	6.04	6.02	6.00	5.99	5.97
17.360	5.94	5.92	5.91	5.89	5.88	5.86
17.668	5.83	5.81	5.80	5.78	5.76	5.75
17.976	5.71	5.70	5.68	5.66	5.65	5.63
18.283	5.60	5.58	5.56	5.55	5.53	5.51
18.591	5.48	5.46	5.45	5.43	5.41	5.40
18.899	5.36	5.34	5.33	5.31	5.29	5.28

Kihei Residential
Existing

Line Start Time (hr)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	Flow (cfs)	Rate (cfs)
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Kihei Residential
Existing

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STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
19.206	5.24	5.22	5.21	5.19	5.17	5.15	5.14
19.514	5.12	5.10	5.08	5.07	5.05	5.03	5.01
19.822	5.00	4.98	4.96	4.94	4.93	4.91	4.89
20.129	4.87	4.85	4.84	4.82	4.80	4.78	4.76
20.437	4.75	4.73	4.71	4.69	4.67	4.66	4.64
20.745	4.62	4.60	4.58	4.56	4.55	4.53	4.51
21.053	4.49	4.47	4.46	4.44	4.42	4.40	4.38
21.360	4.36	4.34	4.33	4.31	4.29	4.27	4.25
21.668	4.23	4.21	4.20	4.18	4.16	4.14	4.12
21.976	4.10	4.08	4.06	4.05	4.03	4.01	3.99
22.283	3.97	3.95	3.93	3.91	3.89	3.88	3.86
22.591	3.84	3.82	3.80	3.78	3.76	3.74	3.72
22.899	3.70	3.69	3.67	3.65	3.63	3.61	3.59
23.207	3.57	3.55	3.53	3.51	3.49	3.47	3.45
23.514	3.44	3.42	3.40	3.38	3.36	3.34	3.32
23.822	3.30	3.28	3.26	3.24	3.22	3.20	3.16
24.130	3.09	3.01	2.89	2.72	2.53	2.31	2.07
24.437	1.84	1.60	1.39	1.19	1.00	0.85	0.71
24.745	0.61	0.51	0.44	0.37	0.32	0.27	0.23
25.053	0.19	0.16	0.14	0.12	0.10	0.08	0.07
25.360	0.06						

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
OUTLET	0.147		1.446		10.33	50.52	343.63

Line Start Time (hr)	Flow (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)
6.898	0.06	0.08	0.11	0.13	0.16	0.19	0.23
7.206	0.26	0.30	0.34	0.38	0.42	0.46	0.51
7.514	0.55	0.59	0.64	0.69	0.73	0.78	0.82
7.821	0.87	0.92	0.97	1.02	1.06	1.11	1.16
8.129	1.21	1.27	1.32	1.38	1.44	1.51	1.59
8.437	1.67	1.76	1.86	1.97	2.09	2.21	2.35
8.744	2.49	2.64	2.80	2.96	3.13	3.31	3.49
9.052	3.69	3.89	4.09	4.31	4.54	4.79	5.05
9.360	5.32	5.61	5.93	6.26	6.62	7.02	7.49
9.668	8.06	8.77	9.72	10.99	12.74	15.16	18.31
9.975	22.22	26.82	31.92	37.09	41.85	45.81	48.59
10.283	50.15	50.52	49.87	48.45	46.40	43.85	41.08
10.591	38.30	35.67	33.25	31.13	29.23	27.49	25.90
10.898	24.46	23.15	21.96	20.91	19.96	19.10	18.33
11.206	17.63	17.01	16.45	15.94	15.48	15.07	14.70
11.514	14.36	14.06	13.78	13.54	13.31	13.10	12.90
11.821	12.72	12.54	12.36	12.20	12.04	11.89	11.74
12.129	11.61	11.48	11.36	11.24	11.12	11.01	10.91
12.437	10.80	10.70	10.61	10.51	10.43	10.34	10.26

Kihei Residential
Existing

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STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in) Existing	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
--------------------------	-----------------------	--------------------------	-----------------------------	----------------	---------------------	------------	------------

Line Start Time (hr)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	Rate (cfs)	Rate (cfs)
12.745	10.17	10.09	10.01	9.93	9.85	9.77
13.052	9.62	9.54	9.46	9.39	9.31	9.23
13.360	9.07	9.00	8.92	8.84	8.76	8.68
13.668	8.52	8.44	8.36	8.28	8.20	8.11
13.975	7.95	7.87	7.79	7.70	7.62	7.54
14.283	7.39	7.32	7.26	7.20	7.14	7.09
14.591	7.00	6.97	6.94	6.91	6.88	6.85
14.899	6.81	6.79	6.77	6.75	6.73	6.71
15.206	6.68	6.66	6.65	6.63	6.62	6.60
15.514	6.57	6.56	6.54	6.53	6.51	6.50
15.822	6.47	6.46	6.44	6.43	6.41	6.40
16.129	6.37	6.35	6.34	6.32	6.31	6.30
16.437	6.27	6.25	6.24	6.22	6.20	6.19
16.745	6.16	6.14	6.13	6.11	6.10	6.08
17.052	6.05	6.04	6.02	6.00	5.99	5.97
17.360	5.94	5.92	5.91	5.89	5.88	5.86
17.668	5.83	5.81	5.80	5.78	5.76	5.75
17.976	5.71	5.70	5.68	5.66	5.65	5.63
18.283	5.60	5.58	5.56	5.55	5.53	5.51
18.591	5.48	5.46	5.45	5.43	5.41	5.40
18.899	5.36	5.34	5.33	5.31	5.29	5.28
19.206	5.24	5.22	5.21	5.19	5.17	5.15
19.514	5.12	5.10	5.08	5.07	5.05	5.03
19.822	5.00	4.98	4.96	4.94	4.93	4.91
20.129	4.87	4.85	4.84	4.82	4.80	4.78
20.437	4.75	4.73	4.71	4.69	4.67	4.66
20.745	4.62	4.60	4.58	4.56	4.55	4.53
21.053	4.49	4.47	4.46	4.44	4.42	4.40
21.360	4.36	4.34	4.33	4.31	4.29	4.27
21.668	4.23	4.21	4.20	4.18	4.16	4.14
21.976	4.10	4.08	4.06	4.05	4.03	4.01
22.283	3.97	3.95	3.93	3.91	3.89	3.88
22.591	3.84	3.82	3.80	3.78	3.76	3.74
22.899	3.70	3.69	3.67	3.65	3.63	3.61
23.207	3.57	3.55	3.53	3.51	3.49	3.47
23.514	3.44	3.42	3.40	3.38	3.36	3.34
23.822	3.30	3.28	3.26	3.24	3.22	3.20
24.130	3.09	3.01	2.89	2.72	2.53	2.31
24.437	1.84	1.60	1.39	1.19	1.00	0.85
24.745	0.61	0.51	0.44	0.37	0.32	0.27
25.053	0.19	0.16	0.14	0.12	0.10	0.08
25.360	0.06					

STORM 10-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Existing	0.147		4.091		10.30	153.19	1041.88

Kihei Residential
Existing

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STORM 10-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	----- Rate (cfs)	----- Rate (csm)
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WinTR-20 Version 1.0

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12/06/2006 18:21

Kihei Residential
Existing

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	----- (cfs)	increment of (cfs)	of 0.044 hr (cfs)	----- (cfs)	----- (cfs)
4.058	0.07	0.10	0.13	0.17	0.22	0.26	0.32
4.366	0.38	0.44	0.50	0.56	0.63	0.70	0.76
4.674	0.83	0.90	0.97	1.05	1.12	1.19	1.26
4.981	1.33	1.41	1.48	1.55	1.63	1.70	1.77
5.289	1.84	1.92	1.99	2.06	2.13	2.20	2.28
5.597	2.35	2.42	2.49	2.56	2.63	2.70	2.77
5.904	2.85	2.92	2.99	3.06	3.13	3.20	3.27
6.212	3.34	3.42	3.50	3.58	3.67	3.77	3.87
6.520	3.97	4.09	4.20	4.33	4.46	4.59	4.73
6.828	4.87	5.02	5.17	5.32	5.48	5.64	5.80
7.135	5.96	6.13	6.30	6.47	6.63	6.80	6.96
7.443	7.12	7.27	7.42	7.57	7.72	7.86	8.00
7.751	8.14	8.28	8.41	8.55	8.68	8.81	8.94
8.058	9.08	9.21	9.35	9.51	9.67	9.86	10.08
8.366	10.33	10.61	10.93	11.29	11.69	12.12	12.59
8.674	13.09	13.61	14.16	14.73	15.32	15.93	16.56
8.982	17.20	17.85	18.52	19.21	19.92	20.66	21.43
9.289	22.24	23.09	24.00	24.96	25.97	27.05	28.23
9.597	29.55	31.12	33.07	35.60	39.01	43.60	49.90
9.905	58.32	68.90	81.52	95.74	110.65	124.88	137.07
10.212	146.18	151.52	153.19	151.59	147.29	141.11	133.32
10.520	124.60	115.63	107.02	99.05	91.95	85.72	80.09
10.828	74.97	70.32	66.12	62.33	58.93	55.90	53.18
11.135	50.74	48.54	46.58	44.80	43.21	41.78	40.48
11.443	39.32	38.27	37.32	36.46	35.68	34.98	34.33
11.751	33.73	33.16	32.62	32.10	31.61	31.13	30.68
12.059	30.26	29.86	29.48	29.13	28.78	28.45	28.13
12.366	27.82	27.52	27.23	26.96	26.69	26.43	26.19
12.674	25.95	25.71	25.48	25.25	25.03	24.81	24.59
12.982	24.37	24.16	23.95	23.73	23.52	23.31	23.10
13.289	22.88	22.67	22.46	22.25	22.04	21.83	21.62
13.597	21.40	21.19	20.98	20.77	20.55	20.34	20.13
13.905	19.91	19.70	19.49	19.27	19.06	18.85	18.64
14.213	18.43	18.24	18.05	17.87	17.71	17.56	17.42
14.520	17.29	17.17	17.07	16.98	16.89	16.81	16.74
14.828	16.67	16.61	16.55	16.49	16.44	16.39	16.34
15.136	16.29	16.24	16.19	16.15	16.10	16.06	16.02
15.443	15.97	15.93	15.89	15.85	15.80	15.76	15.72
15.751	15.68	15.64	15.60	15.56	15.51	15.47	15.43
16.059	15.39	15.35	15.31	15.27	15.23	15.19	15.14
16.366	15.10	15.06	15.02	14.98	14.94	14.89	14.85
16.674	14.81	14.77	14.73	14.69	14.64	14.60	14.56
16.982	14.52	14.48	14.43	14.39	14.35	14.31	14.26
17.290	14.22	14.18	14.14	14.10	14.05	14.01	13.97
17.597	13.92	13.88	13.84	13.80	13.75	13.71	13.67

Kihei Residential
Existing

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
17.905	13.63	13.58	13.54	13.50	13.45	13.41	13.37
18.213	13.32	13.28	13.24	13.20	13.15	13.11	13.07
18.520	13.02	12.98	12.94	12.89	12.85	12.80	12.76
18.828	12.72	12.67	12.63	12.59	12.54	12.50	12.46
19.136	12.41	12.37	12.32	12.28	12.24	12.19	12.15
19.444	12.11	12.06	12.02	11.97	11.93	11.89	11.84

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Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	(cfs)	(cfs)
19.751	11.80	11.75	11.71	11.66	11.62	11.58	11.53
20.059	11.49	11.44	11.40	11.35	11.31	11.27	11.22
20.367	11.18	11.13	11.09	11.04	11.00	10.95	10.91
20.674	10.86	10.82	10.78	10.73	10.69	10.64	10.60
20.982	10.55	10.51	10.46	10.42	10.37	10.33	10.28
21.290	10.24	10.19	10.15	10.10	10.06	10.01	9.97
21.597	9.92	9.88	9.83	9.79	9.74	9.70	9.65
21.905	9.61	9.56	9.52	9.47	9.43	9.38	9.34
22.213	9.29	9.25	9.20	9.16	9.11	9.06	9.02
22.521	8.97	8.93	8.88	8.84	8.79	8.75	8.70
22.828	8.66	8.61	8.56	8.52	8.47	8.43	8.38
23.136	8.34	8.29	8.25	8.20	8.15	8.11	8.06
23.444	8.02	7.97	7.93	7.88	7.83	7.79	7.74
23.751	7.70	7.65	7.61	7.56	7.51	7.47	7.42
24.059	7.34	7.23	7.07	6.84	6.52	6.11	5.63
24.367	5.11	4.57	4.03	3.50	3.02	2.57	2.17
24.675	1.83	1.55	1.31	1.12	0.95	0.81	0.68
24.982	0.58	0.49	0.41	0.35	0.30	0.25	0.21
25.290	0.18	0.15	0.13	0.11	0.09	0.07	0.06
25.598	0.05						

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.147		4.091		10.30	153.19	1041.88

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	(cfs)	(cfs)
4.058	0.07	0.10	0.13	0.17	0.22	0.26	0.32
4.366	0.38	0.44	0.50	0.56	0.63	0.70	0.76
4.674	0.83	0.90	0.97	1.05	1.12	1.19	1.26
4.981	1.33	1.41	1.48	1.55	1.63	1.70	1.77
5.289	1.84	1.92	1.99	2.06	2.13	2.20	2.28
5.597	2.35	2.42	2.49	2.56	2.63	2.70	2.77
5.904	2.85	2.92	2.99	3.06	3.13	3.20	3.27
6.212	3.34	3.42	3.50	3.58	3.67	3.77	3.87
6.520	3.97	4.09	4.20	4.33	4.46	4.59	4.73

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow			
				Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
6.828	4.87	5.02	5.17	5.32	5.48	5.64	5.80
7.135	5.96	6.13	6.30	6.47	6.63	6.80	6.96
7.443	7.12	7.27	7.42	7.57	7.72	7.86	8.00
7.751	8.14	8.28	8.41	8.55	8.68	8.81	8.94
8.058	9.08	9.21	9.35	9.51	9.67	9.86	10.08
8.366	10.33	10.61	10.93	11.29	11.69	12.12	12.59
8.674	13.09	13.61	14.16	14.73	15.32	15.93	16.56
8.982	17.20	17.85	18.52	19.21	19.92	20.66	21.43
9.289	22.24	23.09	24.00	24.96	25.97	27.05	28.23
9.597	29.55	31.12	33.07	35.60	39.01	43.60	49.90
9.905	58.32	68.90	81.52	95.74	110.65	124.88	137.07

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
10.212	146.18	151.52	153.19	151.59	147.29	141.11	133.32
10.520	124.60	115.63	107.02	99.05	91.95	85.72	80.09
10.828	74.97	70.32	66.12	62.33	58.93	55.90	53.18
11.135	50.74	48.54	46.58	44.80	43.21	41.78	40.48
11.443	39.32	38.27	37.32	36.46	35.68	34.98	34.33
11.751	33.73	33.16	32.62	32.10	31.61	31.13	30.68
12.059	30.26	29.86	29.48	29.13	28.78	28.45	28.13
12.366	27.82	27.52	27.23	26.96	26.69	26.43	26.19
12.674	25.95	25.71	25.48	25.25	25.03	24.81	24.59
12.982	24.37	24.16	23.95	23.73	23.52	23.31	23.10
13.289	22.88	22.67	22.46	22.25	22.04	21.83	21.62
13.597	21.40	21.19	20.98	20.77	20.55	20.34	20.13
13.905	19.91	19.70	19.49	19.27	19.06	18.85	18.64
14.213	18.43	18.24	18.05	17.87	17.71	17.56	17.42
14.520	17.29	17.17	17.07	16.98	16.89	16.81	16.74
14.828	16.67	16.61	16.55	16.49	16.44	16.39	16.34
15.136	16.29	16.24	16.19	16.15	16.10	16.06	16.02
15.443	15.97	15.93	15.89	15.85	15.80	15.76	15.72
15.751	15.68	15.64	15.60	15.56	15.51	15.47	15.43
16.059	15.39	15.35	15.31	15.27	15.23	15.19	15.14
16.366	15.10	15.06	15.02	14.98	14.94	14.89	14.85
16.674	14.81	14.77	14.73	14.69	14.64	14.60	14.56
16.982	14.52	14.48	14.43	14.39	14.35	14.31	14.26
17.290	14.22	14.18	14.14	14.10	14.05	14.01	13.97
17.597	13.92	13.88	13.84	13.80	13.75	13.71	13.67
17.905	13.63	13.58	13.54	13.50	13.45	13.41	13.37
18.213	13.32	13.28	13.24	13.20	13.15	13.11	13.07
18.520	13.02	12.98	12.94	12.89	12.85	12.80	12.76
18.828	12.72	12.67	12.63	12.59	12.54	12.50	12.46
19.136	12.41	12.37	12.32	12.28	12.24	12.19	12.15
19.444	12.11	12.06	12.02	11.97	11.93	11.89	11.84
19.751	11.80	11.75	11.71	11.66	11.62	11.58	11.53
20.059	11.49	11.44	11.40	11.35	11.31	11.27	11.22
20.367	11.18	11.13	11.09	11.04	11.00	10.95	10.91
20.674	10.86	10.82	10.78	10.73	10.69	10.64	10.60

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
20.982	10.55	10.51	10.46	10.42	10.37	10.33	10.28
21.290	10.24	10.19	10.15	10.10	10.06	10.01	9.97
21.597	9.92	9.88	9.83	9.79	9.74	9.70	9.65
21.905	9.61	9.56	9.52	9.47	9.43	9.38	9.34
22.213	9.29	9.25	9.20	9.16	9.11	9.06	9.02
22.521	8.97	8.93	8.88	8.84	8.79	8.75	8.70
22.828	8.66	8.61	8.56	8.52	8.47	8.43	8.38
23.136	8.34	8.29	8.25	8.20	8.15	8.11	8.06
23.444	8.02	7.97	7.93	7.88	7.83	7.79	7.74
23.751	7.70	7.65	7.61	7.56	7.51	7.47	7.42
24.059	7.34	7.23	7.07	6.84	6.52	6.11	5.63
24.367	5.11	4.57	4.03	3.50	3.02	2.57	2.17
24.675	1.83	1.55	1.31	1.12	0.95	0.81	0.68
24.982	0.58	0.49	0.41	0.35	0.30	0.25	0.21
25.290	0.18	0.15	0.13	0.11	0.09	0.07	0.06
25.598	0.05						

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
Existing	0.147		5.501		10.28	206.54	1404.76

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)
3.379	0.06	0.09	0.13	0.17	0.23	0.28	0.35
3.687	0.42	0.50	0.58	0.66	0.75	0.84	0.93
3.995	1.03	1.13	1.23	1.33	1.43	1.53	1.64
4.302	1.74	1.85	1.95	2.06	2.16	2.27	2.37
4.610	2.47	2.58	2.68	2.79	2.89	2.99	3.09
4.918	3.19	3.29	3.40	3.50	3.60	3.70	3.80
5.225	3.89	3.99	4.09	4.19	4.29	4.38	4.48
5.533	4.58	4.67	4.77	4.86	4.96	5.05	5.15
5.841	5.24	5.33	5.43	5.52	5.61	5.70	5.80
6.149	5.89	5.99	6.09	6.19	6.31	6.43	6.56
6.456	6.69	6.84	7.00	7.17	7.34	7.52	7.71
6.764	7.91	8.12	8.32	8.54	8.76	8.98	9.21
7.072	9.44	9.68	9.92	10.16	10.39	10.63	10.86
7.379	11.09	11.31	11.53	11.74	11.94	12.14	12.33
7.687	12.52	12.70	12.89	13.06	13.24	13.41	13.58
7.995	13.75	13.93	14.10	14.28	14.47	14.68	14.92
8.303	15.20	15.52	15.89	16.31	16.79	17.33	17.91
8.610	18.55	19.23	19.95	20.71	21.50	22.31	23.15
8.918	24.01	24.89	25.79	26.70	27.64	28.60	29.59
9.226	30.62	31.70	32.84	34.04	35.31	36.65	38.06
9.533	39.59	41.29	43.25	45.66	48.71	52.77	58.19
9.841	65.57	75.62	88.51	104.21	122.35	142.09	161.69

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
10.149	179.23	193.21	202.37	206.54	205.97	201.43	193.89
10.456	184.09	172.54	160.32	148.33	137.07	126.86	117.90
10.764	109.94	102.69	96.11	90.17	84.81	79.99	75.69
11.072	71.84	68.38	65.28	62.50	60.01	57.76	55.75
11.380	53.93	52.29	50.81	49.48	48.28	47.19	46.20
11.687	45.30	44.47	43.69	42.96	42.25	41.57	40.92
11.995	40.30	39.72	39.18	38.67	38.18	37.72	37.27
12.303	36.83	36.41	36.01	35.62	35.25	34.89	34.54
12.610	34.21	33.89	33.57	33.26	32.96	32.66	32.37
12.918	32.08	31.79	31.50	31.22	30.94	30.66	30.38
13.226	30.10	29.82	29.54	29.26	28.98	28.70	28.43
13.534	28.15	27.87	27.59	27.31	27.03	26.75	26.48
13.841	26.20	25.92	25.64	25.36	25.08	24.80	24.52
14.149	24.24	23.97	23.71	23.46	23.22	23.00	22.79
14.457	22.60	22.43	22.27	22.13	22.00	21.89	21.78
14.764	21.68	21.59	21.50	21.42	21.34	21.27	21.20
15.072	21.13	21.07	21.00	20.94	20.88	20.82	20.76
15.380	20.70	20.64	20.59	20.53	20.48	20.42	20.36
15.687	20.31	20.25	20.20	20.14	20.09	20.03	19.98
15.995	19.93	19.87	19.82	19.76	19.71	19.65	19.60
16.303	19.54	19.49	19.43	19.38	19.32	19.27	19.21

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
16.611	19.16	19.10	19.05	18.99	18.94	18.88	18.83
16.918	18.77	18.72	18.66	18.61	18.55	18.50	18.44
17.226	18.39	18.33	18.27	18.22	18.16	18.11	18.05
17.534	18.00	17.94	17.88	17.83	17.77	17.72	17.66
17.841	17.60	17.55	17.49	17.44	17.38	17.32	17.27
18.149	17.21	17.15	17.10	17.04	16.99	16.93	16.87
18.457	16.82	16.76	16.70	16.65	16.59	16.53	16.48
18.765	16.42	16.36	16.31	16.25	16.19	16.14	16.08
19.072	16.02	15.97	15.91	15.85	15.79	15.74	15.68
19.380	15.62	15.57	15.51	15.45	15.39	15.34	15.28
19.688	15.22	15.17	15.11	15.05	14.99	14.94	14.88
19.995	14.82	14.76	14.71	14.65	14.59	14.53	14.48
20.303	14.42	14.36	14.30	14.25	14.19	14.13	14.07
20.611	14.02	13.96	13.90	13.84	13.78	13.73	13.67
20.918	13.61	13.55	13.50	13.44	13.38	13.32	13.26
21.226	13.21	13.15	13.09	13.03	12.97	12.92	12.86
21.534	12.80	12.74	12.68	12.63	12.57	12.51	12.45
21.842	12.39	12.33	12.28	12.22	12.16	12.10	12.04
22.149	11.98	11.93	11.87	11.81	11.75	11.69	11.63
22.457	11.58	11.52	11.46	11.40	11.34	11.28	11.23
22.765	11.17	11.11	11.05	10.99	10.93	10.87	10.82
23.072	10.76	10.70	10.64	10.58	10.52	10.46	10.41
23.380	10.35	10.29	10.23	10.17	10.11	10.05	9.99
23.688	9.94	9.88	9.82	9.76	9.70	9.64	9.58
23.996	9.52	9.45	9.33	9.15	8.90	8.54	8.07

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
24.303	7.49	6.84	6.15	5.46	4.77	4.13	3.53
24.611	2.99	2.52	2.13	1.81	1.53	1.30	1.11
24.919	0.94	0.79	0.67	0.57	0.48	0.41	0.34
25.226	0.29	0.25	0.21	0.17	0.15	0.12	0.10
25.534	0.09	0.07	0.06				

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	0.147		5.501		10.28	206.54	1404.76

Line Start Time (hr)	Flow (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)
3.379	0.06	0.09	0.13	0.17	0.23	0.28	0.35
3.687	0.42	0.50	0.58	0.66	0.75	0.84	0.93
3.995	1.03	1.13	1.23	1.33	1.43	1.53	1.64
4.302	1.74	1.85	1.95	2.06	2.16	2.27	2.37
4.610	2.47	2.58	2.68	2.79	2.89	2.99	3.09
4.918	3.19	3.29	3.40	3.50	3.60	3.70	3.80
5.225	3.89	3.99	4.09	4.19	4.29	4.38	4.48
5.533	4.58	4.67	4.77	4.86	4.96	5.05	5.15
5.841	5.24	5.33	5.43	5.52	5.61	5.70	5.80
6.149	5.89	5.99	6.09	6.19	6.31	6.43	6.56

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Line Start Time (hr)	Flow (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)	Flow Values @ time (cfs)
6.456	6.69	6.84	7.00	7.17	7.34	7.52	7.71
6.764	7.91	8.12	8.32	8.54	8.76	8.98	9.21
7.072	9.44	9.68	9.92	10.16	10.39	10.63	10.86
7.379	11.09	11.31	11.53	11.74	11.94	12.14	12.33
7.687	12.52	12.70	12.89	13.06	13.24	13.41	13.58
7.995	13.75	13.93	14.10	14.28	14.47	14.68	14.92
8.303	15.20	15.52	15.89	16.31	16.79	17.33	17.91
8.610	18.55	19.23	19.95	20.71	21.50	22.31	23.15
8.918	24.01	24.89	25.79	26.70	27.64	28.60	29.59
9.226	30.62	31.70	32.84	34.04	35.31	36.65	38.06
9.533	39.59	41.29	43.25	45.66	48.71	52.77	58.19
9.841	65.57	75.62	88.51	104.21	122.35	142.09	161.69
10.149	179.23	193.21	202.37	206.54	205.97	201.43	193.89
10.456	184.09	172.54	160.32	148.33	137.07	126.86	117.90
10.764	109.94	102.69	96.11	90.17	84.81	79.99	75.69
11.072	71.84	68.38	65.28	62.50	60.01	57.76	55.75
11.380	53.93	52.29	50.81	49.48	48.28	47.19	46.20
11.687	45.30	44.47	43.69	42.96	42.25	41.57	40.92
11.995	40.30	39.72	39.18	38.67	38.18	37.72	37.27
12.303	36.83	36.41	36.01	35.62	35.25	34.89	34.54

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STORM 50-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
12.610	34.21	33.89	33.57	33.26	32.96	32.66	32.37
12.918	32.08	31.79	31.50	31.22	30.94	30.66	30.38
13.226	30.10	29.82	29.54	29.26	28.98	28.70	28.43
13.534	28.15	27.87	27.59	27.31	27.03	26.75	26.48
13.841	26.20	25.92	25.64	25.36	25.08	24.80	24.52
14.149	24.24	23.97	23.71	23.46	23.22	23.00	22.79
14.457	22.60	22.43	22.27	22.13	22.00	21.89	21.78
14.764	21.68	21.59	21.50	21.42	21.34	21.27	21.20
15.072	21.13	21.07	21.00	20.94	20.88	20.82	20.76
15.380	20.70	20.64	20.59	20.53	20.48	20.42	20.36
15.687	20.31	20.25	20.20	20.14	20.09	20.03	19.98
15.995	19.93	19.87	19.82	19.76	19.71	19.65	19.60
16.303	19.54	19.49	19.43	19.38	19.32	19.27	19.21
16.611	19.16	19.10	19.05	18.99	18.94	18.88	18.83
16.918	18.77	18.72	18.66	18.61	18.55	18.50	18.44
17.226	18.39	18.33	18.27	18.22	18.16	18.11	18.05
17.534	18.00	17.94	17.88	17.83	17.77	17.72	17.66
17.841	17.60	17.55	17.49	17.44	17.38	17.32	17.27
18.149	17.21	17.15	17.10	17.04	16.99	16.93	16.87
18.457	16.82	16.76	16.70	16.65	16.59	16.53	16.48
18.765	16.42	16.36	16.31	16.25	16.19	16.14	16.08
19.072	16.02	15.97	15.91	15.85	15.79	15.74	15.68
19.380	15.62	15.57	15.51	15.45	15.39	15.34	15.28
19.688	15.22	15.17	15.11	15.05	14.99	14.94	14.88
19.995	14.82	14.76	14.71	14.65	14.59	14.53	14.48
20.303	14.42	14.36	14.30	14.25	14.19	14.13	14.07
20.611	14.02	13.96	13.90	13.84	13.78	13.73	13.67
20.918	13.61	13.55	13.50	13.44	13.38	13.32	13.26
21.226	13.21	13.15	13.09	13.03	12.97	12.92	12.86
21.534	12.80	12.74	12.68	12.63	12.57	12.51	12.45
21.842	12.39	12.33	12.28	12.22	12.16	12.10	12.04

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
22.149	11.98	11.93	11.87	11.81	11.75	11.69	11.63
22.457	11.58	11.52	11.46	11.40	11.34	11.28	11.23
22.765	11.17	11.11	11.05	10.99	10.93	10.87	10.82
23.072	10.76	10.70	10.64	10.58	10.52	10.46	10.41
23.380	10.35	10.29	10.23	10.17	10.11	10.05	9.99
23.688	9.94	9.88	9.82	9.76	9.70	9.64	9.58
23.996	9.52	9.45	9.33	9.15	8.90	8.54	8.07
24.303	7.49	6.84	6.15	5.46	4.77	4.13	3.53
24.611	2.99	2.52	2.13	1.81	1.53	1.30	1.11
24.919	0.94	0.79	0.67	0.57	0.48	0.41	0.34
25.226	0.29	0.25	0.21	0.17	0.15	0.12	0.10
25.534	0.09	0.07	0.06				

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STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
Existing	0.147		7.902		10.29	296.45	2016.23

Line Start Time (hr)	Flow (cfs)	Values (cfs)	@ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	Flow (cfs)	Rate (cfs)
2.637	0.06	0.09	0.13	0.19	0.25	0.33	0.41
2.945	0.51	0.61	0.72	0.84	0.96	1.08	1.21
3.253	1.35	1.49	1.63	1.77	1.92	2.06	2.21
3.561	2.36	2.52	2.67	2.83	2.98	3.14	3.30
3.868	3.46	3.62	3.78	3.95	4.11	4.27	4.44
4.176	4.60	4.77	4.93	5.10	5.26	5.42	5.58
4.484	5.74	5.90	6.06	6.21	6.36	6.52	6.67
4.791	6.81	6.96	7.11	7.25	7.40	7.54	7.68
5.099	7.83	7.97	8.11	8.25	8.38	8.52	8.66
5.407	8.79	8.93	9.06	9.20	9.33	9.46	9.59
5.715	9.72	9.85	9.98	10.11	10.24	10.36	10.49
6.022	10.62	10.74	10.87	11.00	11.13	11.27	11.43
6.330	11.59	11.77	11.96	12.17	12.39	12.63	12.89
6.638	13.16	13.44	13.73	14.04	14.35	14.67	15.00
6.945	15.34	15.68	16.03	16.38	16.74	17.10	17.46
7.253	17.81	18.16	18.50	18.84	19.16	19.47	19.77
7.561	20.06	20.34	20.61	20.87	21.12	21.37	21.61
7.868	21.85	22.09	22.32	22.55	22.78	23.01	23.26
8.176	23.52	23.82	24.16	24.56	25.04	25.59	26.22
8.484	26.94	27.74	28.63	29.58	30.61	31.69	32.82
8.792	34.00	35.21	36.45	37.72	39.02	40.33	41.67
9.099	43.04	44.44	45.88	47.38	48.94	50.59	52.33
9.407	54.16	56.10	58.15	60.35	62.83	65.70	69.25
9.715	73.80	79.90	88.03	99.10	114.09	133.10	156.00
10.022	182.16	210.25	237.69	261.75	280.38	291.94	296.45
10.330	294.32	286.69	275.07	260.33	243.33	225.58	208.38

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Line Start Time (hr)	Flow (cfs)	Values (cfs)	@ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	Flow (cfs)	Rate (cfs)
10.638	192.36	177.90	165.23	153.94	143.66	134.35	125.96
10.946	118.39	111.60	105.54	100.12	95.26	90.89	86.99
11.253	83.48	80.32	77.49	74.94	72.64	70.56	68.69
11.561	67.01	65.47	64.09	62.82	61.64	60.54	59.50
11.869	58.51	57.55	56.64	55.77	54.95	54.19	53.47
12.176	52.79	52.14	51.51	50.90	50.31	49.74	49.20
12.484	48.67	48.17	47.69	47.22	46.76	46.32	45.89
12.792	45.46	45.05	44.63	44.23	43.82	43.42	43.02
13.099	42.63	42.23	41.84	41.45	41.06	40.67	40.28
13.407	39.89	39.50	39.11	38.73	38.34	37.95	37.56

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
13.715	37.17	36.78	36.40	36.01	35.62	35.23	34.84
14.023	34.45	34.06	33.68	33.30	32.92	32.56	32.22
14.330	31.89	31.58	31.30	31.04	30.80	30.58	30.39
14.638	30.21	30.05	29.90	29.76	29.63	29.51	29.40
14.946	29.29	29.19	29.09	29.00	28.91	28.82	28.73
15.253	28.64	28.56	28.48	28.39	28.31	28.23	28.15
15.561	28.07	28.00	27.92	27.84	27.76	27.69	27.61
15.869	27.53	27.45	27.38	27.30	27.23	27.15	27.07
16.177	27.00	26.92	26.84	26.77	26.69	26.61	26.54
16.484	26.46	26.38	26.30	26.23	26.15	26.07	26.00
16.792	25.92	25.84	25.77	25.69	25.61	25.53	25.46
17.100	25.38	25.30	25.22	25.15	25.07	24.99	24.91
17.407	24.84	24.76	24.68	24.60	24.53	24.45	24.37
17.715	24.29	24.21	24.14	24.06	23.98	23.90	23.83
18.023	23.75	23.67	23.59	23.51	23.43	23.36	23.28
18.330	23.20	23.12	23.04	22.97	22.89	22.81	22.73
18.638	22.65	22.57	22.50	22.42	22.34	22.26	22.18
18.946	22.10	22.02	21.95	21.87	21.79	21.71	21.63
19.254	21.55	21.47	21.39	21.32	21.24	21.16	21.08
19.561	21.00	20.92	20.84	20.76	20.68	20.61	20.53
19.869	20.45	20.37	20.29	20.21	20.13	20.05	19.97
20.177	19.89	19.81	19.74	19.66	19.58	19.50	19.42
20.484	19.34	19.26	19.18	19.10	19.02	18.94	18.86
20.792	18.78	18.70	18.62	18.55	18.47	18.39	18.31
21.100	18.23	18.15	18.07	17.99	17.91	17.83	17.75
21.408	17.67	17.59	17.51	17.43	17.35	17.27	17.19
21.715	17.11	17.03	16.95	16.87	16.79	16.71	16.63
22.023	16.55	16.47	16.39	16.31	16.23	16.15	16.07
22.331	15.99	15.91	15.83	15.75	15.67	15.59	15.51
22.638	15.43	15.35	15.27	15.19	15.11	15.03	14.95
22.946	14.87	14.79	14.71	14.63	14.55	14.47	14.39
23.254	14.31	14.23	14.15	14.07	13.99	13.91	13.83
23.561	13.75	13.67	13.59	13.51	13.43	13.35	13.27
23.869	13.19	13.11	13.03	12.95	12.84	12.67	12.42
24.177	12.06	11.56	10.89	10.09	9.20	8.25	7.31
24.485	6.38	5.51	4.71	3.98	3.35	2.83	2.40
24.792	2.04	1.73	1.47	1.25	1.06	0.90	0.76
25.100	0.64	0.54	0.46	0.39	0.33	0.28	0.23
25.408	0.19	0.16	0.14	0.11	0.09	0.08	0.06
25.715	0.05						

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.147		7.902		10.29	296.45	2016.23

Line
Start Time (hr) ----- Flow Values @ time increment of 0.044 hr -----
(hr) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)

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STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
2.637	0.06	0.09	0.13	0.19	0.25	0.33	0.41
2.945	0.51	0.61	0.72	0.84	0.96	1.08	1.21
3.253	1.35	1.49	1.63	1.77	1.92	2.06	2.21
3.561	2.36	2.52	2.67	2.83	2.98	3.14	3.30
3.868	3.46	3.62	3.78	3.95	4.11	4.27	4.44
4.176	4.60	4.77	4.93	5.10	5.26	5.42	5.58
4.484	5.74	5.90	6.06	6.21	6.36	6.52	6.67
4.791	6.81	6.96	7.11	7.25	7.40	7.54	7.68
5.099	7.83	7.97	8.11	8.25	8.38	8.52	8.66
5.407	8.79	8.93	9.06	9.20	9.33	9.46	9.59
5.715	9.72	9.85	9.98	10.11	10.24	10.36	10.49
6.022	10.62	10.74	10.87	11.00	11.13	11.27	11.43
6.330	11.59	11.77	11.96	12.17	12.39	12.63	12.89
6.638	13.16	13.44	13.73	14.04	14.35	14.67	15.00
6.945	15.34	15.68	16.03	16.38	16.74	17.10	17.46
7.253	17.81	18.16	18.50	18.84	19.16	19.47	19.77
7.561	20.06	20.34	20.61	20.87	21.12	21.37	21.61
7.868	21.85	22.09	22.32	22.55	22.78	23.01	23.26
8.176	23.52	23.82	24.16	24.56	25.04	25.59	26.22
8.484	26.94	27.74	28.63	29.58	30.61	31.69	32.82
8.792	34.00	35.21	36.45	37.72	39.02	40.33	41.67
9.099	43.04	44.44	45.88	47.38	48.94	50.59	52.33
9.407	54.16	56.10	58.15	60.35	62.83	65.70	69.25
9.715	73.80	79.90	88.03	99.10	114.09	133.10	156.00
10.022	182.16	210.25	237.69	261.75	280.38	291.94	296.45
10.330	294.32	286.69	275.07	260.33	243.33	225.58	208.38
10.638	192.36	177.90	165.23	153.94	143.66	134.35	125.96
10.946	118.39	111.60	105.54	100.12	95.26	90.89	86.99
11.253	83.48	80.32	77.49	74.94	72.64	70.56	68.69
11.561	67.01	65.47	64.09	62.82	61.64	60.54	59.50
11.869	58.51	57.55	56.64	55.77	54.95	54.19	53.47
12.176	52.79	52.14	51.51	50.90	50.31	49.74	49.20
12.484	48.67	48.17	47.69	47.22	46.76	46.32	45.89
12.792	45.46	45.05	44.63	44.23	43.82	43.42	43.02
13.099	42.63	42.23	41.84	41.45	41.06	40.67	40.28
13.407	39.89	39.50	39.11	38.73	38.34	37.95	37.56
13.715	37.17	36.78	36.40	36.01	35.62	35.23	34.84
14.023	34.45	34.06	33.68	33.30	32.92	32.56	32.22
14.330	31.89	31.58	31.30	31.04	30.80	30.58	30.39
14.638	30.21	30.05	29.90	29.76	29.63	29.51	29.40
14.946	29.29	29.19	29.09	29.00	28.91	28.82	28.73
15.253	28.64	28.56	28.48	28.39	28.31	28.23	28.15
15.561	28.07	28.00	27.92	27.84	27.76	27.69	27.61
15.869	27.53	27.45	27.38	27.30	27.23	27.15	27.07
16.177	27.00	26.92	26.84	26.77	26.69	26.61	26.54

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Line
Start Time (hr) ----- Flow Values @ time increment of 0.044 hr -----
(cfs) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)

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STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
16.484	26.46	26.38	26.30	26.23	26.15	26.07	26.00
16.792	25.92	25.84	25.77	25.69	25.61	25.53	25.46
17.100	25.38	25.30	25.22	25.15	25.07	24.99	24.91
17.407	24.84	24.76	24.68	24.60	24.53	24.45	24.37
17.715	24.29	24.21	24.14	24.06	23.98	23.90	23.83
18.023	23.75	23.67	23.59	23.51	23.43	23.36	23.28
18.330	23.20	23.12	23.04	22.97	22.89	22.81	22.73
18.638	22.65	22.57	22.50	22.42	22.34	22.26	22.18
18.946	22.10	22.02	21.95	21.87	21.79	21.71	21.63
19.254	21.55	21.47	21.39	21.32	21.24	21.16	21.08
19.561	21.00	20.92	20.84	20.76	20.68	20.61	20.53
19.869	20.45	20.37	20.29	20.21	20.13	20.05	19.97
20.177	19.89	19.81	19.74	19.66	19.58	19.50	19.42
20.484	19.34	19.26	19.18	19.10	19.02	18.94	18.86
20.792	18.78	18.70	18.62	18.55	18.47	18.39	18.31
21.100	18.23	18.15	18.07	17.99	17.91	17.83	17.75
21.408	17.67	17.59	17.51	17.43	17.35	17.27	17.19
21.715	17.11	17.03	16.95	16.87	16.79	16.71	16.63
22.023	16.55	16.47	16.39	16.31	16.23	16.15	16.07
22.331	15.99	15.91	15.83	15.75	15.67	15.59	15.51
22.638	15.43	15.35	15.27	15.19	15.11	15.03	14.95
22.946	14.87	14.79	14.71	14.63	14.55	14.47	14.39
23.254	14.31	14.23	14.15	14.07	13.99	13.91	13.83
23.561	13.75	13.67	13.59	13.51	13.43	13.35	13.27
23.869	13.19	13.11	13.03	12.95	12.84	12.67	12.42
24.177	12.06	11.56	10.89	10.09	9.20	8.25	7.31
24.485	6.38	5.51	4.71	3.98	3.35	2.83	2.40
24.792	2.04	1.73	1.47	1.25	1.06	0.90	0.76
25.100	0.64	0.54	0.46	0.39	0.33	0.28	0.23
25.408	0.19	0.16	0.14	0.11	0.09	0.08	0.06
25.715	0.05						

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STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow			
				Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
				Peak Flow by Storm			
		Alternate	2-Yr (cfs)	10-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)	(cfs)
Existing	0.15		50.5	153.2	206.5	296.4	
OUTLET	0.15		50.5	153.2	206.5	296.4	

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STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	----- Rate (csm)
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TR-55 Output - Proposed Conditions

WinTR-55 Current Data Description

--- Identification Data ---

User: RMTC Date: 12/6/2006
 Project: Kihei Residential Units: English
 SubTitle: Proposed Areal Units: Acres
 State: Hawaii
 County: Maui
 Filename: C:\Documents and Settings\WalterC\Application Data\WinTR-55\Kihei Residential - Proposec

--- Sub-Area Data ---

Name	Description	Reach	Area (ac)	RCN	Tc
Proposed		Outlet	94.1	88	0.696

Total area: 94.10 (ac)

--- Storm Data ---

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.0	5.0	6.0	6.5	7.5	10.0	.0

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type I
 Dimensionless Unit Hydrograph: <standard>

RMTC

Kihei Residential
Proposed
Maui County, Hawaii

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.0	5.0	6.0	6.5	7.5	10.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

RMTC

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Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period			
	2-Yr (cfs)	10-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)

SUBAREAS Proposed	66.97	173.82	227.51	316.07
REACHES				
OUTLET	66.97	173.82	227.51	316.07

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Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period			
	2-Yr (cfs) (hr)	10-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)

SUBAREAS				
Proposed	66.97	173.82	227.51	316.07
	10.30	10.30	10.30	10.31

REACHES

OUTLET	66.97	173.82	227.51	316.07
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Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
Proposed	94.10	0.696	88	Outlet	

Total Area:	94.10 (ac)				

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Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Proposed SHALLOW	7000	0.0300	3				0.696
						Time of Concentration	0.696 =====

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Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Proposed	Open space; grass cover 50% to 75% (fair)	C	16	79
	Paved; curbs and storm sewers	C	31.5	98
	Commercial & business	C	1.9	94
	Residential districts (1/8 acre)	C	8.6	90
	Residential districts (1/4 acre)	C	36.1	83
	Total Area / Weighted Curve Number		94.1	88
			====	==

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Proposed

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STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
Proposed	0.147		1.818		10.30	66.97	455.48

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)
5.111	0.06	0.07	0.09	0.11	0.13	0.16	0.18
5.419	0.21	0.24	0.26	0.29	0.32	0.35	0.38
5.727	0.41	0.44	0.47	0.50	0.53	0.56	0.59
6.034	0.62	0.65	0.68	0.72	0.75	0.78	0.81
6.342	0.85	0.89	0.92	0.96	1.01	1.05	1.10
6.650	1.14	1.19	1.24	1.30	1.35	1.41	1.46
6.958	1.52	1.59	1.65	1.71	1.78	1.84	1.91
7.265	1.98	2.04	2.11	2.18	2.24	2.31	2.38
7.573	2.44	2.50	2.57	2.63	2.69	2.75	2.81
7.881	2.87	2.93	2.99	3.05	3.11	3.18	3.24
8.188	3.31	3.38	3.46	3.56	3.66	3.78	3.91
8.496	4.06	4.22	4.39	4.58	4.78	5.00	5.22
8.804	5.45	5.70	5.95	6.21	6.47	6.75	7.03
9.111	7.32	7.62	7.94	8.27	8.61	8.98	9.37
9.419	9.78	10.22	10.68	11.19	11.76	12.44	13.27
9.727	14.35	15.80	17.76	20.45	24.07	28.65	34.16
10.035	40.43	47.07	53.48	59.06	63.33	65.95	66.97
10.342	66.53	64.87	62.34	59.09	55.38	51.52	47.79
10.650	44.32	41.22	38.49	36.03	33.78	31.74	29.90
10.958	28.22	26.73	25.39	24.18	23.10	22.13	21.26
11.265	20.47	19.77	19.13	18.56	18.04	17.57	17.15
11.573	16.77	16.43	16.11	15.82	15.56	15.31	15.07
11.881	14.84	14.62	14.41	14.20	14.01	13.84	13.67
12.189	13.51	13.35	13.20	13.06	12.92	12.79	12.66
12.496	12.53	12.41	12.30	12.19	12.08	11.97	11.87
12.804	11.77	11.67	11.57	11.47	11.37	11.27	11.18
13.112	11.08	10.98	10.89	10.79	10.70	10.60	10.50
13.419	10.41	10.31	10.21	10.12	10.02	9.92	9.83
13.727	9.73	9.63	9.53	9.43	9.34	9.24	9.14
14.035	9.04	8.94	8.85	8.75	8.65	8.56	8.48
14.342	8.39	8.32	8.25	8.18	8.13	8.07	8.03
14.650	7.98	7.94	7.91	7.87	7.84	7.82	7.79
14.958	7.76	7.74	7.71	7.69	7.67	7.65	7.63
15.266	7.61	7.59	7.57	7.55	7.53	7.51	7.49
15.573	7.47	7.45	7.44	7.42	7.40	7.38	7.36
15.881	7.34	7.32	7.31	7.29	7.27	7.25	7.23
16.189	7.21	7.19	7.18	7.16	7.14	7.12	7.10
16.496	7.08	7.06	7.04	7.03	7.01	6.99	6.97
16.804	6.95	6.93	6.91	6.89	6.87	6.85	6.83
17.112	6.82	6.80	6.78	6.76	6.74	6.72	6.70

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Kihei Residential
Proposed

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)
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STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
17.420	6.68	6.66	6.64	6.62	6.60	6.58	6.56
17.727	6.54	6.52	6.50	6.48	6.46	6.45	6.43
18.035	6.41	6.39	6.37	6.35	6.33	6.31	6.29
18.343	6.27	6.25	6.23	6.21	6.19	6.17	6.15
18.650	6.13	6.11	6.09	6.07	6.05	6.03	6.01
18.958	5.99	5.96	5.94	5.92	5.90	5.88	5.86
19.266	5.84	5.82	5.80	5.78	5.76	5.74	5.72
19.573	5.70	5.68	5.66	5.64	5.62	5.60	5.58
19.881	5.56	5.53	5.51	5.49	5.47	5.45	5.43
20.189	5.41	5.39	5.37	5.35	5.33	5.31	5.29
20.497	5.26	5.24	5.22	5.20	5.18	5.16	5.14
20.804	5.12	5.10	5.08	5.06	5.03	5.01	4.99
21.112	4.97	4.95	4.93	4.91	4.89	4.87	4.84
21.420	4.82	4.80	4.78	4.76	4.74	4.72	4.70
21.727	4.67	4.65	4.63	4.61	4.59	4.57	4.55
22.035	4.53	4.50	4.48	4.46	4.44	4.42	4.40
22.343	4.38	4.35	4.33	4.31	4.29	4.27	4.25
22.651	4.23	4.20	4.18	4.16	4.14	4.12	4.10
22.958	4.07	4.05	4.03	4.01	3.99	3.97	3.94
23.266	3.92	3.90	3.88	3.86	3.84	3.81	3.79
23.574	3.77	3.75	3.73	3.71	3.68	3.66	3.64
23.881	3.62	3.60	3.58	3.55	3.52	3.46	3.39
24.189	3.28	3.13	2.93	2.71	2.46	2.20	1.94
24.497	1.69	1.45	1.24	1.05	0.88	0.75	0.63
24.804	0.54	0.46	0.39	0.33	0.28	0.24	0.20
25.112	0.17	0.14	0.12	0.10	0.09	0.07	0.06
25.420	0.05						

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
OUTLET	0.147		1.818		10.30	66.97	455.48

Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5.111	0.06	0.07	0.09	0.11	0.13	0.16	0.18
5.419	0.21	0.24	0.26	0.29	0.32	0.35	0.38
5.727	0.41	0.44	0.47	0.50	0.53	0.56	0.59
6.034	0.62	0.65	0.68	0.72	0.75	0.78	0.81
6.342	0.85	0.89	0.92	0.96	1.01	1.05	1.10
6.650	1.14	1.19	1.24	1.30	1.35	1.41	1.46
6.958	1.52	1.59	1.65	1.71	1.78	1.84	1.91
7.265	1.98	2.04	2.11	2.18	2.24	2.31	2.38
7.573	2.44	2.50	2.57	2.63	2.69	2.75	2.81
7.881	2.87	2.93	2.99	3.05	3.11	3.18	3.24
8.188	3.31	3.38	3.46	3.56	3.66	3.78	3.91
8.496	4.06	4.22	4.39	4.58	4.78	5.00	5.22
8.804	5.45	5.70	5.95	6.21	6.47	6.75	7.03

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STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in) Proposed	----- Elevation (ft)	Peak Flow Time (hr)	----- Rate (cfs)	----- Rate (csm)
--------------------------------	-----------------------------	--------------------------------	--------------------------------------	----------------------------	---------------------------	------------------------	------------------------

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	Values @ time (cfs)	increment of (cfs)	of 0.044 hr (cfs)	----- (cfs)	----- (cfs)
9.111	7.32	7.62	7.94	8.27	8.61	8.98	9.37
9.419	9.78	10.22	10.68	11.19	11.76	12.44	13.27
9.727	14.35	15.80	17.76	20.45	24.07	28.65	34.16
10.035	40.43	47.07	53.48	59.06	63.33	65.95	66.97
10.342	66.53	64.87	62.34	59.09	55.38	51.52	47.79
10.650	44.32	41.22	38.49	36.03	33.78	31.74	29.90
10.958	28.22	26.73	25.39	24.18	23.10	22.13	21.26
11.265	20.47	19.77	19.13	18.56	18.04	17.57	17.15
11.573	16.77	16.43	16.11	15.82	15.56	15.31	15.07
11.881	14.84	14.62	14.41	14.20	14.01	13.84	13.67
12.189	13.51	13.35	13.20	13.06	12.92	12.79	12.66
12.496	12.53	12.41	12.30	12.19	12.08	11.97	11.87
12.804	11.77	11.67	11.57	11.47	11.37	11.27	11.18
13.112	11.08	10.98	10.89	10.79	10.70	10.60	10.50
13.419	10.41	10.31	10.21	10.12	10.02	9.92	9.83
13.727	9.73	9.63	9.53	9.43	9.34	9.24	9.14
14.035	9.04	8.94	8.85	8.75	8.65	8.56	8.48
14.342	8.39	8.32	8.25	8.18	8.13	8.07	8.03
14.650	7.98	7.94	7.91	7.87	7.84	7.82	7.79
14.958	7.76	7.74	7.71	7.69	7.67	7.65	7.63
15.266	7.61	7.59	7.57	7.55	7.53	7.51	7.49
15.573	7.47	7.45	7.44	7.42	7.40	7.38	7.36
15.881	7.34	7.32	7.31	7.29	7.27	7.25	7.23
16.189	7.21	7.19	7.18	7.16	7.14	7.12	7.10
16.496	7.08	7.06	7.04	7.03	7.01	6.99	6.97
16.804	6.95	6.93	6.91	6.89	6.87	6.85	6.83
17.112	6.82	6.80	6.78	6.76	6.74	6.72	6.70
17.420	6.68	6.66	6.64	6.62	6.60	6.58	6.56
17.727	6.54	6.52	6.50	6.48	6.46	6.45	6.43
18.035	6.41	6.39	6.37	6.35	6.33	6.31	6.29
18.343	6.27	6.25	6.23	6.21	6.19	6.17	6.15
18.650	6.13	6.11	6.09	6.07	6.05	6.03	6.01
18.958	5.99	5.96	5.94	5.92	5.90	5.88	5.86
19.266	5.84	5.82	5.80	5.78	5.76	5.74	5.72
19.573	5.70	5.68	5.66	5.64	5.62	5.60	5.58
19.881	5.56	5.53	5.51	5.49	5.47	5.45	5.43
20.189	5.41	5.39	5.37	5.35	5.33	5.31	5.29
20.497	5.26	5.24	5.22	5.20	5.18	5.16	5.14
20.804	5.12	5.10	5.08	5.06	5.03	5.01	4.99
21.112	4.97	4.95	4.93	4.91	4.89	4.87	4.84
21.420	4.82	4.80	4.78	4.76	4.74	4.72	4.70
21.727	4.67	4.65	4.63	4.61	4.59	4.57	4.55
22.035	4.53	4.50	4.48	4.46	4.44	4.42	4.40
22.343	4.38	4.35	4.33	4.31	4.29	4.27	4.25
22.651	4.23	4.20	4.18	4.16	4.14	4.12	4.10
22.958	4.07	4.05	4.03	4.01	3.99	3.97	3.94
23.266	3.92	3.90	3.88	3.86	3.84	3.81	3.79
23.574	3.77	3.75	3.73	3.71	3.68	3.66	3.64
23.881	3.62	3.60	3.58	3.55	3.52	3.46	3.39
24.189	3.28	3.13	2.93	2.71	2.46	2.20	1.94

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STORM 2-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
24.497	1.69	1.45	1.24	1.05	0.88	0.75	0.63

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Line Start Time (hr)	Flow (cfs)	Values @ time increment (cfs)	Flow (cfs)	Values @ time increment (cfs)	Flow (cfs)	Values @ time increment (cfs)	Flow (cfs)
24.804	0.54	0.46	0.39	0.33	0.28	0.24	0.20
25.112	0.17	0.14	0.12	0.10	0.09	0.07	0.06
25.420	0.05						

STORM 10-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
Proposed	0.147		4.626		10.30	173.82	1182.23

Line Start Time (hr)	Flow (cfs)	Values @ time increment (cfs)	Flow (cfs)	Values @ time increment (cfs)	Flow (cfs)	Values @ time increment (cfs)	Flow (cfs)
2.919	0.05	0.08	0.11	0.15	0.19	0.24	0.29
3.227	0.35	0.42	0.49	0.56	0.63	0.71	0.79
3.534	0.87	0.95	1.03	1.12	1.20	1.29	1.38
3.842	1.47	1.56	1.65	1.74	1.83	1.92	2.02
4.150	2.11	2.20	2.30	2.39	2.49	2.58	2.67
4.458	2.76	2.86	2.95	3.04	3.13	3.22	3.30
4.765	3.39	3.48	3.57	3.65	3.74	3.82	3.91
5.073	3.99	4.07	4.16	4.24	4.32	4.40	4.48
5.381	4.57	4.65	4.73	4.80	4.88	4.96	5.04
5.688	5.12	5.20	5.27	5.35	5.43	5.50	5.58
5.996	5.66	5.73	5.81	5.88	5.96	6.04	6.13
6.304	6.22	6.32	6.43	6.54	6.67	6.80	6.94
6.612	7.09	7.25	7.41	7.58	7.76	7.94	8.13
6.919	8.32	8.52	8.71	8.92	9.12	9.33	9.53
7.227	9.74	9.95	10.15	10.34	10.54	10.72	10.90
7.535	11.07	11.24	11.40	11.56	11.72	11.87	12.01
7.842	12.16	12.30	12.44	12.58	12.71	12.85	13.00
8.150	13.15	13.31	13.50	13.71	13.96	14.26	14.60
8.458	14.99	15.43	15.91	16.44	17.01	17.62	18.25
8.765	18.92	19.61	20.32	21.05	21.80	22.56	23.33
9.073	24.12	24.92	25.75	26.61	27.50	28.43	29.42
9.381	30.46	31.56	32.72	33.95	35.31	36.83	38.65
9.689	40.93	43.90	47.90	53.30	60.70	70.49	82.66
9.996	97.06	113.11	129.69	145.23	158.30	167.71	172.83
10.304	173.82	171.21	165.66	158.09	148.81	138.64	128.33
10.612	118.49	109.44	101.44	94.42	88.07	82.30	77.08
10.919	72.37	68.11	64.31	60.93	57.88	55.16	52.71
11.227	50.52	48.55	46.78	45.19	43.75	42.45	41.29
11.535	40.23	39.28	38.42	37.63	36.91	36.24	35.61

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STORM 10-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
11.843	35.01	34.43	33.88	33.35	32.85	32.39	31.95
12.150	31.53	31.14	30.76	30.40	30.04	29.70	29.37
12.458	29.05	28.75	28.46	28.18	27.91	27.64	27.38
12.766	27.13	26.88	26.63	26.39	26.15	25.91	25.68
13.073	25.44	25.21	24.98	24.75	24.52	24.29	24.06
13.381	23.83	23.60	23.37	23.14	22.91	22.68	22.45

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Proposed

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow Values @ time (cfs)	increment of (cfs)	of 0.044 hr (cfs)	Flow (cfs)	Flow (cfs)
13.689	22.22	21.99	21.76	21.53	21.30	21.07	20.84
13.996	20.61	20.38	20.15	19.92	19.69	19.48	19.27
14.304	19.06	18.88	18.70	18.54	18.39	18.25	18.13
14.612	18.02	17.92	17.82	17.74	17.66	17.59	17.52
14.920	17.45	17.39	17.33	17.27	17.22	17.16	17.11
15.227	17.06	17.01	16.96	16.91	16.87	16.82	16.77
15.535	16.72	16.68	16.63	16.59	16.54	16.49	16.45
15.843	16.40	16.36	16.31	16.27	16.22	16.18	16.13
16.150	16.09	16.04	16.00	15.95	15.91	15.86	15.82
16.458	15.77	15.72	15.68	15.63	15.59	15.54	15.50
16.766	15.45	15.41	15.36	15.31	15.27	15.22	15.18
17.074	15.13	15.09	15.04	14.99	14.95	14.90	14.86
17.381	14.81	14.76	14.72	14.67	14.63	14.58	14.53
17.689	14.49	14.44	14.40	14.35	14.30	14.26	14.21
17.997	14.17	14.12	14.07	14.03	13.98	13.93	13.89
18.304	13.84	13.80	13.75	13.70	13.66	13.61	13.56
18.612	13.52	13.47	13.42	13.38	13.33	13.28	13.24
18.920	13.19	13.14	13.10	13.05	13.00	12.96	12.91
19.227	12.86	12.82	12.77	12.72	12.68	12.63	12.58
19.535	12.54	12.49	12.44	12.40	12.35	12.30	12.26
19.843	12.21	12.16	12.12	12.07	12.02	11.97	11.93
20.151	11.88	11.83	11.79	11.74	11.69	11.64	11.60
20.458	11.55	11.50	11.46	11.41	11.36	11.32	11.27
20.766	11.22	11.17	11.13	11.08	11.03	10.98	10.94
21.074	10.89	10.84	10.80	10.75	10.70	10.65	10.61
21.381	10.56	10.51	10.46	10.42	10.37	10.32	10.27
21.689	10.23	10.18	10.13	10.08	10.04	9.99	9.94
21.997	9.89	9.85	9.80	9.75	9.70	9.66	9.61
22.305	9.56	9.51	9.47	9.42	9.37	9.32	9.28
22.612	9.23	9.18	9.13	9.09	9.04	8.99	8.94
22.920	8.90	8.85	8.80	8.75	8.70	8.66	8.61
23.228	8.56	8.51	8.47	8.42	8.37	8.32	8.27
23.535	8.23	8.18	8.13	8.08	8.04	7.99	7.94
23.843	7.89	7.84	7.80	7.75	7.69	7.61	7.49
24.151	7.32	7.07	6.73	6.30	5.80	5.25	4.69
24.458	4.13	3.59	3.09	2.63	2.22	1.87	1.58
24.766	1.35	1.14	0.97	0.82	0.70	0.59	0.50
25.074	0.42	0.36	0.30	0.26	0.22	0.18	0.15
25.382	0.13	0.11	0.09	0.08	0.06	0.05	

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STORM 10-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
OUTLET	0.147		4.626		10.30	173.82	1182.23

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
2.919	0.05	0.08	0.11	0.15	0.19	0.24	0.29
3.227	0.35	0.42	0.49	0.56	0.63	0.71	0.79
3.534	0.87	0.95	1.03	1.12	1.20	1.29	1.38
3.842	1.47	1.56	1.65	1.74	1.83	1.92	2.02
4.150	2.11	2.20	2.30	2.39	2.49	2.58	2.67
4.458	2.76	2.86	2.95	3.04	3.13	3.22	3.30
4.765	3.39	3.48	3.57	3.65	3.74	3.82	3.91
5.073	3.99	4.07	4.16	4.24	4.32	4.40	4.48
5.381	4.57	4.65	4.73	4.80	4.88	4.96	5.04
5.688	5.12	5.20	5.27	5.35	5.43	5.50	5.58
5.996	5.66	5.73	5.81	5.88	5.96	6.04	6.13
6.304	6.22	6.32	6.43	6.54	6.67	6.80	6.94
6.612	7.09	7.25	7.41	7.58	7.76	7.94	8.13
6.919	8.32	8.52	8.71	8.92	9.12	9.33	9.53
7.227	9.74	9.95	10.15	10.34	10.54	10.72	10.90
7.535	11.07	11.24	11.40	11.56	11.72	11.87	12.01
7.842	12.16	12.30	12.44	12.58	12.71	12.85	13.00
8.150	13.15	13.31	13.50	13.71	13.96	14.26	14.60
8.458	14.99	15.43	15.91	16.44	17.01	17.62	18.25
8.765	18.92	19.61	20.32	21.05	21.80	22.56	23.33
9.073	24.12	24.92	25.75	26.61	27.50	28.43	29.42
9.381	30.46	31.56	32.72	33.95	35.31	36.83	38.65
9.689	40.93	43.90	47.90	53.30	60.70	70.49	82.66
9.996	97.06	113.11	129.69	145.23	158.30	167.71	172.83
10.304	173.82	171.21	165.66	158.09	148.81	138.64	128.33
10.612	118.49	109.44	101.44	94.42	88.07	82.30	77.08
10.919	72.37	68.11	64.31	60.93	57.88	55.16	52.71
11.227	50.52	48.55	46.78	45.19	43.75	42.45	41.29
11.535	40.23	39.28	38.42	37.63	36.91	36.24	35.61
11.843	35.01	34.43	33.88	33.35	32.85	32.39	31.95
12.150	31.53	31.14	30.76	30.40	30.04	29.70	29.37
12.458	29.05	28.75	28.46	28.18	27.91	27.64	27.38
12.766	27.13	26.88	26.63	26.39	26.15	25.91	25.68
13.073	25.44	25.21	24.98	24.75	24.52	24.29	24.06
13.381	23.83	23.60	23.37	23.14	22.91	22.68	22.45

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STORM 10-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
13.689	22.22	21.99	21.76	21.53	21.30	21.07	20.84
13.996	20.61	20.38	20.15	19.92	19.69	19.48	19.27
14.304	19.06	18.88	18.70	18.54	18.39	18.25	18.13
14.612	18.02	17.92	17.82	17.74	17.66	17.59	17.52
14.920	17.45	17.39	17.33	17.27	17.22	17.16	17.11
15.227	17.06	17.01	16.96	16.91	16.87	16.82	16.77
15.535	16.72	16.68	16.63	16.59	16.54	16.49	16.45
15.843	16.40	16.36	16.31	16.27	16.22	16.18	16.13
16.150	16.09	16.04	16.00	15.95	15.91	15.86	15.82
16.458	15.77	15.72	15.68	15.63	15.59	15.54	15.50
16.766	15.45	15.41	15.36	15.31	15.27	15.22	15.18
17.074	15.13	15.09	15.04	14.99	14.95	14.90	14.86
17.381	14.81	14.76	14.72	14.67	14.63	14.58	14.53
17.689	14.49	14.44	14.40	14.35	14.30	14.26	14.21
17.997	14.17	14.12	14.07	14.03	13.98	13.93	13.89
18.304	13.84	13.80	13.75	13.70	13.66	13.61	13.56

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
18.612	13.52	13.47	13.42	13.38	13.33	13.28	13.24
18.920	13.19	13.14	13.10	13.05	13.00	12.96	12.91
19.227	12.86	12.82	12.77	12.72	12.68	12.63	12.58
19.535	12.54	12.49	12.44	12.40	12.35	12.30	12.26
19.843	12.21	12.16	12.12	12.07	12.02	11.97	11.93
20.151	11.88	11.83	11.79	11.74	11.69	11.64	11.60
20.458	11.55	11.50	11.46	11.41	11.36	11.32	11.27
20.766	11.22	11.17	11.13	11.08	11.03	10.98	10.94
21.074	10.89	10.84	10.80	10.75	10.70	10.65	10.61
21.381	10.56	10.51	10.46	10.42	10.37	10.32	10.27
21.689	10.23	10.18	10.13	10.08	10.04	9.99	9.94
21.997	9.89	9.85	9.80	9.75	9.70	9.66	9.61
22.305	9.56	9.51	9.47	9.42	9.37	9.32	9.28
22.612	9.23	9.18	9.13	9.09	9.04	8.99	8.94
22.920	8.90	8.85	8.80	8.75	8.70	8.66	8.61
23.228	8.56	8.51	8.47	8.42	8.37	8.32	8.27
23.535	8.23	8.18	8.13	8.08	8.04	7.99	7.94
23.843	7.89	7.84	7.80	7.75	7.69	7.61	7.49
24.151	7.32	7.07	6.73	6.30	5.80	5.25	4.69
24.458	4.13	3.59	3.09	2.63	2.22	1.87	1.58
24.766	1.35	1.14	0.97	0.82	0.70	0.59	0.50
25.074	0.42	0.36	0.30	0.26	0.22	0.18	0.15
25.382	0.13	0.11	0.09	0.08	0.06	0.05	

STORM 50-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
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STORM 50-Yr

Area or Reach Identifier Proposed	Drainage Area (sq mi) 0.147	Rain Gage ID or Location	Runoff Amount (in) 6.080	Elevation (ft)	Peak Flow Time (hr) 10.30	Rate (cfs) 227.51	Rate (csm) 1547.40
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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
2.429	0.07	0.10	0.14	0.19	0.25	0.32	0.39
2.736	0.47	0.56	0.65	0.75	0.84	0.95	1.05
3.044	1.16	1.27	1.38	1.49	1.61	1.72	1.84
3.352	1.96	2.08	2.20	2.32	2.44	2.56	2.69
3.660	2.81	2.94	3.06	3.19	3.32	3.45	3.57
3.967	3.70	3.83	3.96	4.09	4.22	4.35	4.48
4.275	4.61	4.74	4.87	4.99	5.12	5.24	5.36
4.583	5.48	5.60	5.72	5.83	5.95	6.06	6.17
4.890	6.28	6.40	6.50	6.61	6.72	6.83	6.94
5.198	7.04	7.15	7.25	7.35	7.46	7.56	7.66
5.506	7.76	7.86	7.96	8.06	8.16	8.25	8.35
5.813	8.45	8.54	8.64	8.73	8.83	8.92	9.01
6.121	9.11	9.21	9.31	9.42	9.54	9.66	9.80
6.429	9.95	10.12	10.30	10.49	10.69	10.90	11.12
6.737	11.36	11.60	11.84	12.10	12.36	12.62	12.89

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.044	13.17	13.44	13.72	14.00	14.28	14.55	14.82
7.352	15.09	15.34	15.58	15.82	16.05	16.27	16.48
7.660	16.68	16.87	17.06	17.25	17.43	17.61	17.78
7.967	17.95	18.12	18.30	18.47	18.66	18.86	19.09
8.275	19.37	19.69	20.06	20.51	21.01	21.59	22.23
8.583	22.93	23.68	24.49	25.34	26.23	27.15	28.09
8.891	29.06	30.05	31.05	32.07	33.11	34.17	35.26
9.198	36.38	37.54	38.76	40.03	41.39	42.81	44.32
9.506	45.91	47.65	49.60	51.91	54.79	58.53	63.57
9.814	70.35	79.60	91.95	107.39	125.72	146.29	167.83
10.121	188.28	205.65	218.43	225.67	227.51	224.55	217.60
10.429	207.91	195.95	182.63	169.00	155.98	143.96	133.24
10.737	123.85	115.40	107.72	100.77	94.51	88.86	83.81
11.044	79.31	75.27	71.65	68.40	65.50	62.88	60.53
11.352	58.43	56.52	54.81	53.26	51.87	50.61	49.47
11.660	48.43	47.48	46.60	45.77	44.98	44.23	43.51
11.968	42.82	42.16	41.55	40.98	40.43	39.92	39.43
12.275	38.95	38.49	38.05	37.62	37.21	36.81	36.43
12.583	36.07	35.71	35.37	35.03	34.71	34.38	34.07
12.891	33.75	33.44	33.13	32.83	32.53	32.23	31.93
13.198	31.63	31.33	31.03	30.74	30.44	30.14	29.85
13.506	29.55	29.26	28.96	28.67	28.37	28.08	27.78
13.814	27.49	27.19	26.90	26.60	26.30	26.01	25.72
14.122	25.42	25.14	24.85	24.58	24.32	24.08	23.85
14.429	23.64	23.44	23.27	23.11	22.96	22.83	22.71

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Rate (csm)
2.429	0.07	0.10	0.14	0.19	0.25	0.32	0.39
2.736	0.47	0.56	0.65	0.75	0.84	0.95	1.05
3.044	1.16	1.27	1.38	1.49	1.61	1.72	1.84
3.352	1.96	2.08	2.20	2.32	2.44	2.56	2.69
3.660	2.81	2.94	3.06	3.19	3.32	3.45	3.57
3.967	3.70	3.83	3.96	4.09	4.22	4.35	4.48
4.275	4.61	4.74	4.87	4.99	5.12	5.24	5.36
4.583	5.48	5.60	5.72	5.83	5.95	6.06	6.17
4.890	6.28	6.40	6.50	6.61	6.72	6.83	6.94
5.198	7.04	7.15	7.25	7.35	7.46	7.56	7.66
5.506	7.76	7.86	7.96	8.06	8.16	8.25	8.35
5.813	8.45	8.54	8.64	8.73	8.83	8.92	9.01
6.121	9.11	9.21	9.31	9.42	9.54	9.66	9.80
6.429	9.95	10.12	10.30	10.49	10.69	10.90	11.12
6.737	11.36	11.60	11.84	12.10	12.36	12.62	12.89
7.044	13.17	13.44	13.72	14.00	14.28	14.55	14.82
7.352	15.09	15.34	15.58	15.82	16.05	16.27	16.48
7.660	16.68	16.87	17.06	17.25	17.43	17.61	17.78
7.967	17.95	18.12	18.30	18.47	18.66	18.86	19.09
8.275	19.37	19.69	20.06	20.51	21.01	21.59	22.23
8.583	22.93	23.68	24.49	25.34	26.23	27.15	28.09
8.891	29.06	30.05	31.05	32.07	33.11	34.17	35.26
9.198	36.38	37.54	38.76	40.03	41.39	42.81	44.32
9.506	45.91	47.65	49.60	51.91	54.79	58.53	63.57
9.814	70.35	79.60	91.95	107.39	125.72	146.29	167.83
10.121	188.28	205.65	218.43	225.67	227.51	224.55	217.60
10.429	207.91	195.95	182.63	169.00	155.98	143.96	133.24
10.737	123.85	115.40	107.72	100.77	94.51	88.86	83.81
11.044	79.31	75.27	71.65	68.40	65.50	62.88	60.53
11.352	58.43	56.52	54.81	53.26	51.87	50.61	49.47

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
11.660	48.43	47.48	46.60	45.77	44.98	44.23	43.51
11.968	42.82	42.16	41.55	40.98	40.43	39.92	39.43
12.275	38.95	38.49	38.05	37.62	37.21	36.81	36.43
12.583	36.07	35.71	35.37	35.03	34.71	34.38	34.07
12.891	33.75	33.44	33.13	32.83	32.53	32.23	31.93
13.198	31.63	31.33	31.03	30.74	30.44	30.14	29.85
13.506	29.55	29.26	28.96	28.67	28.37	28.08	27.78
13.814	27.49	27.19	26.90	26.60	26.30	26.01	25.72
14.122	25.42	25.14	24.85	24.58	24.32	24.08	23.85
14.429	23.64	23.44	23.27	23.11	22.96	22.83	22.71
14.737	22.60	22.50	22.40	22.31	22.23	22.14	22.07
15.045	21.99	21.92	21.85	21.78	21.72	21.65	21.59
15.352	21.53	21.46	21.40	21.34	21.28	21.22	21.16
15.660	21.10	21.04	20.98	20.92	20.87	20.81	20.75
15.968	20.69	20.63	20.57	20.51	20.46	20.40	20.34

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STORM 50-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
16.275	20.28	20.22	20.16	20.11	20.05	19.99	19.93
16.583	19.87	19.81	19.76	19.70	19.64	19.58	19.52
16.891	19.46	19.40	19.34	19.29	19.23	19.17	19.11
17.199	19.05	18.99	18.93	18.87	18.81	18.76	18.70
17.506	18.64	18.58	18.52	18.46	18.40	18.34	18.28
17.814	18.22	18.16	18.11	18.05	17.99	17.93	17.87
18.122	17.81	17.75	17.69	17.63	17.57	17.51	17.45
18.429	17.39	17.33	17.28	17.22	17.16	17.10	17.04
18.737	16.98	16.92	16.86	16.80	16.74	16.68	16.62
19.045	16.56	16.50	16.44	16.38	16.32	16.26	16.20
19.352	16.14	16.08	16.02	15.96	15.90	15.84	15.79
19.660	15.73	15.67	15.61	15.55	15.49	15.43	15.37
19.968	15.31	15.25	15.19	15.13	15.07	15.01	14.95
20.276	14.89	14.83	14.77	14.71	14.65	14.59	14.53
20.583	14.47	14.41	14.35	14.29	14.23	14.17	14.11
20.891	14.05	13.99	13.93	13.87	13.81	13.75	13.68
21.199	13.62	13.56	13.50	13.44	13.38	13.32	13.26
21.506	13.20	13.14	13.08	13.02	12.96	12.90	12.84
21.814	12.78	12.72	12.66	12.60	12.54	12.48	12.42
22.122	12.36	12.30	12.24	12.18	12.12	12.06	12.00
22.430	11.94	11.88	11.81	11.75	11.69	11.63	11.57
22.737	11.51	11.45	11.39	11.33	11.27	11.21	11.15
23.045	11.09	11.03	10.97	10.91	10.85	10.79	10.73
23.353	10.66	10.60	10.54	10.48	10.42	10.36	10.30
23.660	10.24	10.18	10.12	10.06	10.00	9.94	9.88
23.968	9.82	9.75	9.66	9.51	9.30	9.00	8.60
24.276	8.07	7.44	6.76	6.05	5.34	4.65	4.00
24.583	3.41	2.88	2.43	2.06	1.74	1.48	1.26
24.891	1.07	0.91	0.77	0.65	0.55	0.47	0.39
25.199	0.33	0.28	0.24	0.20	0.17	0.14	0.12
25.507	0.10	0.08	0.07	0.06			

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
Proposed	0.147		8.531		10.31	316.07	2149.71
Line							
Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)
1.868	0.07	0.11	0.17	0.24	0.32	0.41	0.51
2.176	0.63	0.75	0.88	1.02	1.16	1.31	1.46
2.483	1.61	1.77	1.93	2.09	2.26	2.43	2.60
2.791	2.77	2.94	3.12	3.29	3.47	3.65	3.83

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow			
				Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
3.099	4.01	4.19	4.37	4.55	4.73	4.92	5.10
3.407	5.28	5.47	5.65	5.84	6.03	6.21	6.40
3.714	6.59	6.77	6.96	7.15	7.34	7.53	7.71
4.022	7.90	8.09	8.28	8.47	8.65	8.84	9.02
4.330	9.21	9.38	9.56	9.73	9.90	10.07	10.24
4.637	10.40	10.56	10.71	10.87	11.02	11.17	11.32
4.945	11.46	11.61	11.75	11.89	12.03	12.17	12.31
5.253	12.45	12.58	12.72	12.85	12.98	13.12	13.25
5.561	13.37	13.50	13.63	13.76	13.88	14.01	14.13
5.868	14.25	14.37	14.49	14.61	14.73	14.85	14.97
6.176	15.10	15.24	15.38	15.54	15.72	15.92	16.13
6.484	16.37	16.63	16.90	17.20	17.51	17.83	18.17
6.791	18.52	18.87	19.24	19.62	20.00	20.39	20.78
7.099	21.18	21.57	21.97	22.37	22.75	23.13	23.49
7.407	23.84	24.18	24.50	24.80	25.10	25.38	25.64
7.714	25.90	26.15	26.39	26.62	26.85	27.08	27.30
8.022	27.52	27.74	27.97	28.22	28.50	28.82	29.20
8.330	29.66	30.21	30.85	31.59	32.42	33.35	34.37
8.638	35.46	36.63	37.85	39.12	40.43	41.78	43.15
8.945	44.55	45.97	47.40	48.86	50.35	51.87	53.45
9.253	55.08	56.79	58.59	60.49	62.49	64.61	66.86
9.561	69.34	72.14	75.52	79.76	85.35	92.87	103.03
9.868	116.91	135.07	157.50	183.83	212.88	242.47	269.74
10.176	292.26	307.91	315.70	316.07	310.06	298.95	284.36
10.484	266.80	247.93	229.01	211.09	194.67	180.25	167.59
10.792	156.12	145.72	136.33	127.86	120.22	113.41	107.34
11.099	101.89	97.01	92.63	88.73	85.20	82.05	79.20
11.407	76.64	74.33	72.24	70.37	68.67	67.13	65.73
11.715	64.44	63.24	62.11	61.04	60.01	59.02	58.08
12.022	57.19	56.36	55.58	54.85	54.16	53.48	52.83
12.330	52.20	51.60	51.02	50.46	49.92	49.40	48.90
12.638	48.42	47.95	47.49	47.04	46.60	46.17	45.74
12.945	45.31	44.89	44.48	44.06	43.65	43.24	42.83
13.253	42.42	42.02	41.61	41.21	40.80	40.40	40.00
13.561	39.59	39.19	38.79	38.38	37.98	37.58	37.17
13.869	36.77	36.37	35.96	35.56	35.16	34.76	34.36
14.176	33.97	33.59	33.23	32.88	32.55	32.24	31.96
14.484	31.70	31.47	31.25	31.06	30.88	30.72	30.57
14.792	30.44	30.31	30.19	30.07	29.96	29.86	29.75
15.099	29.66	29.56	29.47	29.38	29.29	29.20	29.12
15.407	29.03	28.95	28.86	28.78	28.70	28.62	28.53

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Line Start Time (hr)	Flow Values @ time increment of 0.044 hr						
(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
15.715	28.45	28.37	28.29	28.21	28.13	28.05	27.97
16.023	27.89	27.81	27.73	27.65	27.57	27.49	27.41
16.330	27.33	27.25	27.17	27.09	27.01	26.93	26.85
16.638	26.77	26.69	26.61	26.53	26.45	26.37	26.29
16.946	26.21	26.13	26.05	25.97	25.89	25.81	25.73

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
17.253	25.65	25.57	25.48	25.40	25.32	25.24	25.16
17.561	25.08	25.00	24.92	24.84	24.76	24.68	24.60
17.869	24.52	24.44	24.36	24.28	24.20	24.11	24.03
18.176	23.95	23.87	23.79	23.71	23.63	23.55	23.47
18.484	23.39	23.31	23.23	23.15	23.06	22.98	22.90
18.792	22.82	22.74	22.66	22.58	22.50	22.42	22.34
19.100	22.25	22.17	22.09	22.01	21.93	21.85	21.77
19.407	21.69	21.61	21.52	21.44	21.36	21.28	21.20
19.715	21.12	21.04	20.96	20.88	20.79	20.71	20.63
20.023	20.55	20.47	20.39	20.31	20.23	20.14	20.06
20.330	19.98	19.90	19.82	19.74	19.66	19.57	19.49
20.638	19.41	19.33	19.25	19.17	19.09	19.00	18.92
20.946	18.84	18.76	18.68	18.60	18.52	18.43	18.35
21.254	18.27	18.19	18.11	18.03	17.95	17.86	17.78
21.561	17.70	17.62	17.54	17.46	17.37	17.29	17.21
21.869	17.13	17.05	16.97	16.88	16.80	16.72	16.64
22.177	16.56	16.48	16.39	16.31	16.23	16.15	16.07
22.484	15.99	15.90	15.82	15.74	15.66	15.58	15.50
22.792	15.41	15.33	15.25	15.17	15.09	15.00	14.92
23.100	14.84	14.76	14.68	14.60	14.51	14.43	14.35
23.407	14.27	14.19	14.10	14.02	13.94	13.86	13.78
23.715	13.70	13.61	13.53	13.45	13.37	13.29	13.20
24.023	13.11	12.97	12.75	12.44	12.01	11.42	10.67
24.331	9.80	8.87	7.91	6.96	6.04	5.19	4.42
24.638	3.73	3.14	2.66	2.26	1.92	1.63	1.38
24.946	1.17	0.99	0.84	0.71	0.60	0.51	0.43
25.254	0.36	0.31	0.26	0.22	0.18	0.15	0.13
25.561	0.10	0.09	0.07	0.06			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Time (hr)	Flow Rate (cfs)	Flow Rate (csm)
OUTLET	0.147		8.531		10.31	316.07	2149.71

Line

Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)
1.868	0.07	0.11	0.17	0.24	0.32	0.41	0.51
2.176	0.63	0.75	0.88	1.02	1.16	1.31	1.46
2.483	1.61	1.77	1.93	2.09	2.26	2.43	2.60
2.791	2.77	2.94	3.12	3.29	3.47	3.65	3.83
3.099	4.01	4.19	4.37	4.55	4.73	4.92	5.10
3.407	5.28	5.47	5.65	5.84	6.03	6.21	6.40
3.714	6.59	6.77	6.96	7.15	7.34	7.53	7.71

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Line

Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)
1.868	0.07	0.11	0.17	0.24	0.32	0.41	0.51
2.176	0.63	0.75	0.88	1.02	1.16	1.31	1.46
2.483	1.61	1.77	1.93	2.09	2.26	2.43	2.60
2.791	2.77	2.94	3.12	3.29	3.47	3.65	3.83
3.099	4.01	4.19	4.37	4.55	4.73	4.92	5.10
3.407	5.28	5.47	5.65	5.84	6.03	6.21	6.40
3.714	6.59	6.77	6.96	7.15	7.34	7.53	7.71

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow			
				Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
4.022	7.90	8.09	8.28	8.47	8.65	8.84	9.02
4.330	9.21	9.38	9.56	9.73	9.90	10.07	10.24
4.637	10.40	10.56	10.71	10.87	11.02	11.17	11.32
4.945	11.46	11.61	11.75	11.89	12.03	12.17	12.31
5.253	12.45	12.58	12.72	12.85	12.98	13.12	13.25
5.561	13.37	13.50	13.63	13.76	13.88	14.01	14.13
5.868	14.25	14.37	14.49	14.61	14.73	14.85	14.97
6.176	15.10	15.24	15.38	15.54	15.72	15.92	16.13
6.484	16.37	16.63	16.90	17.20	17.51	17.83	18.17
6.791	18.52	18.87	19.24	19.62	20.00	20.39	20.78
7.099	21.18	21.57	21.97	22.37	22.75	23.13	23.49
7.407	23.84	24.18	24.50	24.80	25.10	25.38	25.64
7.714	25.90	26.15	26.39	26.62	26.85	27.08	27.30
8.022	27.52	27.74	27.97	28.22	28.50	28.82	29.20
8.330	29.66	30.21	30.85	31.59	32.42	33.35	34.37
8.638	35.46	36.63	37.85	39.12	40.43	41.78	43.15
8.945	44.55	45.97	47.40	48.86	50.35	51.87	53.45
9.253	55.08	56.79	58.59	60.49	62.49	64.61	66.86
9.561	69.34	72.14	75.52	79.76	85.35	92.87	103.03
9.868	116.91	135.07	157.50	183.83	212.88	242.47	269.74
10.176	292.26	307.91	315.70	316.07	310.06	298.95	284.36
10.484	266.80	247.93	229.01	211.09	194.67	180.25	167.59
10.792	156.12	145.72	136.33	127.86	120.22	113.41	107.34
11.099	101.89	97.01	92.63	88.73	85.20	82.05	79.20
11.407	76.64	74.33	72.24	70.37	68.67	67.13	65.73
11.715	64.44	63.24	62.11	61.04	60.01	59.02	58.08
12.022	57.19	56.36	55.58	54.85	54.16	53.48	52.83
12.330	52.20	51.60	51.02	50.46	49.92	49.40	48.90
12.638	48.42	47.95	47.49	47.04	46.60	46.17	45.74
12.945	45.31	44.89	44.48	44.06	43.65	43.24	42.83
13.253	42.42	42.02	41.61	41.21	40.80	40.40	40.00
13.561	39.59	39.19	38.79	38.38	37.98	37.58	37.17
13.869	36.77	36.37	35.96	35.56	35.16	34.76	34.36
14.176	33.97	33.59	33.23	32.88	32.55	32.24	31.96
14.484	31.70	31.47	31.25	31.06	30.88	30.72	30.57
14.792	30.44	30.31	30.19	30.07	29.96	29.86	29.75
15.099	29.66	29.56	29.47	29.38	29.29	29.20	29.12
15.407	29.03	28.95	28.86	28.78	28.70	28.62	28.53
15.715	28.45	28.37	28.29	28.21	28.13	28.05	27.97
16.023	27.89	27.81	27.73	27.65	27.57	27.49	27.41
16.330	27.33	27.25	27.17	27.09	27.01	26.93	26.85
16.638	26.77	26.69	26.61	26.53	26.45	26.37	26.29
16.946	26.21	26.13	26.05	25.97	25.89	25.81	25.73
17.253	25.65	25.57	25.48	25.40	25.32	25.24	25.16
17.561	25.08	25.00	24.92	24.84	24.76	24.68	24.60
17.869	24.52	24.44	24.36	24.28	24.20	24.11	24.03
18.176	23.95	23.87	23.79	23.71	23.63	23.55	23.47
18.484	23.39	23.31	23.23	23.15	23.06	22.98	22.90
18.792	22.82	22.74	22.66	22.58	22.50	22.42	22.34
19.100	22.25	22.17	22.09	22.01	21.93	21.85	21.77
19.407	21.69	21.61	21.52	21.44	21.36	21.28	21.20

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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.044 hr (cfs)	(cfs)	(cfs)
19.715	21.12	21.04	20.96	20.88	20.79	20.71	20.63
20.023	20.55	20.47	20.39	20.31	20.23	20.14	20.06
20.330	19.98	19.90	19.82	19.74	19.66	19.57	19.49
20.638	19.41	19.33	19.25	19.17	19.09	19.00	18.92
20.946	18.84	18.76	18.68	18.60	18.52	18.43	18.35
21.254	18.27	18.19	18.11	18.03	17.95	17.86	17.78
21.561	17.70	17.62	17.54	17.46	17.37	17.29	17.21
21.869	17.13	17.05	16.97	16.88	16.80	16.72	16.64
22.177	16.56	16.48	16.39	16.31	16.23	16.15	16.07
22.484	15.99	15.90	15.82	15.74	15.66	15.58	15.50
22.792	15.41	15.33	15.25	15.17	15.09	15.00	14.92
23.100	14.84	14.76	14.68	14.60	14.51	14.43	14.35
23.407	14.27	14.19	14.10	14.02	13.94	13.86	13.78
23.715	13.70	13.61	13.53	13.45	13.37	13.29	13.20
24.023	13.11	12.97	12.75	12.44	12.01	11.42	10.67
24.331	9.80	8.87	7.91	6.96	6.04	5.19	4.42
24.638	3.73	3.14	2.66	2.26	1.92	1.63	1.38
24.946	1.17	0.99	0.84	0.71	0.60	0.51	0.43
25.254	0.36	0.31	0.26	0.22	0.18	0.15	0.13
25.561	0.10	0.09	0.07	0.06			

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STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
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Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm			
			2-Yr (cfs)	10-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)
Proposed	0.15		67.0	173.8	227.5	316.1
OUTLET	0.15		67.0	173.8	227.5	316.1

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STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	----- Rate (cfs)	----- Rate (csm)
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ATTACHMENT 2

CONSTRUCTION COST ESTIMATE
FOR THE
CONCEPTUAL DRAINAGE SYSTEM

**Kihei Residential Project
 Conceptual Drainage System
 Conceptual Cost Estimate (2006 Dollars)
 2/23/07**

Item	Quantity	Unit Cost	Total Cost
18-inch RCP Drain	2,800 LF	\$240	\$672,000
24-inch RCP Drain	2,100 LF	\$260	\$546,000
36-inch RCP Drain	6,900 LF	\$275	\$1,897,500
42-inch RCP Drain	2,500 LF	\$300	\$750,000
54-inch RCP Drain	1,850 LF	\$360	\$666,000
Standard Catch Basin / Manhole	48 EA	\$8,000	\$384,000
Special Catch Basin / Manhole	18 EA	\$12,000	\$216,000
6' x 5' Box Drain	1,050 LF	\$900	\$945,000
10' x 6' Box Drain	400 LF	\$1,300	\$520,000
12' x 9' Box Drain	500 LF	\$2,000	\$1,000,000
Box Drain Outlet Headwall	3 EA	\$40,000	\$120,000
TOTAL DRAINAGE SYSTEM			\$7,716,500

ATTACHMENT 3

STORM WATER QUALITY CONTROL
CALCULATIONS

REFERENCES

1. Soil Erosion and Sedimentation Control, Maui County Code Chapter 20.08
2. Rules Relating to Storm Drainage Standards, January 2000, Department of Planning and Permitting, City and County of Honolulu

METHODOLOGY

1. Reference 1 has no guidance on design volume or flow rate, so Reference 2 will be used.

CALCULATIONS

Detention-Based Water Quality Control

1. Design Volume

- a. Runoff Coefficient

$$C = 0.05 + (0.009) * (IMP)$$

Where: C = Runoff coefficient
 IMP = Impervious Area, expressed as a percentage

For the proposed development:

$$IMP = 64$$

Type	Ac	% IMP	IMP Ac
Open/Park	16.0	0%	0.0
Roads	31.5	100%	31.5
Business / Commercial	1.9	80%	1.5
Multi-Family (Lots only)	8.6	60%	5.2
Single-Family (Lots only)	36.1	60%	21.6
	94.1	64%	59.8

$$C = 0.626$$

- b. Design storm size: 1-inch storm

- c. Volume Calculation

$$WQDV = C * 1" * A * 3630$$

Where: WQDV = Water Quality Design Volume, cubic feet
 C = Runoff coefficient
 A = Area of site, acres
 3630 = Conversion factor

For the proposed development:

$$WQDV = 213,885 \text{ cubic feet} \qquad 4.91 \text{ Ac-ft}$$

- 2. Detention Time
 - a. Draw-down time: greater than 48 hours
 - b. Draw-down time for bottom half: greater than 36 hours
- 3. Outlet size: greater than 4 inches

Flow-Through Based Water Quality Control

- 1. Flow Rate
 - a. Runoff Coefficient
 - b. Hourly Rainfall Intensity: 4 inches
 - c. Flow Calculation

C = 0.7 (Table 2)

$$WQFR = C * 4" * A$$

Where: WQFR = Water Quality Flow Rate, cfs
C = Runoff coefficient
A = Area of site, acres

For the proposed development:

WQDV = 264 cfs 0.01 Ac-ft