LINDA LINGLE
GOVERNOR

ANTHONY J.H. CHING
EXECUTIVE OFFICER

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

June 30, 2004

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813-2437

Dear Ms. Salmonson:

Subject: LUC Docket No. A03-745/Hanohano, LLC
Finding of No Significant Impact (FONSI)
Keahua, Kula, Maui, Hawaii
Tax Map Key: 2-3-11: 1 and 2

On June 24, 2004, the Land Use Commission (LUC) made a determination that the subject project will not have significant environmental effects and issued a FONSI. The determination was based on the LUC's review of the comments received during the 30-day public comment period.

We respectfully request the publication of this notice in the next available issue of The Environmental Notice.

We have enclosed a completed OEQC Publication Form, project summary, and four copies of the Final Environmental Assessment.

A copy of the Commission's Order reflecting its action of June 24, 2004, will be provided to you under separate cover.

Please feel free to contact Bert Saruwatari of my office at 587-3822, should you require clarification or any further assistance.

Sincerely,

ANTHONY J. H. CHING
Executive Officer

Enclosures

Final
Environmental Assessment

PROPOSED
KUALONO SUBDIVISION

Prepared for:

Hanohano LLC
and
Accepting Authority:
State Land Use Commission

June 2004

MUNEKIYO & HIRAGA, INC.

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Preface

Hanohano LLC proposes to develop 28.695 acres of land at Pukalani, Maui, Hawaii for the Kualono Subdivision. The proposed action will involve the consolidation and resubdivision of TMK 2-3-11:01 and 02 (the subject property) to create 49 single-family residential house lots ranging in size from approximately 18,000 to 34,000 square feet. The installation of landscaping, utilities, and related infrastructure improvements for the subdivision are also proposed. The construction of homes and the installation of individual wastewater systems for each lot will be the responsibility of individual lot buyers.

Since the proposed action will involve the use of State and County lands (roadway right-of-way), this Environmental Assessment (EA) has been prepared as required by Chapter 343, Hawaii Revised Statutes, to document the project's technical characteristics and environmental impacts and alternatives, as well as advance findings and conclusions relative to the significance of the project.

I. PROJECT OVERVIEW

A. PROJECT LOCATION, EXISTING USE, AND LAND OWNERSHIP

The applicant, Hanohano LLC, proposes to develop 28.695 acres of land at Pukalani, Maui, Hawaii for house lots for the proposed Kualono Subdivision, a project consisting of 49 single-family residential house lots. See Figure 1. The Kualono Subdivision site is identified by two (2) contiguous parcels: TMK 2-3-11:01 containing 14.401 acres, and TMK 2-3-11:02 comprising 14.294 acres. See Figure 2. For purposes of this document, Parcels 1 and 2 are referred to herein as the subject property.

The subject property is currently vacant and occupied by various grasses and shrubs, as well as by scattered silver oak and Christmas berry trees. A heiau also lies within the southwestern part of the site. Although the property was formerly utilized for pineapple cultivation, it has lay fallow for a number of years. Access to the subject property is provided by the Old Haleakala Highway which borders the property to the northeast.

The subject property is located in the State "Agricultural" district as reflected by the State Land Use Commission's district boundary map for this area of the island. In addition, the property is designated for "Single-Family Residential" use by the Makawao-Pukalani-Kula Community Plan and is deemed zoned for "R-3, Residential District" use.

Parcel 1 is owned in fee simple by Curtis and Pauline Harada, while Parcel 2 is owned by EKR, Inc. The subject property is currently in the process of being transferred to the applicant.

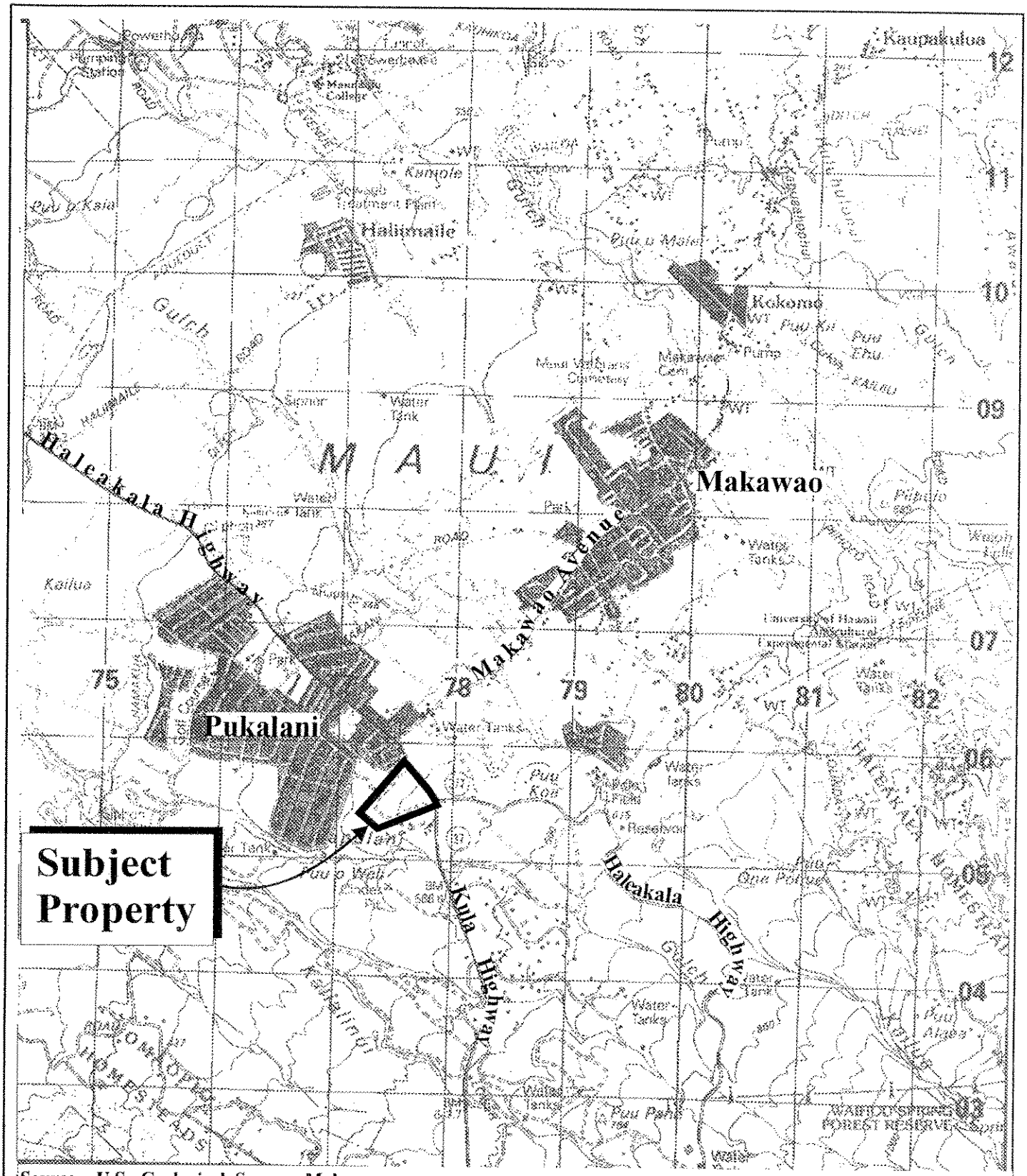


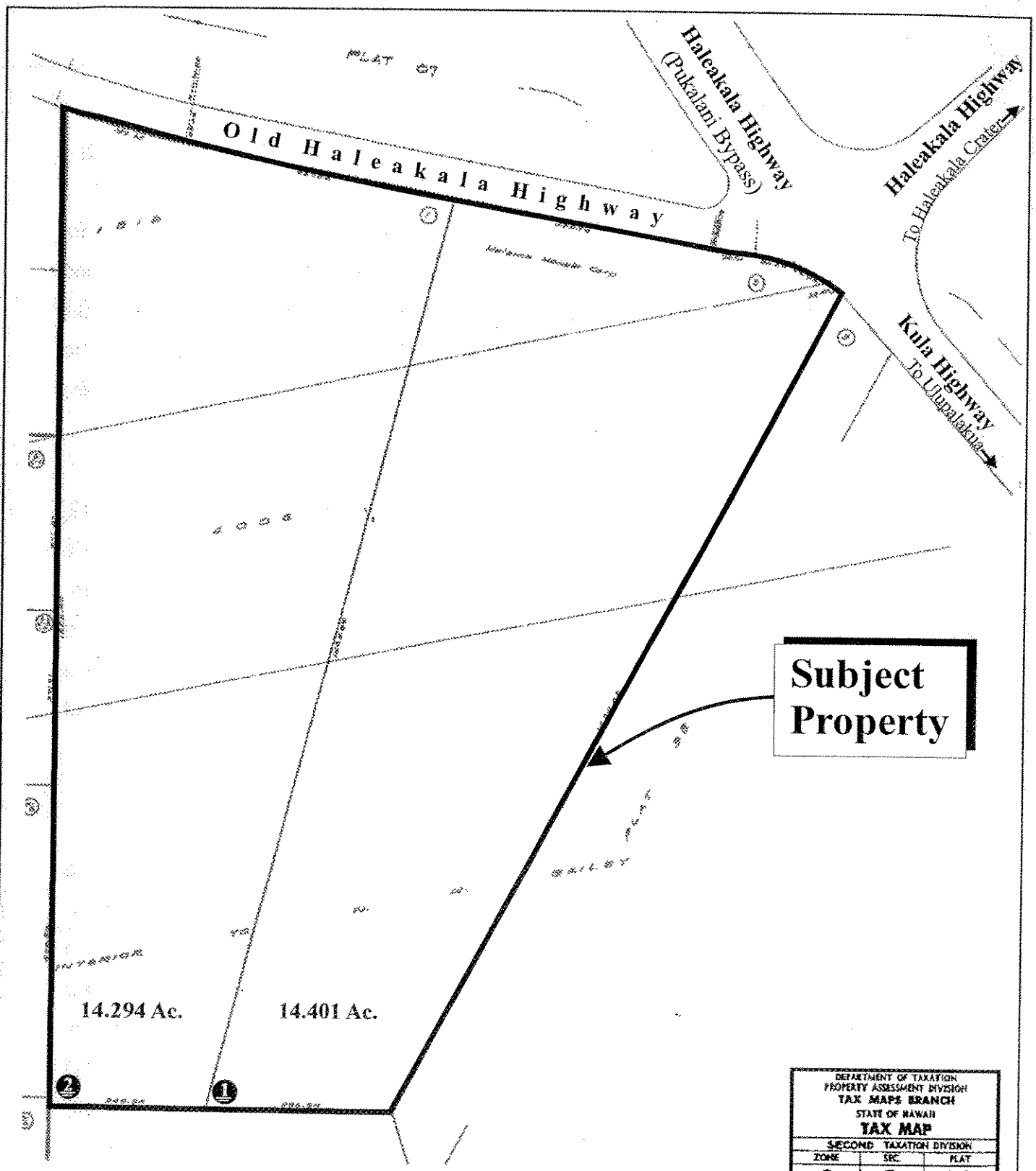
Figure 1 Proposed Kualono Subdivision

Regional Location Map

0 25,000 Inches
12,500 50,000

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.



Source: Department of Taxation

Figure 2 Proposed Kualono Subdivision

Parcel Location Map

0 100 Feet
50 200

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.

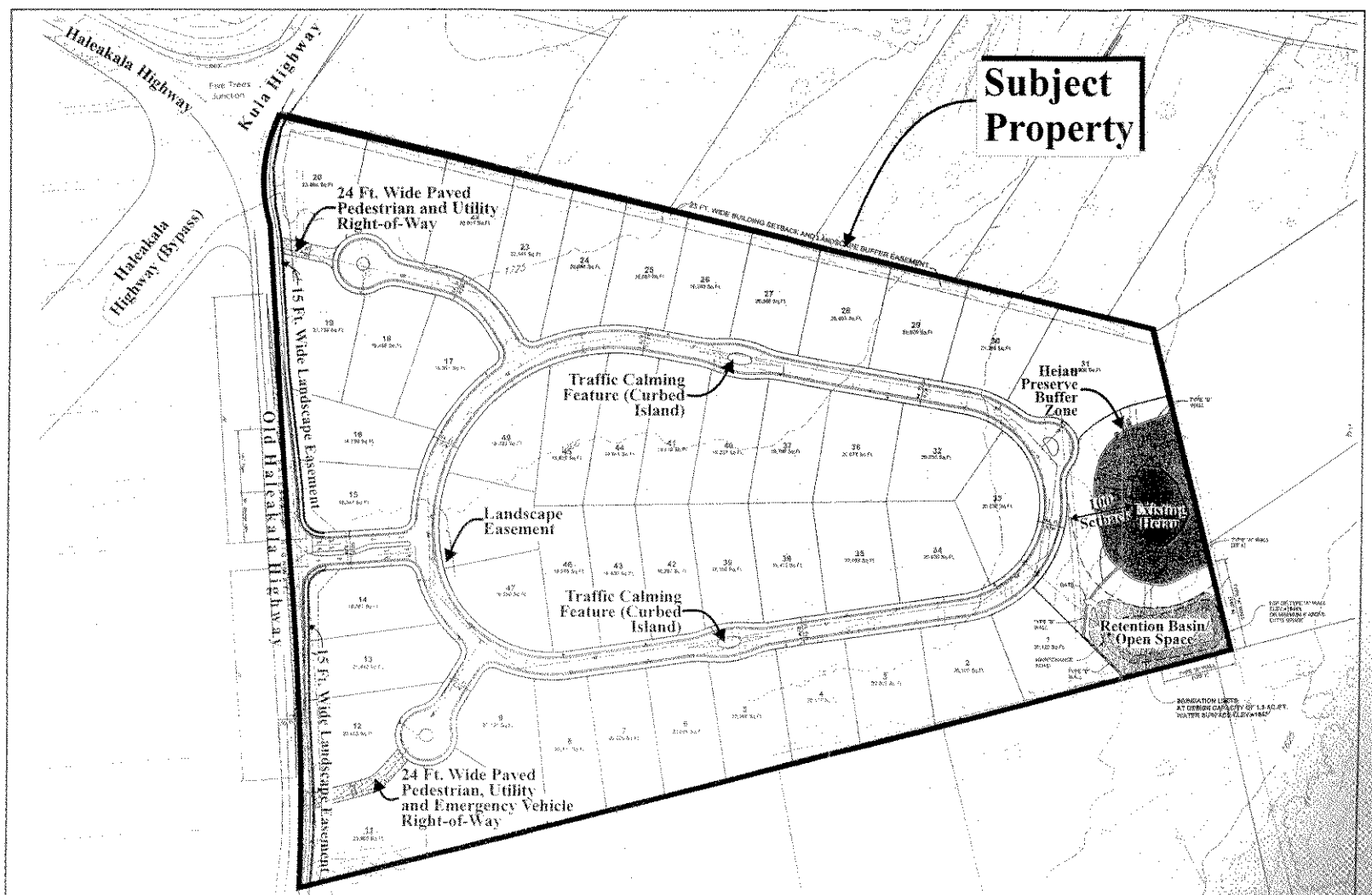
B. BACKGROUND

To enable the development of the proposed Kualono Subdivision, the subject property will require a District Boundary Amendment. Accordingly, a petition to amend the property's State land use district boundary (from Agricultural to Urban) has been filed with the State Land Use Commission to establish the appropriate State land use classification for the subject property. With the approval of the preceding request, the appropriate long-term State land use designation will be established for the subject property.

It should be noted that the subject property was the subject of a July 12, 1982 District Boundary Amendment (A81-514) which changed the State land use classification of the parcels from Agricultural to Urban. Subsequently on August 14, 1987, a decision and order by the State Land Use Commission reclassified the parcels for Agricultural use due to a previous petitioner's noncompliance with the conditions of the District Boundary Amendment approval.

C. PROPOSED ACTION

Since the preparation of the Draft Environmental Assessment (EA), the conceptual site development plan for the proposed project has been modified in response to comments received on the Draft EA. See Figure 3 and Appendix "A", Preliminary Development Plans (the revised plans contained in Appendix "A" supersede all previous plans in this document). The changes to the site development plan include: (1) demarcating the heiau (Site 2701) and retention basin as individual, dedicated areas; (2) providing a 3-foot freeboard for the retention basin; (3) eliminating the street plug adjacent to the heiau and increasing the land area of Lot 31 due to the deletion of the street plug; (4) modifying the paved pedestrian/utility right-of-way between the cul-de-sac on the makai



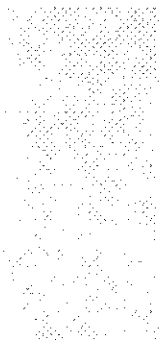
Source: Warren S. Unemori Engineering, Inc.

Figure 3

Proposed Kualono Subdivision
Conceptual Development Plan

NOT TO SCALE

Prepared for: Hanohano LLC



side of the subdivision and the Old Haleakala Highway to accommodate emergency vehicle use. The following is an updated description of the proposed action with the preceding changes.

The subject property is currently vacant and undeveloped. See Appendix "A-1". The applicant seeks to consolidate Parcels 1 and 2 into a single lot consisting of 28.695 acres and then subdivide the consolidated parcel to create 49 single-family residential house lots. The subdivided lots will range in size from approximately 18,000 to 34,000 square feet. As previously noted, separate and distinct areas have been established for the heiau and retention basin. The heiau, with its 100-foot buffer and open space area, will encompass 1.353 acres, while the retention basin and its open space area will cover 0.740 acre. Preliminarily, a dry-stacked, hand-built stone wall will be placed 60 feet from the heiau (except along its south side where the wall will follow the property line). The portion of the buffer zone within the wall will be planted with Native plant species, while the remaining part of the buffer zone will be planted with grass. The retention basin will include a subsurface pipe system and will be situated down slope from the heiau and beyond the 100-foot buffer surrounding Site 2701. A 3-foot freeboard has been incorporated into the design of the retention basin. With the addition of the freeboard, the total capacity of the retention basin has been increased from 1.3 acre-feet to 2.6 acre-feet thereby doubling its design capacity and providing additional storage volume, if needed. (The design capacity is based on a 50-year, 1-hour storm.) A stone wall will be placed around the retention basin for safety and security, while a service road will provide access to the retention basin for maintenance purposes.

Ingress and egress for the subdivision will be provided by an access road with curbed median that lies within a 60-foot wide right-of-way. The

access road will include separate right- and left-turn lanes at its intersection approaches to the Old Haleakala Highway and the subdivision's internal loop road. Traffic circulation within the subdivision will be accommodated by the loop road and two (2) cul-de-sacs near each corner of the subdivision fronting the Old Haleakala Highway. The loop road will be contained within 44-foot wide rights-of-way. Curbed islands will be installed near the midpoints of the east-west segments of the loop road for traffic-calming purposes, while planter islands will be installed in the cul-de-sac turnarounds. All subdivision roadways will be paved and improved with curbs, gutters, and sidewalks. In addition, curb, gutter, and sidewalk improvements will be installed along the subject property's frontage with the Old Haleakala Highway.

Street trees will be installed within planting strips along the subdivision roads. In addition, a 15-foot wide landscape easement will be provided along the subdivision's boundary with the Old Haleakala Highway, while a 25-foot wide building setback and landscape (buffer) easement will be provided along the subdivision's southern boundary. A landscape easement will also be provided at the northeasterly end of the subdivision's internal loop road. In addition, a 24-foot wide paved pedestrian and utility right-of-way that provides access to the Old Haleakala Highway will be established near the easterly corner of the subdivision. The 20-foot wide paved pedestrian and utility right-of-way that was originally proposed near the northern corner of the subdivision will be widened to 24 feet to provide a secondary access for emergency vehicle use.

In addition to the retention basin, the drainage system for the subdivision will consist of concrete curbs, curb inlets, catch basins, and underground drainlines placed within the roadway right-of-way to capture and convey

surface runoff to the retention basin.

In addition to the preceding improvements, site work and the installation of underground utility lines for water, electrical, and telephone services are proposed. Wastewater will be accommodated by individual wastewater systems (i.e., septic tanks with leach fields or seepage pits) which will be installed by individual lot purchasers. The construction of homes will also be the responsibility of each lot owners. In addition, the proposed project will not include accessory dwellings or ohana units. Provisions in this regard will be included in the CC&Rs for the subdivision.

In support of the subdivision, offsite water and roadway improvements are proposed. To provide domestic water service to the subdivision, approximately 200 linear feet (LF) of new 8-inch waterline will be installed within the Kula Highway right-of-way between points near the Five Trees Junction and the subdivision's southern most cul-de-sac. About 320 LF of new 8-inch waterline will be installed within the Old Haleakala Highway right-of-way between points near the subdivision's northerly boundary and cul-de-sac. In addition, a left-turn pocket will be provided within the Old Haleakala Highway right-of-way to facilitate turning movements into the subdivision.

Design and construction for the subdivision, including its infrastructure and offsite improvements, will be coordinated with the appropriate governmental agencies and will be in accordance with applicable regulatory standards.

Based on current market conditions, the preliminary sales prices for the single-family residential lots are expected to range from $250,000.00 to $350,000.00.

Upon the approval of the District Boundary Amendment, the consolidation and resubdivision of Parcels 1 and 2 will commence and take approximately 10 months. The construction bid process, site work, and the construction of subdivision improvements will then follow and are expected to be completed within 18 months. Initial sales of the single-family residential house lots are anticipated to begin by mid 2005, while full build-out of the subdivision is expected to occur by 2010.

II. DESCRIPTION OF THE PHYSICAL ENVIRONMENT

A. PHYSICAL SETTING

1. Climate

The subject property is situated along the windward slopes of Haleakala. The average annual rainfall in the area ranges from 40 to 50 inches with most precipitation occurring during the months of October to April. Average temperatures in the area range from evening lows in the 50's during the winter to daytime highs in the 80's during the summer.

Typical of the Hawaiian Islands, the prevailing winds in the area are the northeast tradewinds. The tradewinds are fairly constant throughout the year with typical wind speeds ranging from 10 to 20 miles per hour, except during the spring and summer months when they are slightly stronger.

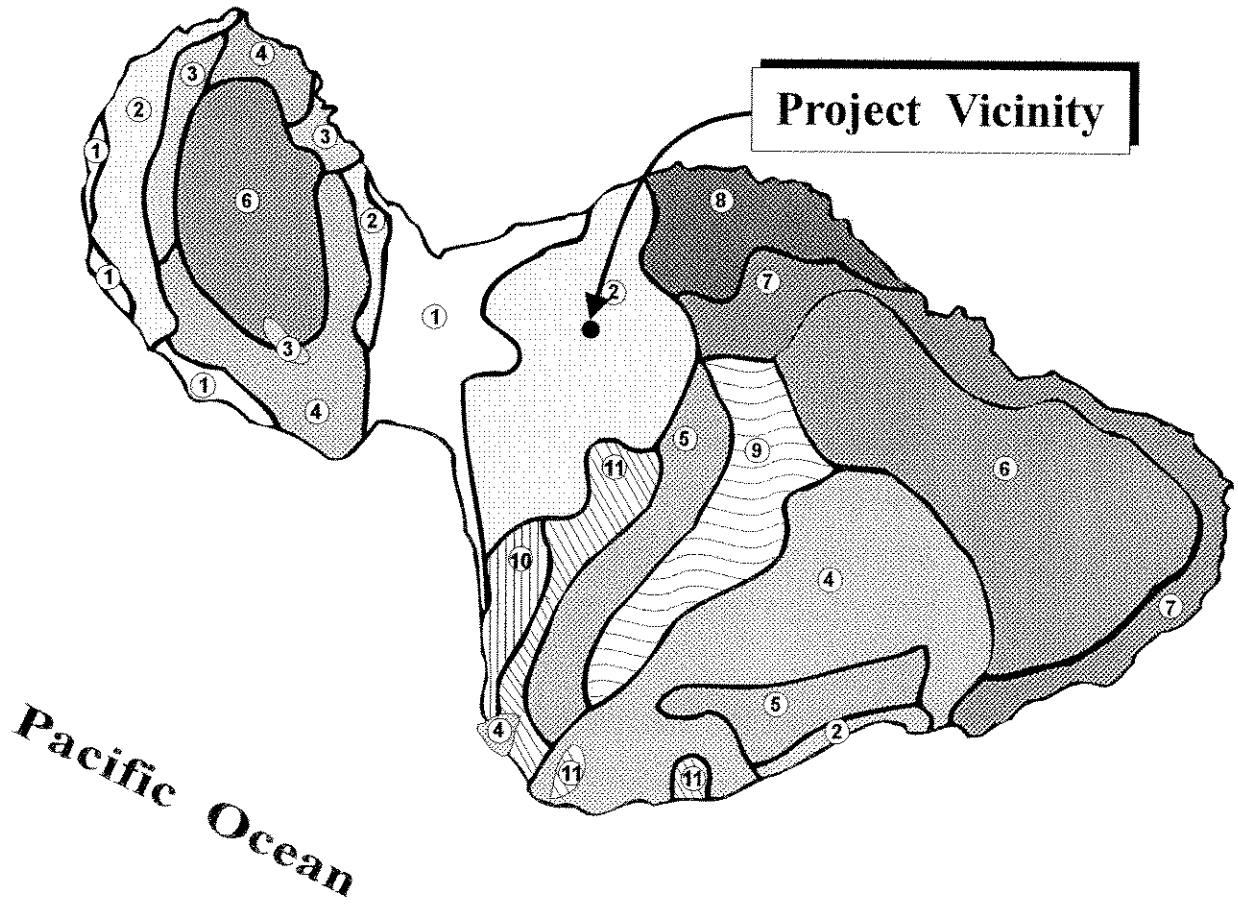
2. Topography and Soils

The subject property is characterized by relatively level and gently sloping terrain. The property generally slopes in a westerly direction at a grade of about 5.5 percent. Onsite elevations range from approximately 1,735 to 1,640 feet above mean sea level.

Underlying the subject property are soils belonging to the Waiakoa-Keahua-Molokai association. See Figure 4. This soil association consists of moderately deep to deep, nearly level to moderately steep, well drained soils on low uplands that have a moderately fine textured subsoil. The soils underlying the subject property include Haliimaile silty clay loam, 3 to 7 percent slopes (HgB) and Keahua silty clay, 7 to 15 percent slopes (KncC). See Figure 5. Haliimaile silty clay loam (HgB) is characterized by

LEGEND

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



Map Source: USDA Soil Conservation Service

Figure 4 Proposed Kualono Subdivision

Soil Association Map

NOT TO SCALE

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.

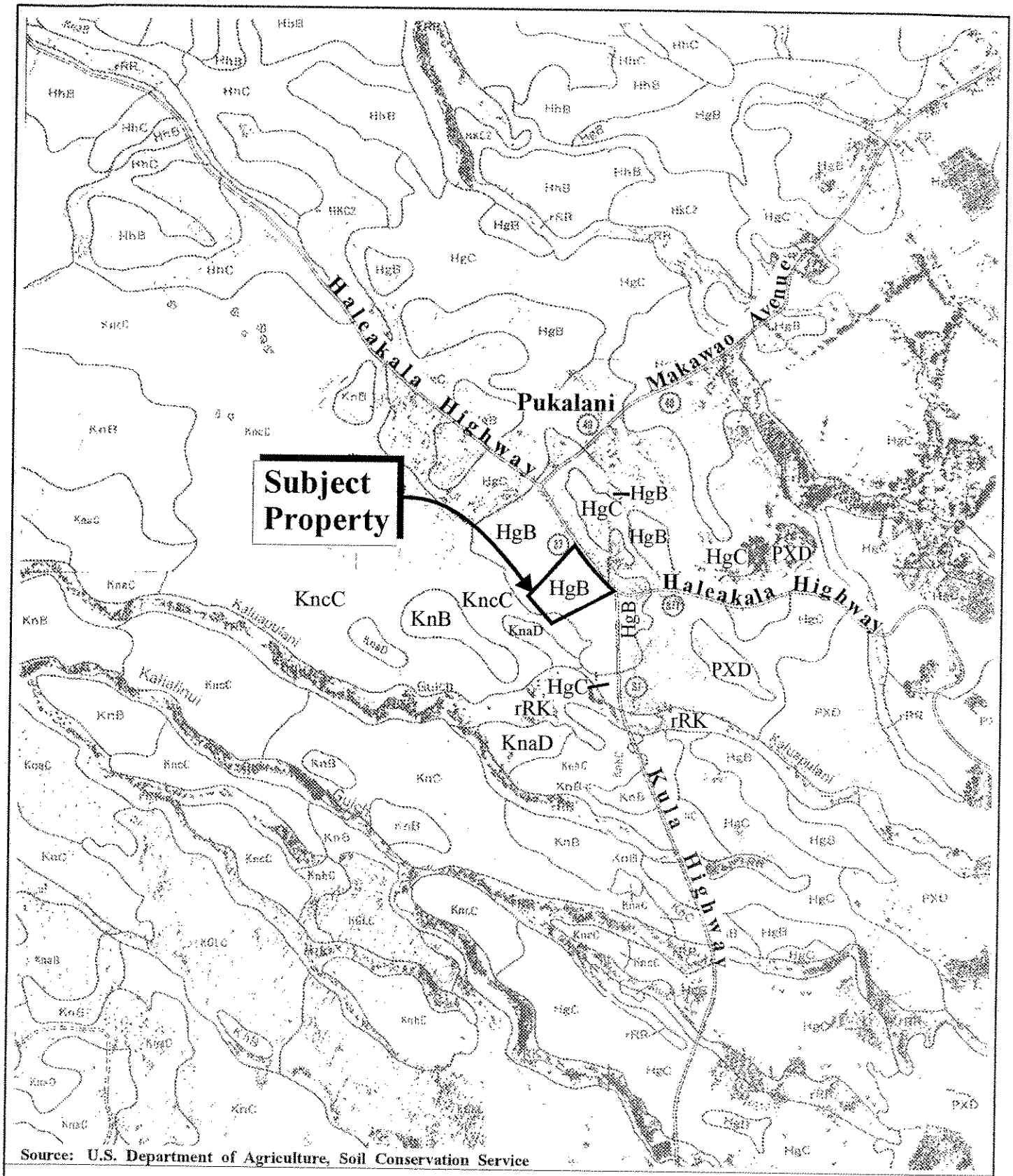


Figure 5 Proposed Kualono Subdivision

Soil Classification Map

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.

moderately rapid permeability, slow runoff, and slight erosion hazard. Keahua silty clay (KncC) is defined by slow to medium runoff and slight to moderate erosion hazard. Both soil types are commonly used for pineapple, pasture, and homesites.

The University of Hawaii Land Study Bureau classifies agricultural productivity characteristics on a scale of "A" to "E", with "A" representing lands with the highest productivity and "E" reflecting lands with the lowest. The letters are appended by numbers which convey information about soil texture, drainage, and stoniness. The land underlying the subject property is classified C21, which reflects soil that is non-stony, deep, fine textured, and well drained. According to this classification, the primary use of this land is for pineapple and sugar cane cultivation.

The State Department of Agriculture has established three (3) categories of Agricultural Lands of Importance to the State of Hawaii (ALISH). "Prime" agricultural lands have the soil quality, growing season, and moisture supply needed to produce sustained high crop yields economically when treated and managed according to modern farming methods. "Unique" agricultural lands possess a combination of soil quality, location, growing season, and moisture supply currently used to produce sustained high yields of a specific crop when treated and managed according to modern farming methods. "Other" agricultural lands include those which have not been rated "prime" or unique". As indicated by the ALISH map of the project area, the land underlying the subject property falls within the "Prime" agricultural lands category. See Figure 6.

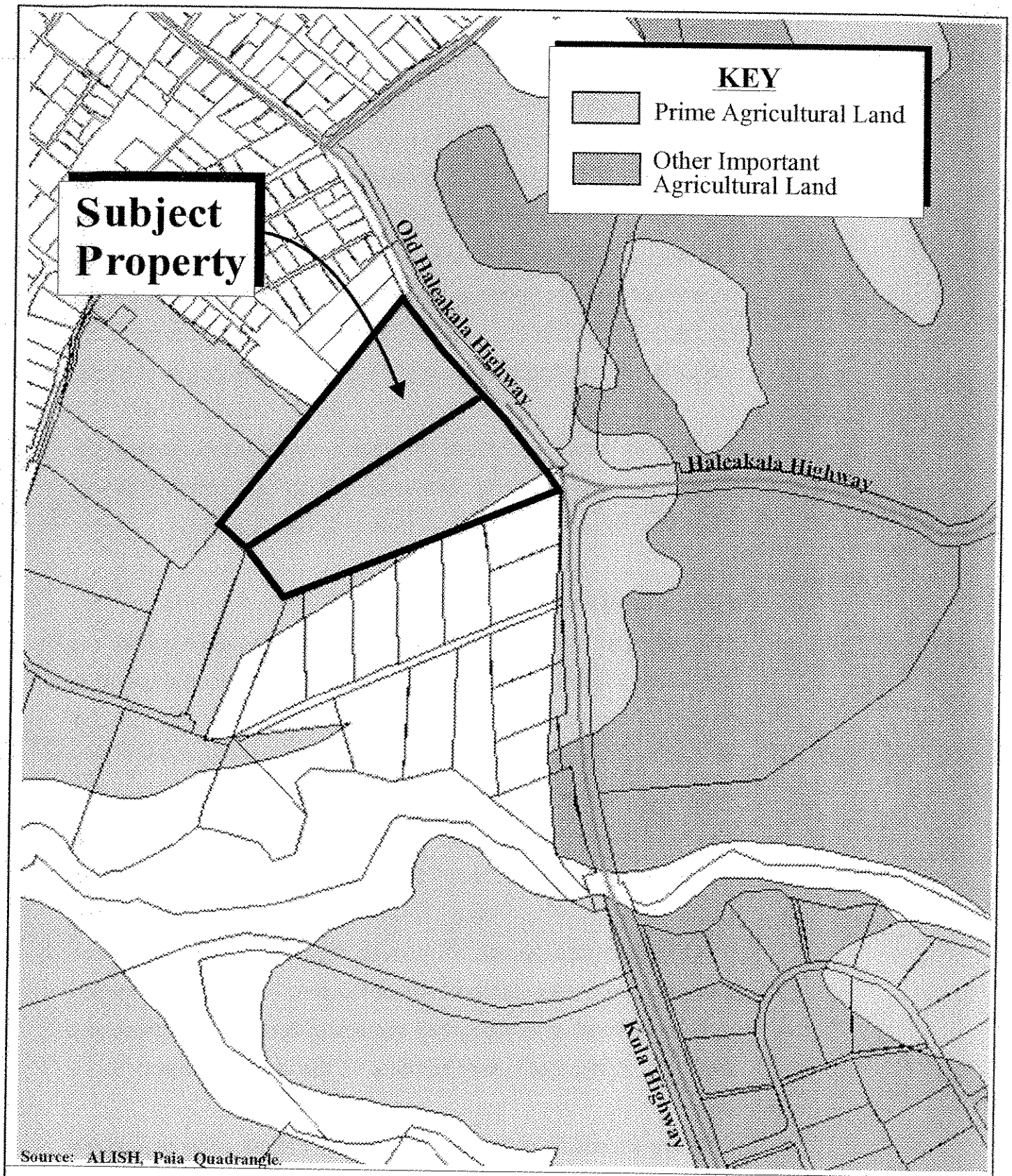


Figure 6 Proposed Kualono Subdivision NOT TO SCALE

Agricultural Lands of Importance to the State of Hawaii

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.

3. *Natural Hazards*

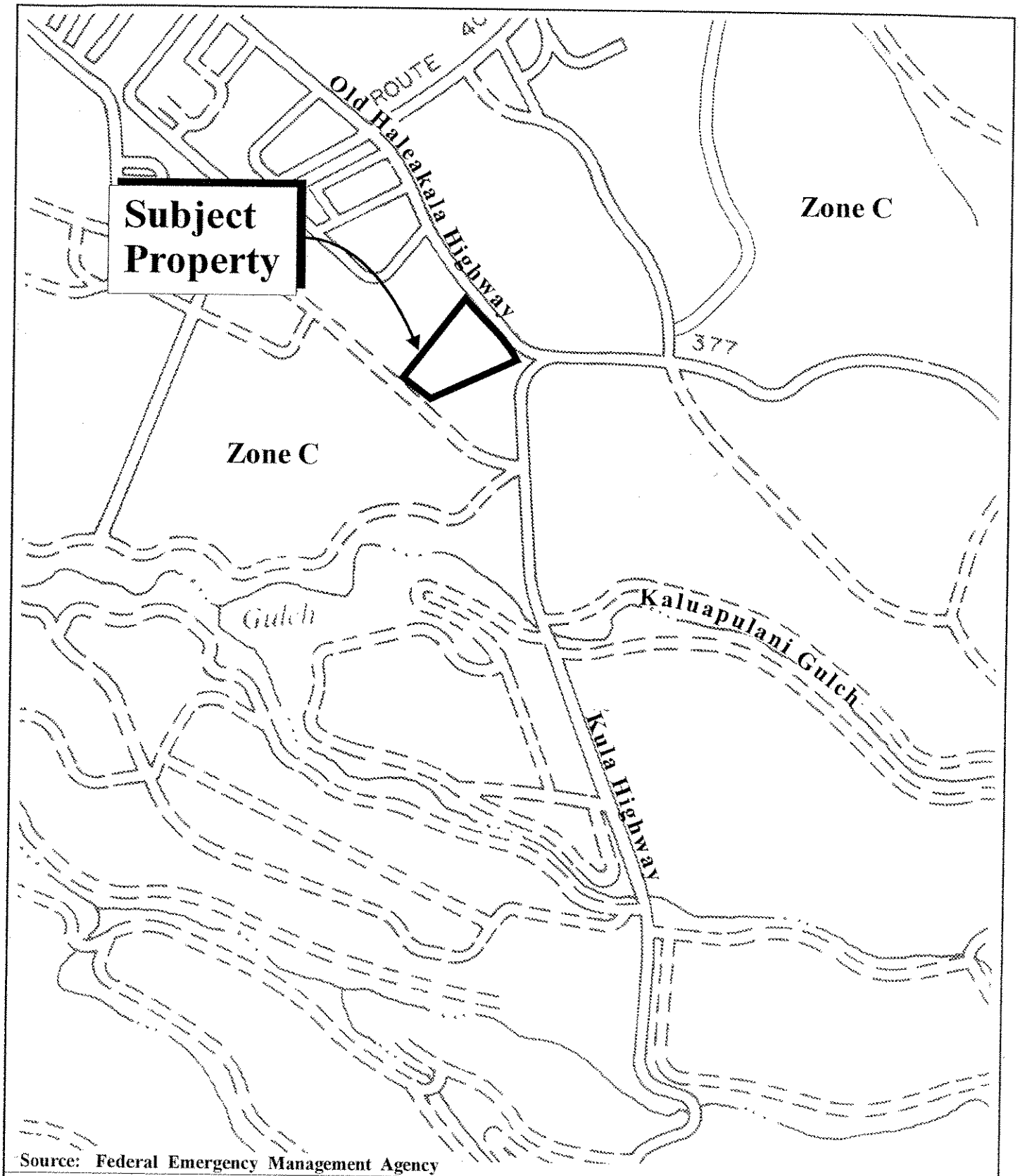
A site inspection of the subject property did not locate any streams or other water bodies on the property. According to the Federal Emergency Management Agency's Flood Insurance Rate Maps for this area of the island, the subject property is situated in Zone C, an area of minimal flooding. See Figure 7. The property is also located well beyond the limits of coastal flooding as indicated by the Civil Defense tsunami inundation maps for the island of Maui.

In addition, while the State of Hawaii experiences occasional earthquakes and volcanic eruptions, the subject property is not situated in an area of active seismic or volcanic activity.

4. *Flora and Fauna*

The subject property was formerly utilized for pineapple cultivation and has lay fallow for a number of years. The subject property is presently vacant and occupied by various grasses and shrubs which form a ground cover ranging in height from 2 to 3 feet. This vegetation, which is common to other undeveloped parcels in the region, includes guinea grass (Panicum maximum), lantana (Lantana camara L.), sensitive plant (Mimosa pudica), prickly pear (Opuntia ficus-indica), agave (Agave sisalana), and koa haole (Leucaena leucocephala). A number of silver oak and Christmas berry trees are also scattered about the site. There are no known rare, threatened, or endangered species of flora, nor are there any wetlands or important plant habitats on the subject project.

With the exception of the Hawaiian hoary bat, all other animal life on the island of Maui are introduced species. Wildlife common to the area include dogs, cats, mice, rats, and the Indian mongoose.



Source: Federal Emergency Management Agency

Figure 7 Proposed Kualono Subdivision

Flood Insurance Rate Map

0 500 Feet
250 1000

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.

Avifauna common to the area include the Common Mynah, House Sparrow, Northern Cardinal, and various species of doves and francolin. Of the various species of birds that have been sighted in the area, the Pacific Golden Plover is the only one indigenous to the Hawaiian Islands (Group 70 International, August 2002).

No known rare, threatened or endangered species of fauna, avifauna, or significant wildlife habitats are found at the subject property.

5. ***Archaeological Resources***

An Archaeological Inventory Survey of the subject property has been conducted. See Appendix "B".

As indicated in the report documenting the findings of the survey, Site 2701 is located within the subject property. This site was previously recorded by Kennedy (1990) as probable *heiau*. A historical and cultural assessment of this *heiau* suggested that this site could be Walker's (1931) Site 224, *Moomoku Heiau*. However, further research needs to be conducted to determine if Site 224 and Site 2701 are the same.

No surface cultural remains or areas of exposed deposits were identified on the surface of the subject property. Due to extensive previous disturbances from pineapple cultivation, backhoe trenches were excavated.

A total of twenty-six (26) backhoe trenches were systematically excavated to determine presence/absence and extent of subsurface cultural remains. No significant surface or subsurface

cultural remains were encountered during the inventory survey. The results of the current investigation produced no evidence for sedentary cultural activities during the prehistoric periods in the subject area, and the background data search also supported this conclusion. However, with the advent of large-scale commercial agricultural activities, the adverse effects of extensive and compounded land clearing and tilling may have effectively impacted and destroyed any remains that may have once existed.

Three (3) trenches were excavated along the exterior boundary of the buffer zone around Site 2701, and two (2) trenches were excavated in the proposed retention basin. One coral fragment was recovered from a trench. However, origin of this fragment could not be established. No other cultural remains were recovered in these trenches.

The results of backhoe testing showed that subsurface cultural remains were absent in all exposed stratigraphic layers. Stratigraphic analysis revealed a three (3) layer stratigraphic sequence. The surface of the entire project area consisted of Layer 1, the till zone. Underlying Layer II was Layer III, varying from silt to silty clay to compact clay. Layer III in one of the trenches was basalt outcrop.

6. ***Air Quality***

There are no point sources of airborne emissions in the immediate vicinity of the subject property. The air quality in the region is considered good, with existing airborne pollutants attributed primarily to vehicle-generated exhaust from traffic along the region's roadways. Other sources of airborne pollutants typically

include dust and equipment emissions resulting from agricultural activities and smoke from sugar cane harvesting operations occurring on the Central Maui plain. These sources are considered intermittent and the generated particulates are quickly dispersed by the prevailing tradewinds.

7. ***Noise***

Noise levels in the region are characteristic of its rural surroundings and are considered relatively low. Ambient noise levels in the vicinity of the subject property are attributed to natural (e.g. wind) conditions, traffic along surrounding roadways, and construction activities in the Kulamalu project area.

8. ***Scenic and Open Space Resources***

Depending on location on the site, the subject property provides expansive upslope views toward the summit of Haleakala, as well as panoramic downslope views of the coastline, Central Maui plain, and the West Maui Mountains. Intermittent views of residential and commercial development in surrounding areas are also visible from parts of the site.

Open spaces in the vicinity of the subject property are characterized by fallow agricultural lands, Haleakala Ranch pasture lands, and Maui Land & Pineapple Company pineapple fields. Downslope of the property, on the Central Maui plain, open spaces are defined by the vast expanse of sugar cane fields cultivated by Hawaiian Commercial & Sugar Co., while open spaces upslope of the property are defined by Haleakala National Park and agricultural lands utilized for farming and ranching activities.

B. COMMUNITY SETTING

1. Community Character

The Makawao-Pukalani-Kula region, also known as Upcountry, is a sprawling agricultural, rural and suburban area on the windward slopes of Haleakala. Farming, cattle ranching, and pineapple cultivation are the predominant agricultural activities within the region. The communities of Makawao and Pukalani are the region's main settlement areas and are characterized by a mixture of residential, commercial, and agricultural land uses. Kula's residential settlements reflect a lower density over a larger area with smaller commercial clusters in Pulehu, Waiakoa, and Keokea. The Upcountry region is also home to many individuals who commute to work in other areas of the island.

Within this region, the subject property is located along the southern outskirts of Pukalani, about 15 miles southeast of the island's population center in Wailuku and Kahului. The property is located near the intersection of the Old Haleakala Highway, Haleakala Highway, and Kula Highway.

2. Land Use History

According to current Maui County real property tax records, Parcel 1 is described as Lot 2 of the Phillips Estate Subdivision, while Parcel 2 is identified as Lot 1 of the same subdivision. Based on real property title records dating back to 1944, Maria P. Felix was identified as the owner of Parcel 1, while Rose P. Pires and her husband Victorino were the owners of Parcel 2. Since then, both parcels have either been leased or changed ownership numerous times. In more recent times, Parcel 1 had been owned by Malama Mohala Corp. until it was purchased by current owner Curtis Y.

Harada and his wife Pauline on April 28, 2000. Similarly, Parcel 2 was also owned by Malama Mohala Corp. until its sale to present owner EKR Inc. on April 28, 2000.

According to real property tax records, Parcels 1 and 2 were leased to Libby McNeill & Libby on November 30, 1944 for pineapple cultivation. Over the years, both parcels were utilized for this purpose until a number of years ago when agricultural activities ceased and these lands were allowed to lie fallow.

3. Surrounding Land Uses

The subject property is bordered on the northeast by the Old Haleakala Highway, and a vacant 40-acre agricultural-zoned parcel which is the site of Maui Land & Pineapple Company's Upcountry Town Center, a mixed use development of proposed office, civic, commercial, cottage industry, senior/multi-family residential uses. King Kekaulike High School lies across the highway to the southeast. Scattered homes and vacant lots lie along the southerly boundary of the property, as well as along its northerly and westerly borders. The Kulamalu project area, which includes the Kulamalu Town Center (under construction) and the Maui Campus of Kamehameha Schools, lies less than a mile south of the subject property.

C. SOCIO-ECONOMIC ENVIRONMENT

1. Population

The population of the County of Maui has exhibited relatively strong growth over the past decade with the 2000 population at 128,241, a 27.6 percent increase over the 1990 population of 100,504 (SMS, June 2002). Growth in the County is expected to continue, with the

resident population for the year 2010 projected to be 151,269 (SMS, June 2002).

Just as the County's population is estimated to grow, the resident population of the Makawao-Pukalani-Kula Community Plan region has also increased. In 2000, the population of the Makawao-Pukalani-Kula region was 21,571 (SMS, June 2002). The resident population in the region is projected to increase to 25,237 in the year 2010 and 28,974 in 2020 (SMS, June 2002).

2. ***Economy***

Tourism and agriculture are major components of Maui's economy and provide for much of the island's economic stability.

The economy of the Makawao-Pukalani-Kula region is very dependent on agriculture. The rich Upcountry soil serves as the foundation for various agricultural activities and has made the region renown for the quality of its produce and flowers which are exported to domestic, mainland, and international markets. The region's farms produce a variety of crops, including corn, onions, cabbages, tomatoes, and strawberries, as well as protea and carnations. Dairy and poultry production, as well as cattle ranching and sheep and llama herding, comprise other important elements of the region's agriculture-based economy.

Large-scale agricultural cultivation in the region is defined by Maui Land & Pineapple Company's pineapple operations and Hawaiian Commercial & Sugar Company's sugar cane activities.

3. *Agriculture*

On the island of Maui, State Agricultural district lands encompass 245,783 acres of the island's 465,800 total acres (Maui County Data Book, 2001). The 28.695 acres that comprise the subject property represents 0.0001 percent of the lands that are available on Maui for State Agricultural district use.

The soils of the subject property are rated as prime agricultural land according to the area location map of the Agricultural Lands of Importance to the State of Hawaii. The soils of the property are rated "C" by the University of Hawaii Land Study Bureau which evaluates land on a scale of "A" to "E" with "A" lands having the highest productivity rating and "E" lands the lowest.

The subject property was leased to Libby McNeil & Libby for pineapple cultivation in 1944. The property has been utilized for this purpose by various owners and lessees throughout the years until a number of years ago when this use was discontinued and the land lay fallow.

D. *PUBLIC SERVICES*

1. *Police and Fire Protection*

Police service for the County of Maui is provided by the Department of Police which is headquartered at the Central Station along Mahalani Street in Wailuku, approximately 11 miles northwest of the subject property. The Central Station provides administrative, support, and patrol services for the department's operations in the following districts: Wailuku (District 1), Lanai (District 2), Hana (District 3), Lahaina (District 4), Molokai (District 5), and Kihei (District 6).

District 1, which serves the community plan regions of Wailuku-Kahului, Paia-Haiku, and Makawao-Pukalani-Kula, is divided into three (3) sectors with a total of 11 motorized beats. The Makawao-Pukalani-Kula region, along with the Paia-Haiku region, comprise the District 1 Country Sector. The Country Sector is divided into five (5) motorized beats, two (2) of which patrol the Makawao-Pukalani-Kula region. Each beat is patrolled by a single police officer (R.M. Towill, July 2002). A police substation at the Eddie Tam Memorial Center complex in Makawao is situated about 2 miles to the northeast of the subject property. In addition, a police service center will be located at the Kulamalu Town Center which is situated less than 1 mile to the south of the subject property.

The Department of Fire Control provides fire prevention, protection, and suppression services for the County of Maui. The department is headquartered at the Kahului Station along Dairy Road, approximately 9 miles northwest of the subject property. The Kahului Station provides administrative and support services for the department's operations throughout Maui County.

The department has two (2) fire stations which serve the Makawao-Pukalani-Kula community plan region. Situated about 0.5 mile to the northeast of the subject property, the Makawao Station is located along Makawao Avenue near the Haleakala Highway in Pukalani. The Makawao Station's service area includes the entire Makawao-Pukalani-Kula community plan region, as well as the eastern portion of the Paia-Haiku community plan region around upper Haiku. The Kula Station is located along Kula Highway approximately 5.5 miles south of the subject property. The service area of the Kula Station covers portions of Pukalani, upper Kula, and the area towards Keokea (R.M. Towill, July 2002).

2. ***Medical Facilities***

Located along Mahalani Street in Wailuku, about 11 miles to the northwest of the subject property, Maui Memorial Medical Center (MMMC) in the only acute care facility serving Maui County. Licensed for 199 beds, and offering a wide range of patient services, MMMC is owned by the State of Hawaii and operated by Hawaii Health Systems Corporation (HHSC).

Situated in the Upcountry region, Kula Hospital and Clinic is located at Keokea Place in Kula, approximately 9 miles south of the subject property. This facility, which is also owned by the State and operated by HHSC, is licensed for a total of 115 beds. Of these beds, 2 beds are for acute care patients, 9 beds are for the developmentally disabled, and 104 beds are for patients requiring skilled nursing and long-term care. The facility also provides physical and occupational rehabilitation services for its patients. In addition, Kula Hospital and Clinic contains a Clinical Laboratories of Hawaii facility which serves both patients and the community, as well as a community out-patient clinic which is open on weekdays from 9:00 a.m. to 5:00 p.m. and is staffed by a physician, a registered nurse, and a clerk (Kula Hospital and Clinic, July 2003).

In addition to the preceding medical facilities, a number of physicians and dentists in Pukalani and Makawao serve the health care needs of the region's residents.

3. ***Schools***

The State Department of Education (DOE) operates five (5) public schools in the Upcountry region: Makawao Elementary School, Pukalani Elementary School, Kula Elementary School, Kalama

Intermediate School, and King Kekaulike High School. Makawao, Pukalani, and Kula Elementary Schools serve students from Kindergarten to Grade 5, while Kalama Intermediate School accommodates students from Grades 6 to 8. Students in Grades 9 to 12 attend King Kekaulike High School.

Makawao Elementary School is located along Ukiu Road in Makawao Town, about 2 miles to the northeast of the subject property, while Pukalani Elementary School is situated along Iolani Street in the town of Pukalani, approximately 0.5 mile northwest of the property. Kula Elementary School is located along the Kula Highway, about 5.5 miles to the south of the subject property, while Kalama Intermediate School is situated along Makani Road in Makawao, approximately 1.5 miles northeast of the property. King Kekaulike High School lies immediately east of the subject property at the intersection of the Old Haleakala Highway, Haleakala Highway, and Kula Highway.

According to the DOE, the student enrollments of these schools for the 2002 to 2003 school year are as follows: Makawao Elementary School - 509, Pukalani Elementary School - 409, Kula Elementary School - 423, Kalama Intermediate School - 1,150 and King Kekaulike High School - 1,396 (Department of Education, April 2003).

The Upcountry region is also served by several private schools such as St. Joseph School (Grades K to 6), Haleakala School (Grades K to 8), Seabury Hall (Grades 6 to 12), and the Maui Campus of Kamehameha Schools (Grades K to 9).

4. *Recreational Facilities*

County parks and recreational facilities in the Upcountry region are maintained by the Department of Parks and Recreation (DPR) and consist of three (3) neighborhood parks and five (5) district parks encompassing a total of 105.6 acres. In addition, the region contains two (2) sport courts, three (3) gyms, five (5) community centers, six (6) tennis courts, and 21 sport fields. The region's public elementary, intermediate, and high schools also include recreational space and facilities (R.M. Towill, June 2002).

Parks and recreational facilities in the vicinity of the subject property include the DPR's Upcountry District Complex, as well as the Eddie Tam Memorial Center Complex. The Upcountry District Complex is located along Pukalani Street, about 0.5 mile to the northwest of the property and includes a playground, sport fields, a jogging path, a swimming pool, basketball courts, and a community center. The Eddie Tam Memorial Center complex, which is situated along Makawao Avenue approximately 1.5 miles northeast of the subject property, includes a gym, sport fields, and a community center, as well as tennis and basketball courts (Department of Parks and Recreation, July 2003). In addition, a park in the Kulamalu project area is currently under construction and is anticipated to be completed in the fall of 2005. This park will have a field to accommodate soccer and Pop Warner football activities.

Located along the upper slopes of Haleakala, Polipoli State Park and Haleakala National Park are State and Federal recreational facilities which provide residents with opportunities for hiking, camping, and sight seeing.

5. *Solid Waste*

Except for the Hana Landfill, the Central Maui Landfill serves the entire island of Maui, including the Makawao-Pukalani-Kula region. This County landfill is operated by the Department of Public Works and Environmental Management (DPWEM) and is situated along Pulehu Road on the Central Maui plain, about 6 miles to the northwest of the subject property. The Central Maui landfill accepts all types of waste material except for hazardous waste, demolition debris, and remnant construction materials. The landfill presently provides 1,050 cubic yards of space to bury the 420 tons of waste it receives on an average daily basis (R.M. Towill, June 2002).

Green waste is accommodated by Eko Compost, which is located at the Central Maui Landfill and provides this service under a contract with the County of Maui and Maui Earth Organic Compost, a privately owned and operated facility near the intersection of Hansen Road and Pulehu Road, approximately 7.5 miles to the northwest of the subject property (Department of Public Works and Environmental Management, July 2003).

Residential solid waste disposal service is provided by the DPWEM on a weekly basis. Demolition and construction waste from construction activities is accepted by the Maui Construction and Demolition Landfill, a privately operated facility located about 12 miles west of the subject property near Maalaea.

E. *INFRASTRUCTURE*

1. *Roadways*

The existing roadway system in the vicinity of the subject property includes the following roadways and intersections.

a. ***Roadways***

Haleakala Highway is generally a two-lane, State highway that links Kahului with Haleakala National Park. The roadway intersects Hana Highway in Kahului on the west side of Kahului Airport. Haleakala Highway is generally oriented in the east-west direction, beginning in Kahului, intersecting Old Haleakala Highway and Kula Highway at the Five Trees junction and terminating at Haleakala National Park. Haleakala Highway is a three-lane facility from Hana Highway to Makawao Avenue with two (2) lanes in the eastbound (mauka) direction and a single lane in the westbound (makai) direction. Haleakala Highway has a posted speed limit of 45 miles per hour (mph) on the section between Makawao Avenue and Kula Highway. East of the Five Trees junction, Haleakala Highway has a posted speed limit of 30 mph except for the section fronting King Kekaulike High School, where the speed limit is reduced to 25 mph during the morning and afternoon peak periods of school traffic. The State is in the process of widening Haleakala Highway from two (2) to four (4) lanes between Hana Highway and its intersection with the Old Haleakala Highway (western junction). A grassed median will be provided to separate the mauka and makai-bound travel lanes and the existing traffic signal system at the highway and fire break road junction will be relocated. In addition, a new traffic signal system will be installed at the highway's intersection with Haliimaile Road. The completion of this widening project is anticipated to occur in the 2005 timeframe.

Kula Highway is a two-lane, rural, arterial, State highway that connects the Pukalani area with the Ulupalakua area. Kula Highway is generally oriented in the north-south direction and begins in Pukalani at the Five Trees junction of Old Haleakala Highway and Haleakala Highway. Kula Highway eventually becomes Piilani Highway south of the study area. In the vicinity of the project site, Kula Highway has a posted speed limit of 45 mph. Fronting King Kekaulike High School, the speed limit is reduced to 25 mph during the morning and afternoon peak hours of school traffic. Fronting Kula Elementary School, the speed limit is reduced to 20 mph during school hours.

Old Haleakala Highway is a two-lane, County collector road that serves the Pukalani area. Old Haleakala Highway provides a parallel route to Haleakala Highway through the town of Pukalani. Old Haleakala Highway is oriented in the north-south direction as it intersects with Haleakala Highway approximately one-half mile east of Haliimaile Road and changes to an east-west roadway through Pukalani and terminates at the Five Trees junction at Haleakala Highway and Kula Highway. Old Haleakala Highway has a posted speed limit of 35 mph.

Makani Road is a two-lane, County collector road that serves Pukalani town and Makawao town. Makani Road is generally oriented in the north-south direction, originating within Pukalani at its intersection with Old Haleakala Highway, and extending northeasterly to eventually intersect with Makawao Avenue.

Pukalani Street is a two-lane, County collector roadway serving residential and commercial areas in Pukalani town. Pukalani Street is generally oriented in the north-south direction, originating at its intersection with Old Haleakala Highway, and extending southwesterly to the Pukalani County Club Golf Course.

Within the study area, Makawao Avenue is a two-lane, County collector road that serves Pukalani town and Makawao town. Makawao Avenue is generally oriented in the north-south direction, originating within Pukalani at its intersection with Baldwin Avenue, Makawao Avenue terminates across from Kaupakulua Road.

Loha Street is a two-lane, County collector roadway serving residential areas in Pukalani. Loha Street is a continuation of Makawao Avenue south of its intersection with Old Haleakala Highway.

b. Intersections

Haleakala Highway/Old Haleakala Highway (western junction) A contraflow operation on Haleakala Highway is implemented during the weekday AM peak period of traffic. When the contraflow operation is in effect, all traffic on the Haleakala Highway eastbound approach is forced to exit via right turn onto Old Haleakala Highway and right-turns from

the Old Haleakala highway approach onto Haleakala Highway are prohibited. As a result of the AM contraflow operation, there is no conflicting traffic for the northbound to westbound left-turn movement from the Old Haleakala Highway approach. The AM contraflow operation is discussed in more detail in the "Field Observations" section.

Haleakala Highway/Makani Road is a "cross" intersection with traffic on Makani Road controlled by a stop sign.

Haleakala Highway/Makawao Avenue is a signalized "cross" intersection.

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees junction) is a signalized "cross" intersection. Haleakala Highway is the southbound and westbound approaches of the intersection (Haleakala Highway makes a 90 degree turn at this intersection). Kula Highway is the northbound approach and Old Haleakala Highway is the eastbound approach at this intersection.

Old Haleakala Highway/Pukalani Street is a signalized "tee" intersection with Pukalani Street as the stem.

Old Haleakala Highway/Makawao Avenue/Loha Street is a signalized "cross" intersection.

The easterly boundary of the project site abuts Old Haleakala Highway. This highway intersects the Pukalani Bypass Highway and Kula Highway near the southeast corner of the project site. This intersection often referred to as the "Five Trees" intersection is signalized.

The Pukalani Highway was constructed by the State Department of Transportation a few years ago to route the Kula-Makawao through traffic along the easterly outskirts of Pukalani's urban core. Therefore, the Old Haleakala Highway through Pukalani now serves as a local collector road only.

2. ***Water***

The Makawao-Haiku water system is supplied by surface water runoff collected on the windward slopes of Haleakala. This water is collected and conveyed by the Wailoa irrigation ditch and tunnel system, owned and maintained by the East Maui Irrigation Company (EMI), with a capacity of 190 million gallons per day (mgd). The County of Maui, Department of Water Supply (DWS) has an agreement with EMI to draw up to 12 mgd at the Kamole Weir forebay.

This water is then treated by the Kamole Weir Water Treatment Plant (WTP), which is owned and operated by the DWS. The Kamole Weir WTP is located northeast of Haliimaile near the intersection of Baldwin Avenue and Haliimaile Road. It has a 300,000 gallon concrete treated water storage tank at a floor elevation of 1,114 feet above mean sea level (msl), and can treat up to 8 mgd in compliance with EPA Safe Drinking Water standards.

Water from the Kamole Weir WTP is transmitted by pumping to Makawao through a 24-inch diameter force main along Baldwin Avenue and Olinda Road. Storage is provided by the 0.3 and 2.0 million gallon Pookela tanks at floor elevations of 1,808 and 1,830 feet msl, respectively.

Water is then pumped via an 18-inch force main to the 0.5 mg Maluhia Tank at 2,051 feet msl.

There is an existing 12-inch waterline on the easterly side of Kula Highway that was installed by an affiliate of the applicant for its Kulamalu and Kamehameha School projects. The affiliate also participated with the Department of Water Supply (DWS) and State

in constructing a 1.0 MG storage tank located 6,000 feet east of the project site at elevation 1,992 feet. The DWS allocated 45 percent of the storage capacity in this tank to the applicant and its affiliates. To date, they have used 255,000 gallons of this storage allocation for their Kulamalu project and have approximately 195,000 gallons of capacity left.

In November of 2002, the Board of Water Supply approved the applicant's request to purchase an additional 204,000 gallons of storage capacity from the DWS. Documents finalizing the transaction are in the County for processing.

The applicant's affiliate also developed a new well in Kaupakalua to supplement the County's surface source for the Makawao/Pukalani water system. This new well source has a capacity of 1.6 MGD. In exchange for developing this source, the source developer is entitled to 45 percent of the total capacity equaling 738,000 gallons. Approximately 467,700 gallons of this amount has been allocated leaving about 270,300 gallons to be allocated. Part of this remaining allocation will be purchased from the applicant's affiliate, Kulamalu LLC, and then used to satisfy the project's average daily water demand.

The DWS has a 4-inch waterline that terminates at the northeast corner of the project site. This line feeds off the 2.0 MG storage Pookela tank at elevation 1,810 feet to serve the upper areas in Pukalani. The 1.0 MG storage tank in Pukalani at elevation 1,684 feet is situated too low to serve consumers along Makawao Avenue and Loha Street.

3. *Wastewater*

Currently, there is no County wastewater collection, treatment, or disposal system serving the Upcountry region. Other than a private wastewater treatment plant which serves Pukalani Terrace residents, wastewater disposal is accommodated via cesspools or individual wastewater systems consisting of septic tanks and leach fields. The Pukalani wastewater treatment plant currently provides treated effluent to the Pukalani Terrace Country Club golf course for irrigation purposes.

4. *Drainage*

There is no drainage system in the project area. However, there is a partially paved drainage swale on the east side of the Old Haleakala Highway, now owned and maintained by the County.

The project site is presently vacant and overgrown with weeds and shrubbery. It was previously used to grow pineapple by an independent grower. Current runoff from the 28.7 acre project site is 30.5 cubic feet per second (cfs) for a 50 year-1 hour recurrent interval storm. The runoff generally sheet flows across the project site in an easterly to westerly direction into the adjoining downstream properties.

5. *Power and Communication Systems*

In the vicinity of the subject property, overhead electrical and telephone lines are placed on utility poles situated within the Old Haleakala Highway right-of-way. Power and communication services in the region are provided by Maui Electric Company, Ltd. and Verizon Hawaii, Inc., respectively.

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Topography and Landform

No significant impacts to topography and soils are anticipated. During construction, portions of the subject property will be cleared, grubbed, and graded for the construction of the subdivision's infrastructure. Grading of the site is expected to be minimal due to the relatively level and gentle sloping terrain of the property. The topography of the site will be slightly modified by cut and fill operations to accommodate the construction of the subdivision's infrastructure. Finish grades will follow existing contours where possible to minimize landform alterations and maintain existing drainage patterns. Materials excavated on the site are expected to be reused for earth cover or for leveling onsite construction areas with uneven grades.

2. Natural Hazards

The subject property is not located within a flood plain, tsunami zone, or erosion-prone area, nor is it situated on geologically hazardous lands, or located by an estuary, fresh waters, or coastal waters. As indicated by the Flood Insurance Rate Maps for the island of Maui, the property is situated within Zone C, an area of minimal flooding. The site also lies beyond the limits of tsunami inundation as reflected by the Civil Defense maps for the island. In addition, the subject property is not located in an area of active seismic or volcanic activity.

3. Flora and Fauna

There are no rare, threatened, or endangered species of flora or fauna or important habitats on the subject property. The site was

formerly utilized for pineapple cultivation and is currently vegetated with various grasses and shrubs, as well as scattered silver oak and Christmas berry trees. In addition, a review of the National Wetlands Inventory Maps for Maui and an inspection of the subject property did not reveal any wetlands on the property. The use of the property for the proposed subdivision is not expected to have an adverse effect on flora and fauna in the vicinity.

4. *Archaeological Resources*

As previously noted, an Archaeological Inventory Survey of the subject property has been conducted. Refer to Appendix "B".

In commenting on the inventory survey report, the State Historic Preservation Division (SHPD), in a letter dated December 24, 2003, requested revisions to the report and also indicated that archaeological monitoring is not warranted for the entire parcel. See Appendix "B-1". After defining the site boundaries for Site 2701, the SHPD indicated that monitoring may be appropriate in the vicinity of the heiau; however, if the site's boundaries are well within the limits of the preservation area, monitoring may not be warranted. The SHPD also indicated that the developer can elect to conduct monitoring on a voluntary basis. Subsequently, in a letter dated May 28, 2004, the SHPD accepted the revised inventory survey report and concurred with the report's findings and significance assessment, as well as the report's recommendation that the heiau be permanently preserved. See Appendix "B-2".

Given the significance of the heiau, archaeological monitoring will be conducted for all ground-altering construction activities in the vicinity of the heiau. An archaeological monitoring plan will be

prepared and submitted to the SHPD for review and approval prior to the commencement of construction.

In addition, a preservation plan for the heiau has been recently submitted to the SHPD for review and approval. See Appendix "B-3". The plan establishes a 100-foot buffer around Site 2701 and includes long-term measures for the preservation of the heiau, as well as interim measures to mitigate potential impacts to the heiau during construction activities. Stewardship opportunities for the heiau will be afforded to Native Hawaiian groups. Selection of the curator group will be determined through consultation with the SHPD, as well as with kupuna that are recognized as being knowledgeable about the protection and preservation of heiaus.

Should archaeological features, cultural artifacts, or human burials be located during ground-altering construction activities, work shall promptly cease in the vicinity of the find, and the find shall be protected from further disturbance. The SHPD shall be immediately notified to determine the significance of the find and establish appropriate mitigative measures if required.

5. ***Cultural Impact Considerations***

A Cultural Impact Assessment has been prepared for the proposed project. See Appendix "C".

a. ***Background***

The assessment indicates that the subject property is located in the ahupua'a of Kula, in the *'ili* of Maka'eha.

Maka'eha, or Maka'ehu, has a unique position in all of Maui.

From its surroundings, Maka'eha is nestled on a ridge and is encompassed by gulches and plateaus.

Maka'eha literally means sore eyes. It is rich with heritage. Much of the upper plains of the Kula region were dry and arid. This had left few options of plants for farming purposes. However, this area served as one of the best vicinities for plants that could handle such arid conditions. This area was home to King Kihapi'ilani's mala 'uala (sweet potato garden).

The word *Kula* in Hawaiian translates to "plain". While this may barely describe some of the topographical features of this ahupua'a, much of its landscape is dry and arid. Therefore, farming was limited to plants that were tolerable to cold evenings and hot tempered days. Although the landscape of Kula has changed considerably over the past two (2) to three hundred (300) years, the climate has remained constant. the scene for most of the landscape was farming families.

It is often documented that the people of Kula were incompetent. This was derived from the fact that the people of Kula were not accustomed to the ways of the ocean. Families that lived near the ocean, and those who frequented the shores, mocked those of Kula who lacked experience in the ocean lifestyle. Therefore, those who lacked the experience needed to master the familiarities of the ocean were deemed incompetent.

Many of the culturally significant sites, such as heiau and

ahu are no longer existent, due primarily to the "paniolo era". During this era, much of the land was cleared for the industrially driven use by cattle ranchers. Heiau and ahu were plundered without regard for its significant to the area. As mentioned earlier, the ahupua'a of Kula had many heiau and ahu located in 'ili, such as Oma'opio. During the late 1950's and 1960's, the conceptualized "suburbia" became the dream place to live, and thus began the influx of homes and population to Kula. This left little recovery of what had already been destroyed by the paniolo era. Thus, there is a lack of information of such items.

The Cultural Impact Assessment addresses other culturally pertinent parameters such as native plant growth and wildlife. In addition, a number of informant interviews were conducted to obtain personal perspective and recollections of the project area and surrounding vicinity. Refer to Appendix "C".

b. ***Cultural Resources***

Situated within the subject property is a rather large heiau, suspected to be, by reliable sources, a *luakini* or po'okanaka heiau.

Winslow Walker, in his study "Archaeology of Maui", sites a heiau whose physical features are similar to the heiau on the subject property. Site 224, as listed in Walker's personal recollections of the area, is quite possibly Mo'omuku Heiau. The assessment hypothesizes that there is a strong chance that Mo'omuku Heiau and the heiau on the subject property

may be one in the same.

Evidence to this possible conclusion is drawn from various sources. A 1996 interview with the late Kahu (Rev.) David Ka'alakea concluded that the heiau in question was a *luakini* (sacrificial heiau). The various pits located within the structure, *ki'i* (wooden images of various gods of the past) that were found, and other physical features of this suggest as such.

Secondly, the definition of Mo'omuku means "cut-off section of land". It is difficult to envision this happening today, however, if one were a *konohiki* it would be an easy concept to interpret the view from this heiau as "cut-off sections of land". This particular site, from what is suspected to be Mo'omuku Heiau, had a prime view of Maui's North and South shores, as well as West Maui.

In the 1990 archaeological inventory survey of the subject property that was prepared by Archaeological Consultants of Hawaii, Inc., it is suspected that parts of the heiau may have been cleared for production of some of the "sweetest" pineapples in all of Maui.

c. ***Conclusion***

The assessment notes that much of the history of Maka'eha, which includes this project area, lacks in quantitative measures. Thus, it is extremely difficult to extract the details of a lifestyle unfamiliar to those of today. The natural habitat is inundated with foreign forest shrubbery and various other

plants brought in to "beautify" certain landscapes, such as the cactus (panini) which thrives in this region today.

The two (2) gulches that sit on both sides of the ridge largely protect Maka'eha. This fact has historically made Maka'eha's region one of great importance. The heiau expounded on earlier, and the numerous amounts of petroglyphs found in gulches in the vicinity, allows this report to conclude that this area and adjacent *'ili* were of great importance to *ka po'e kahiko* (people of old).

Much of Kula's natural and indigenous landscape barely exists. The thinking then should be to reverse the impact on the land by planting shrubs native to the area, desecrate the land as little as possible, and try to preserve and protect remnants of the past. More cautious approaches to certain areas are solutions to the vitality of Hawai'i.

6. ***Air Quality***

Emissions from construction equipment and other vehicles involved in construction activities may temporarily affect the ambient air quality within the immediate vicinity. However, these effects can be minimized by properly maintaining construction equipment and vehicles.

In addition, dust generated during construction, especially from earth-moving operations, such as clearing, grubbing, excavating, and trenching, may also result in a temporary decrease in ambient air quality. Mitigation measures include utilizing dust barriers, waterwagons and/or sprinklers to control dust, and watering graded

areas after construction activity has ceased for the day and during weekends and holidays.

On a long-term basis, once construction activities have been completed, residential subdivision traffic will generate vehicular emissions. However, these emissions are not expected to adversely impact local and regional ambient air quality conditions.

7. ***Noise***

Ambient noise conditions will be temporarily affected by construction activities. Heavy construction equipment, such as bulldozers, dump trucks, front-end loaders, and material-transport vehicles, are anticipated to be the dominant noise-generating source during the construction period.

Proper equipment and vehicle maintenance are anticipated to minimize noise levels. In addition, the use of equipment mufflers or other noise attenuating equipment may be necessary if noise levels are determined to be excessive. All construction activities are expected to be limited to daylight working hours.

Once completed, vehicles traveling within the subdivision and along the region's roadways will be the primary source of long-term noise in the area. However, vehicular traffic is not expected to generate any significant and unfavorable noise conditions.

8. ***Scenic and Open Space Resources***

The Upcountry region includes a diverse range of scenic and open spaces. The subject property is situated along the windward slopes of Haleakala between the elevations of 1,735 to 1,640 feet above

mean sea level. Due to this location, and depending on your location on the site, views of Haleakala, the coastline, the Central Maui plain, and the West Maui Mountains are available from the property. Cultivated fields, pastoral ranch lands, and vacant, undeveloped properties typify the open space character of the region.

The subject property is not part of a scenic corridor. The proposed subdivision is not expected to have an adverse impact upon the visual and open space character of the surrounding area.

9. ***Use of Chemicals and Fertilizers***

Use of herbicides on the subject property will generally be limited to the initial plant establishment period for subdivision landscaping. Pesticides are anticipated to be used only as a treatment and not as a preventive measure. As a treatment, application usage will be minimal. In addition, tree and plant selection for the subdivision will be based on hardiness, drought tolerance, pest resistance as well as aesthetic concerns.

Nitrogen/Phosphorus/Potash mixed fertilizers are anticipated to be applied to lawn areas, groundcover, and flowering shrubs. With proper irrigation management practices, leaching of fertilizers should be negligible.

A Phase I Environmental Site Assessment (ESA) of the subject property was conducted to test for the presence of hazardous materials. See Appendix "D". The assessment notes that there is no evidence of any historic misuse or significant spills of hazardous or regulated substances on the subject property. The subject

property was utilized for pineapple cultivation for several decades up until the early 1990s. The application of pesticides and herbicides are activities that are commonly associated with this past agricultural use.

Three (3) empty 55-gallon drums were located during a physical inspection of field conditions at the subject property; however, there was no surface soil staining or odors associated with these drums. The assessment indicates that while the use of pesticides on the property does not necessarily result in an adverse impact to the environmental condition of the site, it is possible, although unlikely, for residual amounts of these substances to accumulate to concentrations that pose a potential threat. Although soil sampling is not a requirement for a Phase I ESA, soil sampling will be conducted during a Phase II ESA, in order to identify any residual levels of these substances that were used during past pineapple cultivation activities. Should the Phase II work determine that levels exceed acceptable regulatory limits, the State Department of Health will be consulted and Phase III remedial work will be conducted prior to the construction of the project.

B. COMMUNITY SETTING

1. Community Character

The town of Pukalani is one (1) of two (2) main settlement areas in the Upcountry region, the other being the nearby community of Makawao. Pukalani is also a largely suburban community, with many of its residents commuting to their jobs in Central Maui and other parts of the island.

Land uses in Pukalani are characterized by a mixture of residential,

school, park, golf course, and business/commercial uses. Some of the facilities serving the public and the Pukalani community include Pukalani Elementary School, the Upcountry District Complex (playground, swimming pool, sports fields, jogging path, basketball courts, community center), the Pukalani Country Club and Golf Course, Pukalani Superette, Pukalani Square, and the Pukalani Terrace Center.

The subject property is situated along the southern outskirts of Pukalani. The proposed subdivision will contain a total of 49 single-family residential lots ranging in size from approximately 18,000 square feet to 26,000 square feet.

The majority of residential lots in Pukalani contain a minimum area of 10,000 square feet and are zoned for R-3, Residential District uses or contain a minimum area of 0.5 acre and are zoned for RU-0.5 Rural District uses. While RU-0.5, Rural District uses permit single-family dwellings and the growing and harvesting of agricultural crops (subject to certain restrictions), the predominant use of these parcels in Pukalani is for single-family dwellings.

The use of the subject property for residential purposes is not expected to have an adverse effect upon the character of the community.

2. ***Surrounding Land Uses***

The subject property is designated for Single-Family Residential use by the Makawao-Pukalani-Kula Community Plan and is deemed zoned for R-3, Residential District use. In addition, the subject property is located in an area of existing and ongoing urban

development.

The use of the subject property for residential purposes is compatible with the land uses permitted for the site and is not expected to have an adverse impact upon surrounding land uses.

C. SOCIO-ECONOMIC ENVIRONMENT

1. Population

The population of the island of Maui has exhibited relatively strong growth over the past decade, with the 2000 population of 117,644 reflecting a 28.8 percent increase over the 1990 population of 91,361. Population gains were especially pronounced in the 1970's as the rapidly developing visitor industry attracted many new residents to Maui in search of employment.

Just as the island's population has grown, the resident population of the Upcountry region has also increased in the last decade. The 2000 resident population of the Makawao-Pukalani-Kula region was 21,571, while the population in 1990 was 18,923. Regional projections for the years 2010 and 2020 reflect population estimates of 25,237 and 28,974, respectively. Compared to 2000, these estimates reflect increases of approximately 17 percent and 34 percent for the years 2010 and 2020, respectively (SMS, June 2002).

From a regional perspective, Wailuku and Kahului serve as the population and employment center of Maui. In the long term, the proposed subdivision is not expected to have an adverse effect on population parameters, nor is it anticipated to be a significant employment source.

On a short-term basis, the proposed subdivision will support construction and construction-related employment.

Upon the completion and occupancy of homes, the subdivision's residents will contribute to the long-term support of the local economy through the payment of income, property, and sales taxes, as well as via the purchase of goods and services from local businesses.

2. ***Economy***

An Economic Impact Analysis has been prepared for the proposed Kualono Subdivision. See Appendix "E". The objectives of the study are to: [1] estimate the effects on the Maui economy which will result from the undertaking of the subject project; and [2] project the effects on public costs and benefits attributed to the project. Key findings of the study are as follows:

1. The construction of the Kualono Subdivision (infrastructure and finished homes) and their on-going use will bring $21.3 million in direct real property capital investment and create some 233 "worker years" of employment on Maui, generating $9.7 million in total wages, over the initial ten-year building and use period of the project. Profits to local contractors and suppliers resulting from the development are estimated to be $3.0 million. The maintenance, landscaping and upgrading of the homes will create about seven (7) permanent jobs in the regional economy with annual wages of $172,400.00

2. The average de facto population of the community at full-absorption is forecast at 206 persons, of which 185 will be full-time residents, 16 will be part-time residents, and the rest being guests. There will be an estimated 46 school age children, of which 31 are likely to attend public institutions. The stabilized discretionary expenditures of the neighborhood population are estimated at $3.9 million

annually, and the household income of full-time residents at $6.2 million per year.

3. The total base economic impact on Maui from the subject project for the first ten (10) years of home construction and residential use is projected at $41.2 million, with a stabilized base impact of $4.6 million per year thereafter. The total overall economic impact during the first decade will be in excess of $80 million and some $9.2 million annually over the long term.

4. The State of Hawaii will receive $5.3 million in primary tax revenues from the project during the 10-year development and operational model used in our analysis, with an additional $566,000.00 annually in receipts thereafter. The County of Maui will gain some $1.7 million in taxes during the modeling decade, and $220,524.00 per year following.

5. In no year of the projection or stabilized periods does Maui County suffer a revenue shortfall (costs exceeding receipts) due to the Kualono Subdivision, whether analyzed on a per capita or actual cost basis. The stabilized net annual "benefit" flowing to the County from the development could exceed $100,000.00. Overall, the State is anticipated to show minor net revenue gains from the project with "actual" cost-based benefits reaching as high as $300,000.00 on a stabilized basis.

3. ***Agriculture***

The subject property was formerly utilized for pineapple cultivation and has remained fallow for a number of years.

As previously indicated, State Agricultural district lands on Maui occupy an area of 245,783 acres. Of this acreage, the subject property encompasses 28.695 acres, or 0.0001 percent of the lands in the State Agricultural district. The soils of the subject property are rated Prime according to the map of Agricultural Lands of Importance to the State of Hawaii, and "C" by the University of Hawaii Land Study Bureau.

The conversion of the subject property's fallow agricultural lands for single-family residential purposes is not anticipated to have an adverse effect on the existing inventory of lands available for agricultural use.

4. ***Housing***

A Market Study has been prepared to assess the market support for the proposed Kualono Subdivision. See Appendix "F".

a. ***Recommended Pricing***

The Kualono Subdivision will include 49 residential house lots of about 18,000 to about 26,000 square feet in the Pukalani neighborhood of Maui's Upcountry district. House lots would be afforded views towards Haleakala and the West Maui Mountains.

Based on the size, location, and view potential of the proposed lots in the Kualono Subdivision, the individual lots could be priced from about $250,000.00 to about $350,000.00. Considering current construction costs, the price of an improved house and lot in the proposed subdivision would start at about $425,000.00.

b. ***Target Market and Buyer Profile***

The Kualono Subdivision lots are expected to appeal to existing homeowners seeking to trade up. The lots would be marketed for build-to-suit single-family residential development. Equity from the sale of an existing residence is typically used as a basis for a down payment.

The primary demand for the 49 lots is expected to come from the resident population in Upcountry Maui. The supply of existing and planned single-family housing on Maui is limited. Therefore, secondary demand could come from other neighborhoods on Maui including Wailuku, Kahului and Kihei.

c. ***Projected Demand for Residential Development***

Based on the anticipated population growth and other demographic considerations, the demand for new housing in the primary market area is projected to average about 134 new housing units annually through 2005 and about 181 new housing units through 2010. The new housing demand in the secondary market area is projected to average 310 new housing units annually through 2005 and 441 new housing units annually through 2010, as shown in Table 1.

Table 1

PROJECTED ANNUAL NEW HOUSING DEMAND 2003-2010			
	Primary Market Area	*Secondary Market Area*	*Total*
2003 to 2005	134	310	444
2006 to 2010	181	441	622

Of this total, about 40 new housing units priced at $425,000.00 or more (or, alternatively, vacant lots priced from about $250,000.00) are projected to be required in the

primary market area between 2003 and 2005. The annual demand for residential product in this price category is projected to increase to about 54 units in 2006. Similarly, the annual effective new housing demand in the secondary market area is projected at about 81 units over the next three years and 115 units annually through 2010, as shown in Table 2.

Table 2

PROJECTED ANNUAL NEW HOUSING DEMAND FOR SINGLE-FAMILY HOMES PRICED AT $425,000+ OR VACANT HOUSE LOTS PRICED AT $250,000+ (ANNUAL EFFECTIVE NEW HOUSING DEMAND) 2003-2010

	Primary Market Area	*Secondary Market Area*	*Total*
2003 to 2005	40	81	121
2006 to 2010	54	115	169

d. Projected Absorption of the Kualono Subdivision Lots

In assessing the competitive position and projected market share for the Kualono Subdivision, the following factors were considered.

- Convenient location in Upcountry Maui
- Physical characteristics of the lots, including half-acre lot size and view potential
- Estimated retail prices for the lots
- Limited supply of competitive product planned or under construction
- Lack of comparable development sites with entititlements and/or utilities

Based on these considerations, the Kualono Subdivision lots could capture at least 50 percent of the annual effective new housing demand in the primary market area and 25 percent of the annual effective new housing demand in the secondary market area. Consequently, the projected demand for the Kualono Subdivision lots is about 40 lots per year, or about 3 to 4 lots per month, as shown in Table 3.

Table 3

PROJECTED ANNUAL DEMAND FOR THE KUALONO SUBDIVISION 2003-2005			
	Primary Market Area	***Secondary Market Area***	***Total***
Annual effective new housing demand	40	81	
Kualono Subdivision market share	50%	25%	
Projected demand for the Kualono subdivision lots, rounded	20	20	40

County affordable housing requirements for the subdivision will be addressed through a $125,000.00 cash contribution as agreed upon by the applicant and the County Department of Housing and Human Concerns (DHHC). See Appendix "F-1". These funds will be provided as a donation to Habitat for Humanities, for its use in providing affordable housing units. To memorialize this contribution, the applicant will prepare and submit an Affordable Housing Agreement to the DHHC for review and approval.

D. PUBLIC SERVICES

1. Police and Fire Protection

The proposed subdivision is not expected to adversely affect police and fire protection services. The subject property is served by police officers patrolling the Country Sector and is situated 2 miles from the police substation in Makawao. The property is also located within 0.5 mile of the Makawao Fire Station.

2. Medical and Educational Facilities

The proposed subdivision is not expected to increase the need for additional health care services and facilities.

Based on a total of 49 residential lots, the State Department of Education (DOE) estimates that the proposed action is projected to generate 12 students in Grades K to 5; 5 students in Grades 6 to 8; and 5 students in Grades 9 to 12 (Department of Education, July 2003). The construction of new homes and the occupancy of the completed dwellings are expected to occur within a 10-year time span. In this regard, the student counts projected by the DOE would depend on the construction and occupancy of homes by individual lot owners.

As previously noted, the proposed project will not include accessory dwellings or ohana units. Provisions in this regard will be included in the CC&Rs for the subdivision. The applicant will follow-up with the DOE to discuss the applicability of the department's policies regarding educational facilities.

3. ***Recreational Facilities***

Pursuant to Section 18.16.320 of the Maui County Code, a subdivider can provide or dedicate land for park and playground purposes; or make a cash payment to the County; or improve a park in the community plan region; or provide an equivalent combination thereof.

As indicated by this section of the Maui County Code, a subdivider can provide or dedicate land for park and playground purposes. In addition, the land provided or dedicated must have an area of 500 square feet for each unit or lot (in excess of three) resulting from the subdivision. Accordingly, based on the number of proposed lots, the land required to be dedicated for the proposed project is 23,000 square feet or 0.528 acre (49 lots - 3 lots = 46 lots x 500 sq. ft. = 23,000 sq. ft.).

The applicant and Kulamalu LLC (an affiliate company) are in the process of dedicating 9.7 acres of land to the County of Maui for a public park in the Kulamalu Project area. The park dedication agreement for this land is currently being reviewed by the County. The County Department of Parks and Recreation (DPR) has recently concurred with the applicant's proposal to acquire and utilize park credits from the Kulamalu Project to satisfy its park dedication requirements for the proposed project. See Appendix "G". An agreement to this effect will be prepared and submitted to the DPR for review and approval.

The proposed action is not expected to generate a demand for additional recreational facilities.

4. Solid Waste

As indicated in the Phase I Environmental Site Assessment of the subject property, landscaping debris covered by soil stockpiles was observed along the western boundary of the property and in its northeastern sector. Refer to Appendix "D". Wood pallets, metals, and plastics were noted throughout the landscaping debris. In addition, a discarded stove, archaeological excavation trenches, and historic irrigation infrastructure (dismantled) were observed.

During the short term, construction activities will require the disposal of the existing onsite waste, as well as cleared vegetation and construction-related solid waste. A solid waste management plan will be coordinated with the County's Solid Waste Division for the disposal of onsite and construction-related waste material. The applicant will work with the contractor to minimize the amount of solid waste generated during the construction of the project. In the long term, solid waste collection and disposal for subdivision residents will be provided by the County of Maui.

E. INFRASTRUCTURE

1. Roadways

The Old Haleakala Highway will be used to provide access from the Pukalani Bypass Highway by way of the signalized intersections at Makawao Avenue or the closer "Five Trees" intersection. A left-turn pocket will be provided within the Old Haleakala Highway right-of-way to facilitate turning movements into the subdivision. In addition, curb, gutter and sidewalk improvements will be installed along the subject property's frontage with the Old Haleakala Highway.

The entry road to the subdivision will have a right-of-way of 60 feet with 3 lanes to facilitate left turns. The subdivision streets will have a 44-foot right-of-way and a curb-to-curb travel way of 28 feet. Diameter of cul-de-sacs will be 97 feet with a pavement diameter of 81 feet with a planter island.

Road improvements will consist of standard curb and gutter and a four foot wide sidewalk on one side. Raised curb islands will be provided at two (2) locations to serve as a traffic calming feature. Wheel chair ramps will also be provided at appropriate locations to meet ADA requirements.

Appropriate traffic control measures will be utilized during the construction of the subdivision to minimize impacts to traffic flow and provide for the safe passage of vehicles.

A Traffic Impact Analysis Report (TIAR) has been prepared for the proposed project. See Appendix "H".

The TIAR uses accepted methods for analyzing signalized and unsignalized intersections, as set forth by the 2000 Highway Capacity Manual. The TIAR includes level-of-service analysis (LOS) which represent general measures of traffic operating conditions, with LOS A reflecting free-flowing conditions and LOS F reflecting severe congestion.

Conclusions

The traffic study reaches the following conclusions regarding future traffic conditions without and with the project.

Without Project-Generated Traffic

The following are the conclusions of the traffic study for conditions without traffic generated by the proposed project:

- Without installation of a traffic signal system at Haleakala Highway/Old Haleakala Highway (western intersection), the northbound left-turn will operate at LOS F during the Base Year 2005 AM and PM peak hours of traffic.
- With the installation of a traffic signal system at Haleakala Highway/Old Haleakala Highway (western intersection), the northbound left-turn and westbound through traffic will operate at LOS F with a volume to capacity ratio greater than 1.0 during the Base Year 2005 AM peak hour of traffic. A traffic signal phasing such that the westbound through traffic on Haleakala Highway and northbound left-turn traffic on Old Haleakala Highway are not given a green signal at the same time was assumed. It may be possible to use an alternate traffic signal phasing that allows these two movements to proceed through the intersection simultaneously, which would result in all individual movements operating at LOS D or better.
- With the installation of a traffic signal system at the Haleakala Highway/Makani Road intersection, all individual movements will operate at LOS D or better during Base Year 2005.
- During Base Year 2005, Haleakala Highway will be approaching capacity within the study area with some movements at the Makawao Avenue intersection operating at LOS E.

With Project-Generated Traffic

The following are the conclusions of the traffic study for conditions with project-generated traffic:

- Development of the Kualono Subdivision will not have a significant impact on the roadways and intersections within the study area, as the project will only generate approximately 48 and 62 total vehicular trips during the AM

and PM peak hours of traffic, respectively. The project is expected to generate fewer than 550 daily trips.

- Traffic demands at the Old Haleakala Highway/Road A (Project) intersection can be served as an unsignalized intersection. All individual turning movements at this unsignalized intersection will operate at LOS D or better with separate lanes for left-turns and right-turns on the Road A northbound approach.
- Although projected traffic volumes at the Old Haleakala Highway/Road A intersection do not require an exclusive westbound left-turn lane, consider installing a left-turn pocket on Old Haleakala Highway to allow westbound vehicles to access the project without impeding westbound through traffic.
- Projected traffic volumes at the Old Haleakala Highway/Road A intersection warrant a taper to facilitate eastbound right-turn vehicles entering the project. An exclusive eastbound right-turn lane on Old Haleakala Highway is not warranted.

Recommendations

The traffic study advances the following recommendations without and with project-generated traffic.

The following are the recommendations of the traffic study without project-generated traffic:

- Install traffic signal systems at the Haleakala Highway/Old Haleakala Highway (western intersection) and Haleakala Highway/Makani Road intersection. Interconnect and synchronize these traffic signal systems with existing traffic signals along Haleakala Highway at Makawao Avenue and the Five Trees junction.

The following are the recommendations of the traffic study with the project:

- Provide separate lanes for left-turns and right-turns

on the Road A northbound approach to Old Haleakala Highway.

- Consider constructing a left-turn pocket on the Old Haleakala Highway westbound approach to Road A.
- Incorporate in the design of the Old Haleakala Highway/Road A intersection a taper to facilitate eastbound traffic turning right into the Project.

2. ***Water***

A Preliminary Engineering Report has been prepared for the proposed Kualono Subdivision. See Appendix "I". Based upon an assigned source allocation of 800 gallons per unit a day (gpud) agreed upon by the applicant and the DWS, the estimated average daily water demand for the project is calculated to be 39,200 gpud.

The onsite distribution system will be connected to the existing 12-inch transmission line within the Kula Highway right-of-way. Refer to Appendix "I". The connection will be made on the south side of the "Five Trees" intersection. The 8-inch distribution system will be looped along the proposed subdivision road and connected back to the existing 4-inch waterline at the northeast corner of the project site within the Old Haleakala Highway right-of-way.

Fire hydrants will be installed throughout the subdivision at intervals of 300 and 350 feet in accordance with DWS standards. The distribution system will be designed to satisfy the fire demand of 1,000 gpm for urban residential districts.

An affiliate company, Kulamalu LLC (fka, Kulamalu, Limited Partnership), developed the Kaupakalua Well (State Well No. 5318-01). This well is located on a portion of TMK 2-7-15:34 in Kaupakalua, approximately 4.5 miles to the northeast of the subject

property. For developing this well source, the source developer received a capacity allocation of 738,000 gallons per day (gpd) from the County of Maui. A portion of the remaining allocation (approximately 270,300 gpd) will be purchased from Kulamalu LLC to satisfy the average daily water demand for the proposed project.

The proposed subdivision is not anticipated to have an adverse effect on water sources, storage facilities, and distribution and transmission systems.

3. ***Wastewater***

At full build out, the proposed subdivision is expected to generate about 17,150 gallons of wastewater per day based on the wastewater contribution flow standards of the County Department of Public Works and Environmental Management (DPWEM). This estimate is based on a total of 49 homes and the DPWEM's rate of 350 gallons per unit per day for a single-family dwelling.

The proposed subdivision will utilize septic tanks with seepage pits or leach fields as individual wastewater systems for each lot. Refer to Appendix "I". These systems, which will be the responsibility of individual lot buyers, will be designed and installed in accordance with the provisions of Chapter 11-62 of the Hawaii Administrative Rules pertaining to wastewater systems.

4. ***Drainage and Erosion Control***

The subject property presently generates approximately 30.5 cfs of onsite surface runoff during a 50-year recurrence interval, 1-hour duration storm. The existing onsite surface runoff generally sheet flows across the property in an easterly to westerly direction and

onto the adjoining downstream properties. Refer to Appendix "I".

Offsite surface runoff generally sheet flow flows across the subject property and into the adjoining downstream properties below the property.

The drainage concept that will be used for the proposed development will try to maintain the natural drainage pattern of both the onsite and offsite surface runoff.

The post-development peak runoff from the subject property is expected to be approximately 52.4 cfs for a 50-year recurrence interval, 1-hour duration storm. This translates to a net increase of approximately 21.9 cfs due to the proposed development. This onsite surface runoff generated by the proposed development will be intercepted by new curb inlet type catch basins and conveyed by means of a new underground drainage system located within the subdivision roadways. This surface runoff will be directed into a retention basin that will be located down slope from the heiau and beyond the 100-foot buffer surrounding the site. Since the publication of the Draft EA, a 3-foot freeboard has been incorporated into the design of the retention basin. With the freeboard, the total capacity of the retention basin has been increased from 1.3 acre-feet to 2.6 acre-feet thereby doubling the storage volume of the retention basin beyond its design capacity and providing additional storage volume if needed (the design capacity is based on a 50-year, 1-hour storm). A stone wall will be placed around the retention basin for safety and security purposes. In order for the drainage system to function as designed and constructed, provisions for the maintenance of the subdivision's

drainage system (including retention basin) will be included in the CC&Rs for the project. Upon its completion, the homeowners' association will be responsible for the maintenance of the subdivision drainage system.

The existing offsite surface runoff that currently sheet flows onto the adjacent downstream properties will be allowed to continue as it is presently doing in accordance with the provisions of the County's "Rules for the Design of Storm Drainage Facilities in the County of Maui".

The proposed drainage system will be designed to produce no adverse effect by stormwater runoff to downstream and adjacent properties. Construction of the subdivision will be conducted in accordance with applicable soil and erosion control standards.

Examples of erosion control measures that may be implemented during construction of the subdivision include, but are not limited to the following:

1. Minimize the time of construction;

2. Retain existing ground cover as long as possible in order to complete construction;

3. Implement the early construction of drainage control features;

4. Use temporary area sprinklers in non-active construction areas when ground cover is removed;

5. Utilize onsite waterwagons for immediate sprinkling, as needed, in active construction areas;

6. Use temporary berms, cut-off ditches, or silt screen fencing,

where needed, to control soil erosion;

7. Water graded areas thoroughly after construction activity has ceased for the day, as well as on weekends and holidays;

8. All cut and fill slopes shall be sodded or planted immediately after grading work has been completed;

9. Upon completion of finish grading, cover all exposed areas with grass or an appropriate cover material; and

10. Ensure that adequate measures are implemented to prevent sediment-laden runoff from leaving the project site.

5. ***Power and Communication Systems***

The installation of utility lines for electrical and telephone systems will be placed underground and coordinated with the respective utility companies. The proposed action is not anticipated to have an adverse impact upon power and communication services.

F. ***CUMULATIVE AND SECONDARY IMPACTS***

The proposed project is not part of a larger action and is not expected to impact population parameters or result in significant new demands for public services and facilities and infrastructure. During the short term, the project will benefit the economy, directly and indirectly, through the payment of wages, salaries, benefits and taxes for employees involved in construction and construction-related jobs. Beneficial long-term housing and economic effects are anticipated from the proposed action.

IV. RELATIONSHIP TO GOVERNMENT PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

Pursuant to Chapter 205, Hawaii Revised Statutes (HRS), all lands in the State have been divided and placed into one (1) of four (4) land use districts by the State Land Use Commission (SLUC). These land use districts have been designated "Urban", "Rural", "Agricultural", and "Conservation". The SLUC classifies the majority of lands on Maui for "Agricultural" and "Conservation" uses. The island of Maui encompasses a total land area of 465,800 acres. Of this total area, "Agricultural" lands occupy 245,783 acres, "Conservation" lands encompass 194,836, "Urban" lands comprise 21,403 acres, and "Rural" lands consist of 3,778 acres (Maui County Data Book, 2001). The lands underlying the subject property are presently designated "Agricultural". See Figure 8.

While single-family residential uses are compatible with the Urban designation, these activities are generally not considered permissible within the "Agricultural" District without a Special Use Permit. As such, a District Boundary Amendment from the "Agricultural" to "Urban" District is being requested to establish the appropriate State land use designation for the 28.695-acre subject property.

B. LAND USE COMMISSION RULES, CHAPTER 15-15, HAWAII ADMINISTRATIVE RULES

The proposed reclassification of the subject property from the "Agricultural" to "Urban" district is in conformance with the following standards established for "Urban" District as set forth in Chapter 15-15-18, Hawaii Administrative Rules:

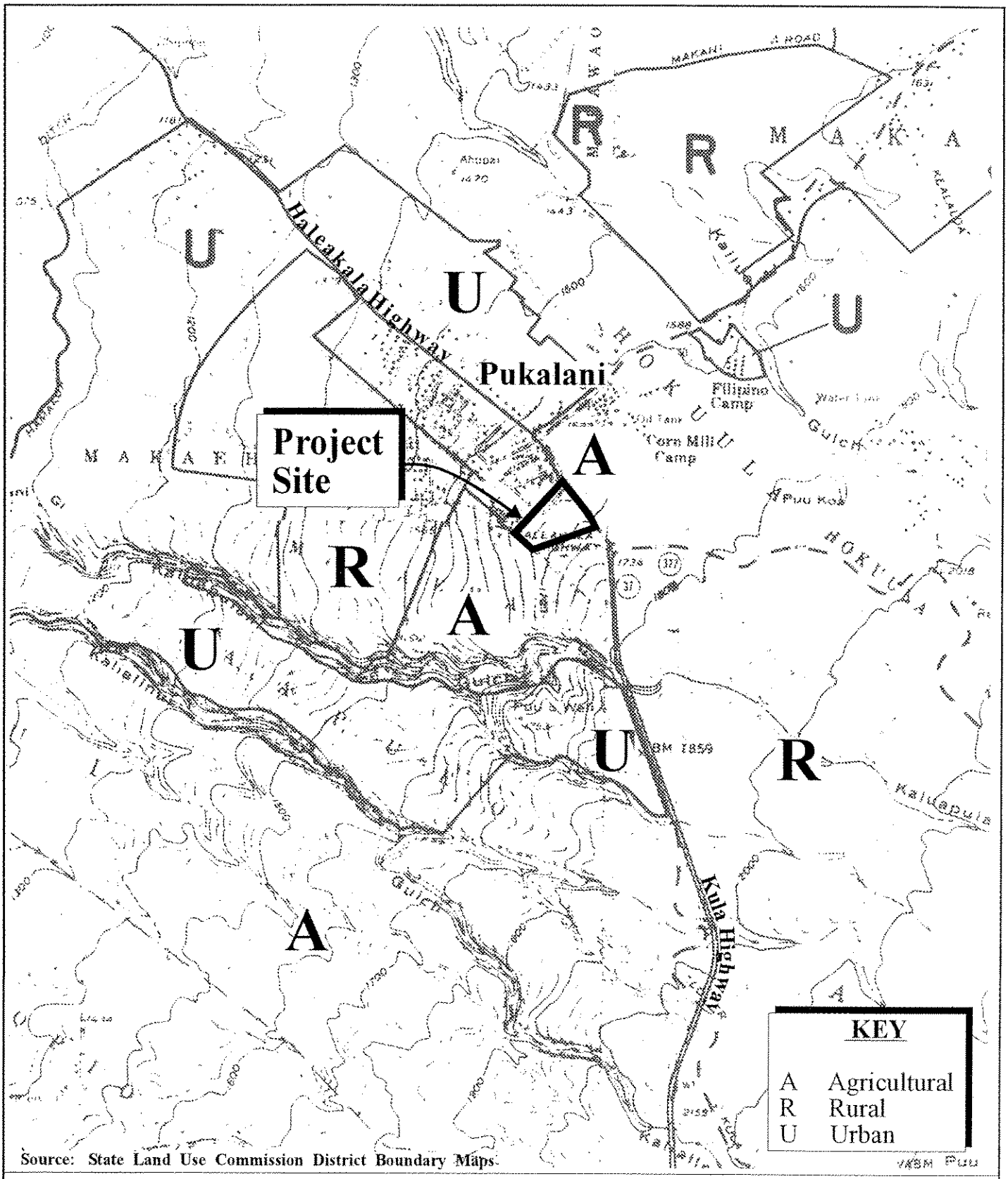


Figure 8 Proposed Kualono Subdivision
State Land Use District Classifications

1000 Feet
0 500 2000

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.

Chapter 15-15-18(1):

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

Comment: The subject property consists of 28.695 acres and is located along the southern outskirts of Pukalani. In addition to the neighboring community of Makawao, which lies about two (2) miles to the northeast, Pukalani is one (1) of the two (2) main settlement areas and population centers in the Makawao-Pukalani-Kula region. Situated within the State Urban district, the town of Pukalani is a suburban community by nature as many of its residents commute to jobs in Wailuku and Kahului, as well as other parts of the island.

Pukalani is characterized by a mix of residential, school, park, golf course, and business/commercial uses. Infrastructure and public services for the community are met through services and facilities provided by the County and State. The town of Pukalani is served by both State and County roadway systems. Potable water and residential waste disposal services are provided by the County, while power and communication systems are provided by Maui Electric Company and Verizon Hawaii, respectively. As there is no public sewer system in the Upcountry area, wastewater is accommodated by cesspools or septic tanks or by a private wastewater treatment plant which serves the Pukalani Terrace section of the town. Parks and recreational facilities in Pukalani are maintained by the County, while public schools fall under the jurisdiction of the State.

Chapter 15-15-18(2):

(2) It shall take into consideration the following specific factors:

a. Proximity to centers of trading and employment except where the development would generate new centers of trading and employment.

Comment: As previously noted, the subject property is situated along the southern outskirts of the town of Pukalani. Regional centers of trading and employment in Pukalani and Makawao lie approximately 0.5 mile northwest and 2 miles northeast of the subject property, respectively. The island's centers of trading and employment lie in Wailuku and Kahului, about 9 miles and 11 miles to the northwest of the subject property, respectively.

The Kulamalu project area is located less than 1 mile to the south of the subject property. This planned community includes a commercial component and is the site of the Kamehameha Schools Maui Campus. The King Kekaulike High School is located to the immediate southeast of the property. Both educational facilities and the commercial component of the Kulamalu area serve as employment sources for the Upcountry community.

b. Substantiation of economic feasibility by the petitioner.

Comment: The reclassification of the subject property from the State Agricultural district to the State Urban district will provide the petitioner with the appropriate State land use designation for the development of the property for single-family residential uses. Given the property's location, proximity to existing and proposed land uses, the current

housing market, and housing demand, the proposed request is considered economically warranted and feasible.

c. ***Proximity to basic services such as sewers, transportation services, water, sanitation, schools, parks, and police and fire protection.***

Comment: There is no County wastewater system serving the Upcountry area. A privately owned and operated wastewater treatment plant serves homes in the Pukalani Terrace section of the town, while cesspools or septic tanks serve other homes in the region. Access to the subject property is currently provided by the Old Haleakala Highway, a two-lane County collector road, while potable water is provided by the County's domestic water system. Residential waste disposal service is provided by County collection crews on a once-a-week basis. Educational facilities serving the Pukalani community include Pukalani Elementary School, approximately 0.5 mile to the northwest of the subject property; Kalama Intermediate School in Makawao, about 1.5 miles northeast of the subject property; and King Kekaulike High School, across the street from the property. The Upcountry District Complex, a major County recreational facility which includes a playground, sport fields, a jogging path, a swimming pool, basketball courts, and a community center, is located in Pukalani about 0.5 mile to the northwest of the subject property. Police and fire protection services in the area are provided by the County's police and fire departments. In addition to motorized patrols, a police substation is located in Makawao, approximately 2 miles northeast of the subject property,

while the Makawao Fire Station lies approximately 0.5 mile to the northeast of the property. Power and communication systems in the region are provided by Maui Electric Company and Verizon Hawaii.

d. ***Sufficient reserve areas for urban growth in appropriate locations based on a ten (10) year projection.***

Comment: Updated in July 1996, the Makawao-Pukalani-Kula Community Plan designates the subject property for Single-Family Residential uses, which encompasses single-family and duplex dwellings. As reflected by the community plan's land use map, the subject property lies adjacent to lands designated for Single-Family Residential, as well as Rural uses including low-density single-family residential lots.

The majority of residential lots in Pukalani are zoned for R-3, Residential District or RU-0.5 Rural District uses. While RU-0.5, Rural District zoning permits single-family dwellings and the cultivation of agricultural crops (subject to certain restrictions), the predominant use of these parcels is for single-family dwellings. The subject property is deemed zoned for R-3, Residential use and lies adjacent to similarly zoned parcels and is in close proximity to lots zoned RU-0.5, Rural.

The subject property's location in an area of existing and planned urban development establishes an appropriate context and foundation for future urban growth in the area.

Chapter 15-15-18(3):

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

Comment: The subject property is located within Zone C, an area of minimal flooding. The property is characterized by relatively level and gentle sloping topography and is not subject to tsunami inundation or unstable soil conditions. Construction of the proposed subdivision will result in short-term impacts to air quality and ambient noise levels. These effects, however, are temporary and appropriate measures to minimize these impacts will be implemented during construction.

Chapter 15-15-18(4):

(4) In determining growth for the next ten (10) years, or in amending the boundary, land contiguous with existing urban areas shall be given more consideration that non-contiguous land, and more particularly when indicated for future urban use on State or County general plans.

Comment: The subject property is situated along the southern outskirts of the town of Pukalani and lies adjacent to and in proximity of areas with existing and proposed urban development. Existing land uses in the vicinity of the subject property include scattered single-family residences and vacant properties to the north, south, and west of the property. In addition, the existing King Kekaulike High School lies to the southeast of the property, while less than a mile to the south lies the Kulamalu project area, which is currently under construction and includes the existing Maui Campus of Kamehameha Schools and a mixture of business, public/quasi-public, single- and multi-family residential, and park uses. Proposed uses in the vicinity include Maui Land & Pineapple

Company's Upcountry Town Center which is located on a site across the street and to the east of the subject property.

Chapter 15-15-18(5):

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

Comment: As previously indicated, the subject property is designated for single-family residential use by the community plan and is deemed zoned for R-3, Residential District use. Lands within the surrounding area are similarly designated. Also, given its location in an area of existing and proposed urban development, the subject property lies in an area that is appropriate for reclassification to the State Urban district.

The Makawao-Pukalani-Kula Community Plan encourages "*new residential developments in areas which are contiguous extensions of, or infills within the established residential pattern, and which do not adversely affect agricultural uses*". *Within Pukalani, the community plan supports "single-family expansion contiguous with existing residential uses*". In addition, the community plan supports "*the reclassification of State Land Use districts to ensure consistency between State Land Use designations and land use designations defined by the Makawao-Pukalani-Kula Community Plan land use map*".

Chapter 15-15-18(6):

(6) It may include lands which do not conform to the standards in paragraphs (1) to (5):

a. When surrounded by or adjacent to existing urban development; and

Comment: As previously noted, the subject property is located along the southern outskirts of the town of Pukalani and is situated in proximity to lands which are presently in the State Urban district.

b. Only when those lands represent a minor portion of this district.

Comment: On the island of Maui, lands within the State Agricultural district comprise approximately 245,800 acres of the island's 465,800 acres. The subject property encompasses an area of 28.695 acres and comprises a minor portion of Agricultural designated lands.

Chapter 15-15-18(7):

(7) 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.

Comment: The proposed reclassification does not contribute toward scattered spot urban development as the subject property is designated for urban use by the Makawao-Pukalani-Kula Community Plan and is deemed zoned for R-3, Residential District use. The subject property lies within the limits of existing public infrastructure and support services. The proposed action will not necessitate any unreasonable investment in infrastructure or public services.

Chapter 15-15-18(8):

(8) It may include lands with a general slope of 20 percent or more which do not provide open space amenities or scenic values if the commission finds that those lands are desirable and suitable for urban purposes and that official design and construction controls are adequate to protect the public health, welfare, and safety, and the public's interest in the aesthetic quality of the landscape.

Comment: The subject property is characterized by relatively level and gently sloping topography with a grade that is significantly less than 20 percent.

C. *CHAPTER 205-17, HRS, LAND USE COMMISSION DECISION MAKING CRITERIA*

As required by Chapter 205-17, HRS, the State Land Use Commission shall specifically consider the following when reviewing any petition for reclassification of district boundaries:

Chapter 205-17(1):

The extent to which the proposed reclassification conforms to the applicable goals, objectives, and policies of the Hawaii State Plan and relates to the applicable priority guidelines of the Hawaii State Plan and the adopted functional plans.

Comment: The proposed reclassification is in conformance with the Hawaii State Plan and relates to applicable priority guidelines of the Hawaii State Plan and the adopted functional plans (see Chapter IV, Section D and Section E).

Chapter 205-17(2):

The extent to which the proposed reclassification conforms to the applicable district standards.

Comment: The proposed reclassification conforms to Urban district standards as identified in Chapter 205-2 and is in keeping with the Maui County General Plan. (See Chapter V, Section A).

Chapter 205-17(3):

The impact of the proposed reclassification on the following areas of State concern:

1. ***Preservation or maintenance of important natural systems or habitats***

   Comment: There are no important natural systems or habitats within the subject property.

2. ***Maintenance of valued cultural, historical, or natural resources***

   Comment: An Archaeological Inventory Survey of the subject property was conducted to identify the presence of any significant archaeological and cultural resources. The existing heiau on the property will be preserved in place and surrounded by a 100-foot buffer. A preservation plan for the heiau has been recently submitted to the State Historic Preservation Division (SHPD) for review and approval. The plan includes long-term measures for the preservation of the heiau, as well as interim measures to mitigate potential impacts to the heiau during construction activities. Archaeological monitoring will be conducted for all ground-altering construction activities in the vicinity of the heiau. An archaeological monitoring plan will be prepared and submitted to the SHPD for review and approval prior to the commencement of construction. Should any archaeological features, cultural artifacts, or human burials be located during construction, the SHPD will be consulted to assess the significance of the find and establish appropriate

mitigative measures if necessary.

3. ***Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to agricultural resources***

Comment: The subject property consists of 28.695 acres and represents 0.0001 percent of the 245,783 acres of State Agricultural district lands on the island of Maui that are available for agricultural uses. The proposed reclassification of the subject property from the State Agricultural district to the State Urban district is not anticipated to have an adverse impact on agriculture, nor is it expected to affect the total acreage of State Agricultural district lands that are available for agricultural uses.

4. ***Commitment of State funds and resources***

Comment: The proposed reclassification is not expected to result in a significant commitment of State funds and resources. The petitioner will work with the appropriate governmental agencies to ensure that adequate infrastructure and public services are available to accommodate the proposed subdivision.

5. ***Provision for employment opportunities and economic development***

Comment: The proposed action will provide construction-related employment during the development of the subdivision. Upon completion, subdivision residents will contribute to the support of the local economy through the payment of taxes and the purchase of goods and services.

6. *Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups*

Comment: The proposed action will provide opportunities for residents to purchase a lot and construct a home that meets their individual or family's needs. As agreed upon by the applicant and the County Department of Housing and Human Concerns, County affordable housing requirements for the project will be addressed in the form of a $125,000.00 donation to Habitat for Humanities for its use in providing affordable housing units.

D. *CHAPTER 226, HRS, HAWAII STATE PLAN*

Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive plan which serves as a guide for the future long-range development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The proposed action is in concert with the following goals of the Hawaii State Plan.

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.

1. *Objective and Policies of the Hawaii State Plan*

The proposed reclassification is in conformance with the following objectives and policies of the Hawaii State Plan:

Chapter 226-5, HRS, Objective and Policies for Population

226-5(a), HRS: It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter.

226-5(b)(1), HRS: Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.

226-5(b)(3), HRS: Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

Chapter 226-6, HRS, Objectives and Policies for the Economy - in General

226-6(a)(1), HRS: Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.

226-6(b)(6), HRS: Strive to achieve a level of construction activity responsive to, and consistent with, State growth objectives.

Chapter 226-11, HRS, Objectives and Policies for the Physical Environment - Land-Based, Shoreline, and Marine Resources.

226-11(a)(2), HRS: Effective protection of Hawaii's unique and fragile environmental resources.

226-11(b)(3), HRS: Take into account the physical attributes of areas when planning and designing activities and facilities.

226-11(b)(8), HRS: Pursue compatible relationships among activities, facilities, and natural resources.

Chapter 226-12, HRS, Objective and Policies for the Physical Environment - Scenic, Natural Beauty, and Historic Resources.

226-12(b)(1), HRS: Promote the preservation and restoration of significant natural and historic resources.

226-12(b)(4), HRS: Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.

226-12(b)(5), HRS: Encourage the design of developments and activities that complement the natural beauty of the islands.

Chapter 226-13, HRS, Objectives and Policies for the Physical Environment - Land, Air, and Water Quality.

226-13(b)(2), HRS: Promote the proper management of Hawaii"s land and water resources.

226-13(b)(6), HRS: Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.

226-13(b)(7), HRS: Encourage urban developments in close proximity to existing services and facilities.

Chapter 226-19, HRS, Objectives and Policies for Socio-Cultural Advancement - Housing.

226-19(a)(2), HRS: The orderly development of residential areas sensitive to community needs and other land uses.

226-19(b)(1), HRS: Effectively accommodate the housing needs of Hawaii's people.

226-19(b)(3), HRS: Increase home ownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.

226-19(b)(5), HRS: Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.

226-19(b)(7), HRS: Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the culture and values of the community.

Chapter 226-23, HRS, Objective and Policies for Socio-Cultural Advancement - Leisure.

226-23(b)(4), HRS: Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.

Chapter 226-25, HRS, Objective and Policies for Socio-Cultural Advancement - Culture.

226-25(b)(1), HRS: Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and the history of Hawaii.

2. ***Priority Guidelines of the Hawaii State Plan***

The proposed action is in keeping with the following priority guidelines of the Hawaii State Plan.

Chapter 226-103, HRS, Economic Priority Guidelines:

226-103(1): Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.

a. Encourage investments which:

(i) Reflect long term commitments to the State;

(ii) Rely on economic linkages within the local economy;

(iii) Diversify the economy;

(iv) Reinvest in the local economy;

(v) Are sensitive to community needs and priorities; and

(vi) Demonstrate a commitment to management opportunities to Hawaii residents.

Chapter 226-104, HRS, Population Growth and Land Resources Priority Guidelines

226-104(a)(1), HRS: Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people.

226-104(b)(1), HRS: Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.

226-104(b)(2), HRS: Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

226-104(b)(12), HRS: Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline conservation lands, and other limited resources for future generations.

Chapter 226-106, HRS: Affordable Housing Priority Guidelines

226-106(1), HRS: Seek to use marginal or nonessential agricultural land and public land to meet

housing needs of low- and moderate-income and gap-group households.

226-106(8), HRS: Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.

E. STATE FUNCTIONAL PLANS

The State Functional Plans implement the Hawaii State Plan by identifying needs, problems and issues, and by recommending 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 Agriculture Functional Plan

The proposed action will reclassify 28.695 acres of land from the State Agricultural district to the State Urban district. While the subject property was formerly utilized for pineapple cultivation, it has lay fallow for a number of years. As the subject property is designated for Single-Family Residential use by the community plan and is deemed zoned for R-3, Residential district use, these considerations, coupled with the proximity of the subject property to existing and planned urban land uses, provide a reasonable nexus and an appropriate foundation for the proposed reclassification request.

2. State Historic Preservation Functional Plan

With lot sizes ranging from approximately 18,000 square feet to 34,000 square feet, the proposed subdivision will maintain the rural sense of place and historic open space character of the Upcountry

region. The existing heiau on the subject property will be preserved in place and provide the public with an opportunity to learn more about Hawaii's unique culture.

3. *State Housing Functional Plan*

Market studies indicate a current shortage of single-family housing in the Upcountry area with the demand for housing increasing. The 49 single-family residential lots within the proposed subdivision will provide residents with the opportunity to purchase a lot and construct a home that best fits their needs.

4. *State Recreational Functional Plan*

The proposed project will not impact recreational facilities. The applicant will utilize park credits from its Kulamalu Project to satisfy the park dedication requirements for the project.

5. *State Transportation Functional Plan*

The provision of paved pedestrian pathways leading from the subdivision to the Old Haleakala Highway will provide subdivision residents with alternate access to surrounding areas, including the town of Pukalani and King Kekaulike High School. In addition, the provision of curbed islands within the subdivision's streets will have a traffic-calming effect and enhance public safety and transportation.

F. *HAWAII COASTAL ZONE MANAGEMENT PROGRAM*

The Hawaii Coastal Zone Management Program (HCZMP), as formalized in Chapter 205A, Hawaii Revised Statutes, establishes objectives and policies for the preservation, protection, and restoration of natural resources of Hawaii's coastal zone. Functional areas addressed by the

HCZMP include recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation and beach protection.

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

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 non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

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

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

Response: The proposed action is not anticipated to impact coastal recreational opportunities or affect existing public access to the shoreline. In addition, the proposed project is not a direct generator of, nor does it create a demand for, regional recreational resources.

2. *Historical/Cultural 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 archeological 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: The subject property was previously utilized for pineapple cultivation. The existing heiau will be preserved in place

and surrounded by a 100-foot buffer. A preservation plan for the interim and long-term protection and preservation heiau has been recently submitted to the State Historic Preservation Division (SHPD) for review and approval. Archaeological monitoring will be conducted for all ground-altering construction activities in the vicinity of the heiau. An archaeological monitoring plan will be prepared and submitted to SHPD for review and approval prior to the start of construction. Should archaeological features, cultural artifacts, or human burials be inadvertently discovered during ground-altering construction activities, work shall cease at once in the immediate area of the find, and the find shall be protected from further disturbance. The State Historic Preservation Division shall be immediately notified to determine the significance of the find and establish appropriate mitigative measures, if necessary.

3. ***Scenic and Open Space Resources***

Objectives: 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 proposed subdivision will be designed and landscaped in accordance with applicable regulatory standards to

ensure visual compatibility with surrounding land uses. The proposed action is not contrary to the objectives and policies for scenic and open space resources.

4. *Coastal Ecosystem*

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: The proposed action is not expected to adversely impact coastal ecosystems. The subdivision's drainage system will be designed in accordance with applicable regulatory standards to ensure that there are no adverse effects to adjacent or downstream properties.

In addition, appropriate erosion control measures will be

implemented to minimize the effects of stormwater runoff during construction of the subdivision and to ensure that coastal ecosystems are not adversely impacted.

5. *Economic Use*

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

Policies:

a. Concentrate coastal dependent development in appropriate areas;

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

c. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
   (i) Use of presently designated locations is not feasible;
   (ii) Adverse environmental effects are minimized; and
   (iii) The development is important to the State's economy.

Response: The proposed project is consistent with the goals of the Makawao-Pukalani-Kula Community Plan, which guides growth and development in the region.

6. *Coastal Hazards*

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

Policies:

a. Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
b. Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;
c. Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
d. Prevent coastal flooding from inland projects.

Response: The subject property falls within Zone C, an area of minimal flooding. The drainage system for the subdivision will be designed in accordance with the Drainage Standards of the County of Maui to ensure that surface runoff from the site will not adversely affect downstream and adjoining 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 of conflicting permit requirements; and
c. Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: All aspects of development will be conducted in accordance with applicable State and County requirements. Opportunity for review of the proposed action is offered through

various regulatory permit 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: Opportunities for public awareness, education, and participation in coastal management are provided through various regulatory permit 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 subject property is located approximately 8 miles from the shoreline and is not anticipated to impact shoreline processes.

10. Marine Resources

Objective:

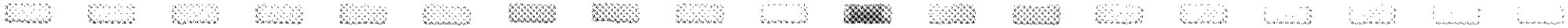
Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

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.

Resources: Best Management Practices (BMP's) will be incorporated during construction to support the policies of effective management of marine resources.

It is noted that the subject property is not located within the boundaries of the County of Maui's Special Management Area.



V. CONFORMANCE WITH COUNTY PLANS AND PROGRAMS

A. GENERAL PLAN OF THE COUNTY OF MAUI

The General Plan of the County of Maui provides long-term goals, objectives and policies directed toward the betterment of living conditions in the county. Addressed are social, environmental, and economic issues which influence both the quantity and quality of growth in Maui County. The proposed action is in consonance with the following objectives and policies of the General Plan.

Objectives:

To preserve for present and future generations existing geographic and traditional 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.

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

Preserve and protect the County's unique and fragile environmental resources.

To preserve for present and future generations the opportunity to know and experience the arts, culture, and history of Maui County.

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

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

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

To provide a wide range of recreational, cultural, and traditional opportunities for all our people.

Policies:

Provide and maintain a range of land use districts sufficient to meet the

social, physical, environmental and economic needs of the community.

Identify and preserve significant historic and cultural sites.

Preserve for present and future generations the opportunity to experience the natural beauty of the islands.

Encourage the recordation and preservation of all cultural and historic resources, to include culturally significant natural resources.

Identify and maintain an inventory of significant and unique cultural resources for special protection.

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

Encourage the establishment of continuous green areas, bike paths, active and passive recreation areas, and mini-parks in new subdivision development.

Support Maui County's street tree plan and encourage landscape planting, irrigation, and maintenance programs along all public highways and rights-of-way.

Encourage the identification, restoration, and preservation of important archaeological, historical, and cultural sites.

B. *MAKAWAO-PUKALANI-KULA COMMUNITY PLAN*

The subject property is located within the Makawao-Pukalani-Kula Community Plan region, one (1) of nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective community plans, which are designed to implement the Maui County General Plan. Each community plan contains recommendations and standards which guide the sequencing, patterns, and characteristics of future development in the region.

The subject property is designated for Single-Family Residential use by the Makawao-Pukalani-Kula Community Plan. The proposed action is in

keeping with the following goals, objectives, and policies of the community plan. See Figure 9.

Goals:

Land Use - The maintenance and enhancement of Upcountry's unique and diverse rural land use character with sensitivity to existing land use patterns, natural resource values, and economic and social needs of the region's residents.

Environment - Protection of Upcountry's natural resources and environment as a means of preserving and enhancing the region's unique beauty, serenity, ecology, and productivity, in order that future generations may enjoy and appreciate an environment of equal or higher quality.

Cultural Resources - The identification, preservation, and where appropriate, restoration and promotion of cultural resources and practices which reflect the rich and diverse heritage found in the Upcountry region.

Housing - Housing opportunities for the residents of Makawao-Pukalani-Kula, to include all income and age groups, which are affordable, safe, and environmentally and culturally compatible.

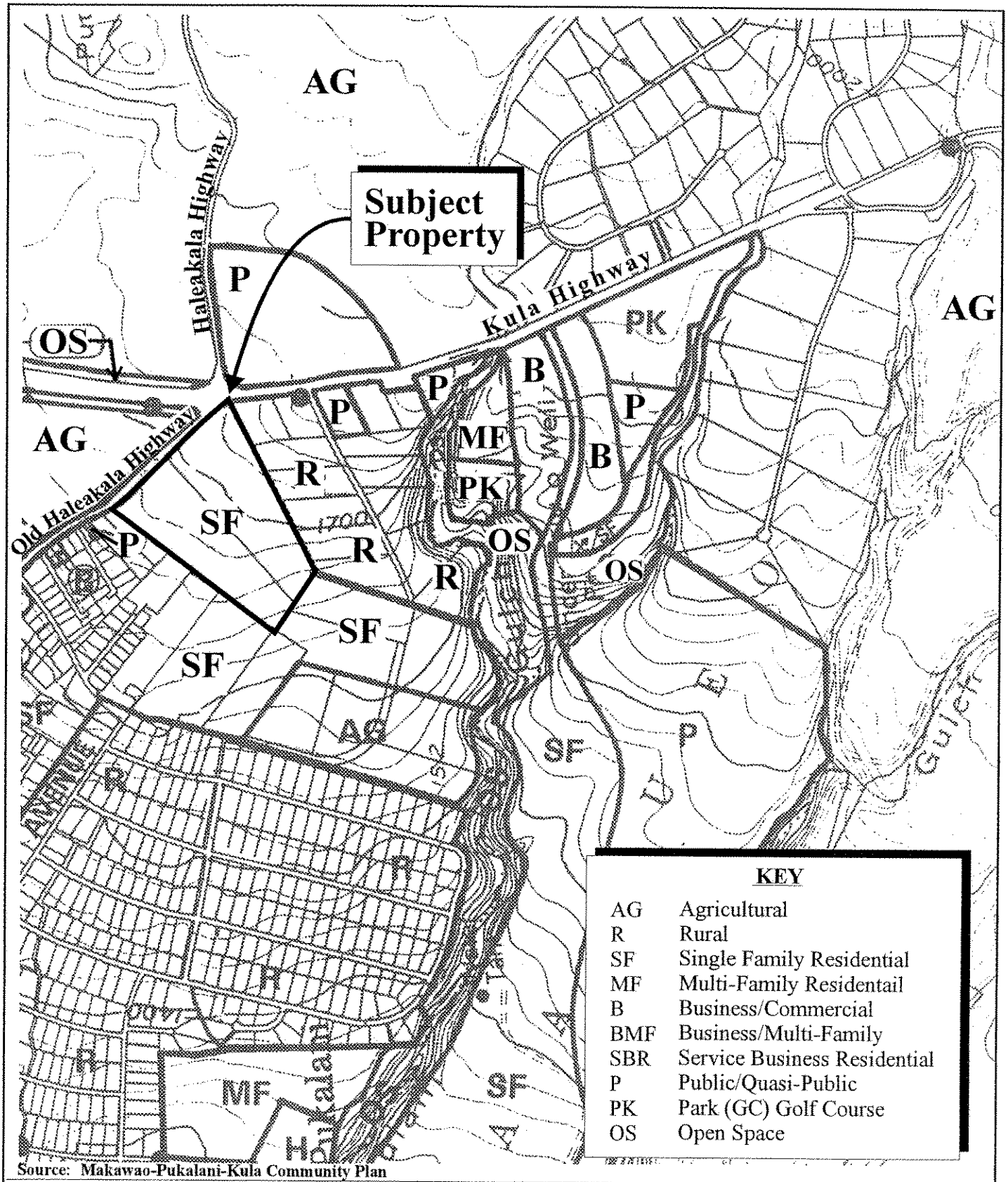
Objectives and Policies:

Land Use - Encourage new residential developments in areas which are contiguous extensions of, or infills within the established residential pattern, and which do not adversely affect agricultural uses.

Land Use - Within Pukalani, support the following land use and circulation patterns within Pukalani: single-family expansion contiguous with existing residential uses; parks and open spaces within and surrounding commercial and residential areas.

Land Use - Where appropriate, support the reclassification of State Land Use districts to ensure consistency between State Land Use designations and land use designations defined by the Makawao-Pukalani-Kula land use map.

Land Use - Ensure an adequate supply of lands designated for residential use to address the affordable and elderly housing needs of the region's residents.



Source: Makawao-Pukalani-Kula Community Plan

Figure 9 Proposed Kualono Subdivision

Makawao-Pukalani-Kula Community Plan Land Use Designations

0 250 500 1000 Feet

Prepared for: Hanohano LLC

MUNEKIYO & HIRAGA, INC.

Land Use - Ensure an adequate supply of land designated for residential use to provide opportunity for residents to participate in housing market "trade ups".

Cultural Resources - Promote distinct cultural resources as an identifying characteristic of the region.

Cultural Resources - Protect the visual integrity of Upcountry cultural landscapes.

Housing - To establish an efficient settlement pattern, discourage a dispersed pattern of development, thereby reducing public service, infrastructure, and maintenance costs.

Housing - Seek the timely and orderly development of lands designated by the community plan for residential purposes.

In addition, the proposed action is in consonance with the following implementing action and planning standard included in the community plan.

Implementing Actions:

Land Use - The 21-acre Malama Pacific property shall have an appropriate buffer and one row of Rural uses on the mauka side.

Planning Standards:

Cultural Resources - Require appropriate mitigative measures as needed to preserve and protect archaeological sites. Such measures could include greater building setbacks (suggested minimum of 50 feet), buffer areas, controlled access, or other means as appropriate.

C. ZONING

The subject property is deemed zoned for R-3, Residential District use.

Pursuant to Chapter 19.08 of the Maui County Code pertaining to the Residential District, uses permitted in this district include the following:

> *"single-family residences; greenhouses, flower and truck gardens and nurseries; parks and playgrounds, schools, buildings or premises uses by the Federal, State, or County governments for public purposes; accessory buildings*

located on the same lot (provided such use is necessary to that of the main dwelling or the use of the land); an accessory dwelling (where the area of the lot on which the main dwelling is located is 7,500 square feet or more); day care nurseries, kindergartens, nursery schools, child care homes, day care homes, day care centers, nurseries, preschool kindergartens, babysitting services, and specified bed and breakfast homes."

Prior to the early consultation process for the preparation of the Draft EA, consultation with the County of Maui indicated that the subject property is zoned for R-3, Residential District use. Subsequently, the County indicated that the subject property is located within the "Interim Zoning District". While the Single-Family Residential use that is accorded to the subject property by the Makawao-Pukalani-Kula Community Plan is consistent with R-3, Residential District zoning, the applicant acknowledges that the zoning of the subject property will require clarification with the County Planning Department. If required, a request for a change in zoning will be prepared and submitted to the Planning Department for processing as a subsequent action to the granting of the District Boundary Amendment.

VI. ALTERNATIVES TO THE PROPOSED ACTION

A. NO ACTION ALTERNATIVE

The proposed project involves the development of 28.695 acres of vacant land to provide 49 single-family residential house lots ranging in size from approximately 18,000 to 34,000 square feet. The proposed subdivision will be located along the southerly limits of the town of Pukalani and is in consonance with existing surrounding land uses in the area.

The "no action" alternative would maintain the existing physical condition of the project site. When considering the land use context for the subject property, the "no action" alternative does not support the highest and best use of the property as reflected by the Makawao-Pukalani-Kula Community Plan (Single Family) and Maui County zoning (R-3, Residential) land use designations for the property.

B. DEFERRED ACTION ALTERNATIVE

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

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

C. SITE PLAN ALTERNATIVE

During the project's site planning phase, requirements for the proposed subdivision were examined to ensure that spatial and functional criteria for

the project were adequately addressed. The site planning process involved an adjacencies, and space relationships and layouts. Through the planning and environmental review process, the project's conceptual site development plan was reviewed and modified to ensure that operational and performance standards for the subdivision are addressed.

VII. SUMMARY OF ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed action will result in unavoidable construction-related impacts which include noise-generated impacts occurring from the proposed improvements. In addition, there may be temporary air quality impacts associated with dust generated from exhaust emissions discharged by construction equipment. Appropriate mitigation measures will be implemented to minimize these construction-related impacts.

The proposed project is not anticipated to create any significant, long-term adverse environmental effects.

VIII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The construction of the proposed project would involve the commitment of land for the proposed action. However, this commitment is consistent with land use policies and plans for the region. There are no other significant irreversible and irretrievable commitment of resources associated with the proposed action.

IX. 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 analysis is provided:

1. *No Irrevocable Commitment to Loss or Destruction of any Natural or Cultural Resource Would Occur as a Result of the Proposed Project*

The proposed project will not result in any adverse environmental impacts. There are no known, rare, threatened or endangered species of flora, fauna or avifauna located within the subject property.

Site 2701 (heiau) will be preserved in place. A preservation plan for the heiau has been recently submitted to the State Historic Preservation Division (SHPD) for review and approval. Archaeological monitoring will be conducted during all ground-altering construction activities in the vicinity of the heiau. An archaeological monitoring plan will be prepared and submitted to the SHPD for review and approval prior to the start of construction. Should archaeological features be encountered during construction, work will be halted in the immediate vicinity of the find and the find protected from any further disturbance. The SHPD will be promptly notified and appropriate mitigative measures will be formulated, if necessary.

2. *The Proposed Action Would Not Curtail the Range of Beneficial Uses of the Environment*

The proposed action and the commitment of land resources will not curtail the range of beneficial uses of the environment. The proposed project is intended to provide additional housing opportunities for Maui's residents. Use of the land for housing purposes is considered appropriate in the

context of the Makawao-Pukalani-Kula Community Plan and the current market need for new housing inventory.

3. ***The Proposed Action Does Not Conflict with the State's Long-term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, Hawaii Revised Statutes***

The State's Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes. The proposed action is in consonance with the policies and guidelines.

4. ***The Economic or Social Welfare of the Community or State Would Not be Substantially Affected***

The proposed project is expected to have a direct beneficial effect on the local economy during construction. In the longer term, the addition of housing units to the market inventory is anticipated to address a portion of the housing demand currently facing Maui residents.

5. ***The Proposed Action Does Not Affect Public Health***

No impacts to the public's health and welfare are anticipated as a result of the proposed project.

6. ***No Substantial Secondary Impacts, Such as Population Changes or Effects on Public Facilities are Anticipated***

The proposed subdivision is anticipated to accommodate demand from existing residents.

The proposed action is not expected to adversely impact existing water and wastewater systems and facilities. Best Management Practices (BMP's) and appropriate erosion control measures will be utilized during the construction period. Drainage system improvements will be

constructed in accordance with applicable regulatory design standards to ensure that surface runoff will not have an adverse effect on adjacent or downstream properties. The project is not expected to adversely impact public services such as police, fire, and emergency medical operations, nor is it anticipated to have an adverse effect upon educational and recreational facilities.

7. ***No Substantial Degradation of Environmental Quality is Anticipated***

During the construction phase of the project, there will be short-term air quality and noise impacts as a result of the project. In the long term, effects upon air quality and ambient noise levels should be minimal. The project is not anticipated to significantly affect the open space and scenic character of the area.

No substantial degradation of environmental quality resulting from the project is anticipated.

8. ***The Proposed Action Does Not Involve a Commitment to Larger Actions, Nor Would Cumulative Impacts Result in Considerable Effects on the Environment***

The proposed action does not involve a commitment to larger actions.

9. ***No Rare, Threatened or Endangered Species or Their Habitats Would be Adversely Affected by the Proposed Action***

There are no rare, threatened or endangered species of flora, fauna, avifauna or their habitats on the subject property.

10. ***Air Quality, Water Quality or Ambient Noise Levels Would Not be Detrimentally Affected by the Proposed Project***

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind-blown emissions. Noise impacts will occur primarily from construction-related activities. It is anticipated that construction will be limited to daylight working hours. Water quality is not expected to be affected.

In the long term, the project is not anticipated to have a significant impact on air and water quality or ambient noise levels.

11. ***The Proposed Project Would Not Affect Environmentally Sensitive Areas, Such as Flood Plains, Tsunami Zones, Erosion-prone Areas, Geologically Hazardous Lands, Estuaries, Fresh Waters or Coastal Waters***

The proposed project is not located within and would not affect environmentally sensitive areas. The subject property is not subject to flooding or tsunami inundation nor are the soils of the property erosion-prone. There are no geologically hazardous lands, estuaries, or coastal waters within or adjacent to the subject property.

12. ***The Proposed Action Would Not Substantially Affect Scenic Vistas and Viewplanes Identified in County or State Plans or Studies***

The subject property is not identified as a scenic vista or viewplane. The proposed action will not affect scenic corridors and coastal scenic and open space resources.

13. ***The Proposed Action Would Not Require Substantial Energy Consumption***

The proposed action will involve the short-term commitment of fuel for equipment, vehicles, and machinery during construction activities. However, this use is not anticipated to result in a substantial consumption of energy resources. In the long term, the project will create an additional demand for electricity. However, this demand is not deemed substantial or excessive within the context of the region's overall energy consumption.

Based on the foregoing findings, it is anticipated that the proposed action will not result in any significant impacts.

X. LIST OF PERMITS AND APPROVALS

The following permits and approvals will be required prior to the implementation of the project.

State of Hawaii

1. State Land Use Commission District Boundary Amendment
2. Work-to-Perform in State right-of-way
3. NPDES Permit
4. Community Noise Permit (as applicable)

County of Maui

1. Construction Permits (e.g., grubbing, grading, driveway, electrical, plumbing, work-to-perform in County right-of-way).

A change in zoning may be required pending the results of discussions with the County of Maui. If required, the zoning change will be processed as a subsequent action to the granting of the District Boundary Amendment.

XI. AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during the preparation of the Draft Environmental Assessment. Agency comments and responses to substantive comments are also included in this section.

1. Neal Fujiwara, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

2. George Young, P.E.
Chief, Regulatory Branch
U.S. Army
Engineer District, Honolulu
Bldg. 230
Fort Shafter, Hawaii 96858-5440

3. Paul Henson, Ph.D.
Field Supervisor
U. S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122, Box 50088
Honolulu, Hawaii 96850

4. Rae Loui, Assistant Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

5. Chiyome L. Fukino, M.D., Director
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

6. Peter T. Young, Director
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

7. P. Holly McEldowney, Acting Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

8. Fred Cajigal, Maui District Engineer
State of Hawaii
Department of Transportation
Highways Division
650 Palapala Drive
Kahului, Hawaii 96732

9. Clyde Namu'o, Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

10. Carl Kaupololo, Chief
County of Maui
Department of Fire Control
200 Dairy Road
Kahului, Hawaii 96732

11. Alice Lee, Director
County of Maui
Department of Housing and Human Concerns
200 S. High Street
Wailuku, Hawaii 96793

12. Michael W. Foley, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

13. Glenn Correa, Director
County of Maui
Department of Parks and Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawaii 96793

14. Tom Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

15. Gilbert Coloma-Agaran, Director
County of Maui
Department of Public Works and Waste Management
200 South High Street
Wailuku, Hawaii 96793

16. George Tengan, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

17. Honorable Charmaine Tavares
Councilmember
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

18. Ms. Elliott Krash, President
Kula Community Association
P.O. Box 417
Kula, Hawaii 96790

19. Aric Nakashima, President
Pukalani Community Association
15 Makawao Avenue
Makawao, Hawaii 96768

20. Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96793

NOV 26 2003

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
File:

October 3, 2003

Mr. Glenn Tadaki
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Ste 104
Wailuku, HI 96793

Dear Mr. Tadaki:

SUBJECT: **Comments to the Proposed Development**
Kualono Subdivision
Pukalani, Maui

Our comments should be printed as follows:

"Project activities shall comply with the Administrative Rules of the Department of Health:

- Chapter 11-46 Community Noise Control.

Should there be any questions, please contact me at 586-4701.

Sincerely,

Russell S. Takata
Program Manager
Noise, Radiation & IAQ Branch

MUNEKIYO & HIRAGA, INC.

December 3, 2003

Russell S. Takata, Program Manager
Noise, Radiation and IAQ Branch
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Takata:

Thank you for providing us with your October 3, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

Construction activities will comply with the applicable provisions of Chapter 11.46 of the Hawaii Administrative Rules pertaining to Community Noise Control.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
Warren Unemori, Warren S. Unemori Engineering, Inc.
dowling\pukalani\dohnoise.res

LINDA LINGLE
GOVERNOR

OCT 28 2003

RODNEY K. HARAGA
DIRECTOR

DEPUTY DIRECTOR
BRUCE Y. MATSUI

IN REPLY FERER TO;
HWY-M 2.512-03

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732-2321

October 24, 2003

MEMORANDUM

TO: **Glenn Tadaki**
Munekiyo & Håraga, Inc.

FROM: **Paul M. Chung**
State Highways

SUBJECT: **Kualono Subdivision**
ME 03-65

Thank you for the opportunity to provide early consultation for the subject project. Based upon our review of the submittal, a Traffic Impact Assessment Report should be included in the Environmental Assessment.

If there are any questions or concerns, please call me at 873-3535.

/pmc

MUNEKIYO & HIRAGA, INC.

November 14, 2003

Paul Chung, Maui District
Highways Division
Department of Transportation
650 Palapala Drive
Kahului, Hawaii 96732-2321

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Chung:

Thank you for providing us with your October 24, 2003 comments on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

A Traffic Impact Analysis Report will be included in the Draft Environmental Assessment (EA). A copy of the Draft EA will also be provided to the Department of Transportation for review.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
dowling\pukalani\dot.res

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

ALAN M. ARAKAWA
Mayor

ALICE L. LEE
Director

HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

NOV 03 2003

October 27, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

Subject: **PROPOSED KUALONO SUBDIVISION**
TMK: 2-3-11:01 AND 02

We have reviewed your October 20, 2003 letter and enclosures and wish to inform you that the Administration's Maui County Housing Policy applies to applications for a change-in-zoning which establish land use designations under which a residential housing project is developed.

Thank you for the opportunity to comment.

Very truly yours,

ALICE L. LEE
Director

ETO:hs

c: Housing Administrator

MUNEKIYO & HIRAGA, INC.

December 22, 2003

Alice L. Lee, Director
Department of Housing
and Human Concerns
County of Maui
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Ms. Lee:

Thank you for providing us with your October 27, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

Affordable housing requirements associated with the granting of the District Boundary Amendment for the project will be discussed with the Department of Housing and Human Concerns.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Don Fujimoto, Hanohano LLC
dowling/pukalani/dhhcltr.res

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

NOV 12 2003

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
File:

November 6, 2003

03-1180A CAB

Mr. Glenn Tadaki, Planner
Munekiyo and Hiraga, Inc.
305 High Street, Suite 103
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: Pre-Assessment Consultation for the Proposed Kualono Subdivision, Pukalani, Maui

This letter is to transmit the following comments on the subject document:

Control of Fugitive Dust:

There is a significant potential for fugitive dust emissions during all phases of construction. Proposed construction activities will occur in proximity to existing residences and major thoroughfares, thereby exacerbating potential dust problems. It is recommended that a dust control management plan be developed which identifies and addresses all activities that have a potential to generate fugitive dust. Implementation of adequate dust control measures during all phases of development and construction activities is warranted.

Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust.

The contractor should provide adequate measures to control dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:

a) Plan the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Provide an adequate water source at the site prior to start-up of construction activities;
c) Landscape and provide rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimize dust from shoulders and access roads;
e) Provide adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Control dust from debris being hauled away from the project site.

If you have any questions, please contact Mr. Barry Ching of my staff at 586-4200.

Sincerely,

for WILFRED K. NAGAMINE
Manager, Clean Air Branch

BC:jhm

MUNEKIYO & HIRAGA, INC.

November 21, 2003

Wilfred K. Nagamine, Manager
Clean Air Branch
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Nagamine:

Thank you for providing us with your November 6, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

Construction activities will comply with the applicable provisions of Section 11-60 of the Hawaii Administrative Rules pertaining to Fugitive Dust. In addition, Best Management Practices, similar to those described in your letter, will be utilized to control dust during the construction and development of the project.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
Warren Unemori, Warren S. Unemori Engineering, Inc.
dowling\pukalani\dohcab.res

NOV 12 2003

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EMD / CWB

11018PAW.03

November 6, 2003

Mr. Glenn Tadaki
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

Subject: Proposed Kualono Subdivision
TMK 2-3-11:01 and 02

The Department of Health, Clean Water Branch (CWB), has reviewed the subject document and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 to identify whether a Federal license or permit (including a Department of Army permit) is required for this project. Pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification 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...."

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following activities:

   a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

   b. 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.**

   c. Discharges of treated effluent from leaking underground storage tank remedial activities.

   d. Discharges of once through cooling water less than one (1) million gallons per day.

e. Discharges of hydrotesting water.

f. Discharges of construction dewatering effluent.

g. Discharges of treated effluent from petroleum bulk stations and terminals.

h. Discharges of treated effluent from well drilling activities.

i. Discharges of treated effluent from recycled water distribution systems.

j. Discharges of storm water from a small municipal separate storm sewer system.

k. Discharges of circulation water from decorative ponds or tanks.

The CWB requires that a Notice of Intent (NOI) to be covered by a NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.state.hi.us/doh/eh/cwb/forms/genl-index.html.

3. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible. An application for the NPDES permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at http://www.state.hi.us/doh/eh/cwb/forms/indiv-index.html.

4. Hawaii Administrative Rules, Section 11-55-38, also requires the owner 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. Please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

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

Sincerely,

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

MUNEKIYO & HIRAGA, INC.

November 21, 2003

Denis R. Lau, P.E., Chief
Clean Water Branch
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Lau:

Thank you for your November 6, 2003 comment letter on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. A copy of the project's early consultation letter and project summary were sent to the U.S. Department of the Army for their review and comment.

2. The proposed project will comply with the applicable provisions for NPDES general permit coverage.

3. The proposed project is not expected to involve any type of activity in which wastewater is discharged into State waters.

4. An early consultation letter and project summary were also sent to the State Historic Preservation Division for their review and comment.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
Warren Unemori, Warren S. Unemori Engineering, Inc.
dowling\pukalani\dohcwb.res

NOV 10 2003

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EMD / WB

M2 3 011 001.wpd W10
EPO 03-115 WB 31007

November 6, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Tadaki:

Subject: Proposed Kualono Subdivision - 49 lot residential subdivision
Pukalani, Maui
TMK: (2) 2-3-011: 001 and 002 (14.4 acres and 14.3 acres)

We have reviewed the subject document which proposes to develop a 49 lot residential subdivision and related improvements in Pukalani, Maui. Lot sizes range from approximately 18,000 to 26,000 square feet.

Wastewater treatment and disposal has not be been adequately addressed other than to say individual wastewater systems will be used. No new cesspools will be allowed in this area. We also have concerns regarding the supply of potable water to individual lots. The potable water system may impact development in this area as our wastewater rules have specific setback distance requirements between water wells and on site wastewater systems.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at direct toll-free telephone no. 984-2400 extension 64294.

Sincerely,

HAROLD K. YEE, P.E., CHIEF
Wastewater Branch

LK/mt

MUNEKIYO & HIRAGA, INC.

November 21, 2003

Harold K. Yee, P.E., Chief
Wastewater Branch
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Yee:

Thank you for providing us with your November 6, 2003 comments on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

The applicant developed a new well in Kaupakalua to supplement the County's surface water source for the Makawao/Pukalani water system. In exchange for developing this source, the applicant is entitled to a percentage of the new well's total capacity. A portion of the applicant's capacity allocation will be used to satisfy the potable water demands for the project.

Individual wastewater systems comprised of septic tanks with seepage pits or leach fields will be utilized to accommodate the wastewater for each developable lot in the subdivision. The design and installation of these individual wastewater systems will be in accordance with Chapter 11-62 of the Hawaii Administrative Rules pertaining to Wastewater Systems.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
Warren Unemori, Warren S. Unemori Engineering, Inc.
dowling\pukalani\dohwwb.res

NOV 18 2003

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

November 14, 2003

Mr. Glenn Tadaki
Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

LOG NO: 2003.2350
DOC NO: 0311CD28

Dear Mr. Tadaki,

SUBJECT: **Chapter 6E-42 Historic Preservation Review – Information Request**
For the Proposed Kualono Subdivision
Makaehu Ahupua`a, Makawao District, Island of Maui
TMK: (2) 2-3-011:001 and 002

Thank you for the opportunity to review and comment on the Request for the Proposed Kualono Subdivision, which was received by our staff November 22, 2003. Our review is based on reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was conducted of the subject property.

Based on the submitted information request, we understand the proposed undertaking consists of the construction of a 49-lot subdivision to be located on two contiguous parcels involving a total of 14.3 acres. In addition to landscaping and infrastructure, an approximately 2.1 acre park/retention basin is proposed to be constructed along the project's western boundary. There is an existing *heiau* located within the area designated for the proposed park/retention basin which will be preserved with a 100-foot open space buffer. The subject properties are currently vacant and vegetation cover includes scattered trees, grasses, and shrubs. We also understand an Environmental Assessment is will be prepared as required by Chapter 343, Hawaii Revised Statutes (HRS).

A search of our records indicates an archaeological inventory survey has not been conducted of the subject property. This area in general is likely to have once been the location of pre-Contact farming, perhaps with scattered houses. In 1990, Archaeological Consultants of Hawaii (ACH) conducted subsurface testing at the site of the *heiau* to determine if the structure was a formal *heiau*. Based on the findings of the excavations, it was concluded that the structure is a *heiau* and assigned a State Inventory of Historic Properties (SIHP) Site Number 50-50-10-2701. The report documenting the findings (*Letter Report to Mr. McClary from Archaeological Consultants of Hawaii*...Kennedy 1990) does not meet our current standards of inventory survey, only focuses on the *heiau*, and does not cover the entire property involved in the proposed undertaking. In addition, we have no record on file showing that we have reviewed and accepted this document.

Given the above information, and in order to determine the effect of the proposed undertaking on historic sites, we recommend that no action be taken on the proposed undertaking until an archaeological inventory survey has been conducted of the proposed project area to determine whether additional significant historic sites are present. An acceptable report documenting the findings of the survey will need to be submitted to this office for review. If significant historic sites are identified, a mitigation plan may need to be developed, in consultation with this office, and executed. We appreciate your commitment to preserve SIHP – 2701. However we believe we will be better able to determine an appropriate buffer zone following the completion of the inventory survey.

If you have any questions, please call Cathleen A. Dagher at 692-8023.

Aloha,

P. Holly McEldowney

P. Holly McEldowney, Acting Administrator
State Historic Preservation Division

CD:jen

c: Cultural Resources Commission, Planning Dept, 250 S. High Street, Wailuku, HI 96793
Michael Foley, Director, Dept of Planning, 250 South High Street, Wailuku, HI 96793

MUNEKIYO & HIRAGA, INC.

November 21, 2003

P. Holly McEldowney, Acting Administrator
State Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Ms. McEldowney:

Thank you for providing us with your November 14, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

An archaeological inventory survey of the subject properties was conducted in July 2003. The report documenting the findings of the survey was recently completed and submitted to the State Historic Preservation Division for review and approval.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
Lisa Rotunno-Hazuka, Archaeological Services Hawaii
dowling\pukalani\shpd.res

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

POLICE DEPARTMENT
COUNTY OF MAUI

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE
YOUR REFERENCE

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

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

November 17, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Tadaki:

SUBJECT: Proposed Kualono Subdivision TMK 2-3-11:01 and 02

Thank you for your letter of October 20, 2003, requesting comments on the above subject.

We have reviewed the proposed summary and have enclosed our comments and recommendations. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Sydney Kikuchi
for: Thomas M. Phillips
Chief of Police

Enclosure

c: Michael W. Foley, Dept. of Planning

COPY

TO : THOMAS PHILLIPS, CHIEF, MAUI POLICE DEPARTMENT

VIA : CHANNELS 11/17/03

FROM : RANDALL BURGESS, P.O.III, COMMUNITY POLICING

SUBJECT : PROPOSED KUALONO SUBDIVISION

Sir, this To/From is being submitted in regards to police comments/recommendations to the proposed Kualono Subdivision located at TMK 2-3-11-01 and 02 in Pukalani, Hi.

Project review and site inspection revealed the following comments in regards to vehicle and pedestrian traffic:

* For vehicle traffic Kula bound on Old Haleakala Hwy., suggest a turnout/deceleration lane for vehicles entering the project.

* For vehicle traffic Pukalani bound on Old Haleakala Hwy., suggest a left turn only lane for vehicles entering the project.

* In regards to pedestrian traffic along Old Haleakala Hwy., there are currently no concrete sidewalks in the area of the project.

In closing, there are no further comments at this time.

COMMENTS NOTED:
11/7/03

Respectfully submitted,
Randall Burgess
Randall BURGESS #1023
110703 @ 1445 hours

B/CAPT SOLOMON WAS SICK WHEN THIS WAS SUBMITTED. I FOUND THIS TODAY (11/13/03) DUE TO GUARD EXCLUSE SORRY FOR THE DELAY.
11/13/03

MUNEKIYO & HIRAGA, INC.

December 19, 2003

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

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Chief Phillips:

Thank you for providing us with your department's November 17, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

With regard to your comments about turning lanes, a copy of your comment letter has been furnished to the project's traffic engineer for consideration, as well as for follow-up coordination purposes. In addition, the subdivision's street frontage along the Old Haleakala Highway will be improved with curb, gutter, and sidewalk improvements as required by County standards.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
Keith Niiya, Austin Tsutsumi & Associates, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
dowling\pukalani\mpd.res

NOV 18 2003

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

November 18, 2003

REPLY TO
ATTENTION OF
Regulatory Branch

Mr. Glen Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

This letter responds to your request for comments on the proposed Kualono Subdivision project, dated October 20, 2003. Based on the information you provided I am unable to determine if a Department of the Army (DA) permit will be required for this project. Please include information in the environmental assessment (EA) concerning the presence or absence of streams or other water bodies or wetlands on the property, and if present, what effect the project will have on them. Please place us on the mailing list for the draft EA.

If you have any questions concerning this matter, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200400025.

For your information, the correct address for this office is:
Regulatory Branch
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

Sincerely,

William B. Lennan

for George P. Young, P.E.
Chief, Regulatory Branch

MUNEKIYO & HIRAGA, INC.

December 3, 2003

George P. Young, P.E. , Chief
Regulatory Branch
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Young:

Thank you for providing us with your November 18, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

There are no wetlands, streams or other water bodies present on the subject properties. Information regarding this condition will be included in the Environmental Assessment.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
dowling\pukalani\usarmy.res

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

ALAN M. ARAKAWA
Mayor

GILBERT S. COLOMA-AGARAN
Director

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

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

NOV 26 2003

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

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

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

BRIAN HASHIRO, P.E.
Highways Division

JOHN D. HARDER
Solid Waste Division

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

November 20, 2003

Mr. Glenn Tadaki, Planner
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: EARLY CONSULTATION
PROPOSED KUALONO SUBDIVISION
TMK: (2) 2-3-011:001, 002

We reviewed the subject application and have the following comments:

1. Submit plan for disposal and composting of cleared and grubbed material and disposal and recycling of construction waste.

2. Require construction of subdivision improvements for roadways such as curb, gutter, sidewalk which shall be built to County standards if the roads are to be dedicated to the County.

3. Traffic-calming islands within the roads are to be kept under private maintenance.

4. Any drainage system traversing private property shall be kept under private ownership and maintenance. The drainage retention basin shall also be kept under private ownership and maintenance.

5. Applicant shall provide:

   a. Traffic Impact Analysis Report
   b. Master Drainage Plan Report for subdivision.
   c. Provide at least two (2) access vehicular points for this subdivision.

If you have any questions regarding this letter, please call Milton Arakawa at 270-7845.

Very truly yours,

for GILBERT S. COLOMA-AGARAN
Director

GSCA:MA:jlh
S:\LUCA\ALL\PERMITS\JLH\Kualono Subdivision_environmental assessment.wpd

MUNEKIYO & HIRAGA, INC.

December 19, 2003

Gilbert S. Coloma-Agaran, Director
Department of Public Works
and Environmental Management
County of Maui
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Coloma-Agaran:

Thank you for providing us with your November 20, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. A solid waste management plan for the disposal of construction waste will be submitted to the department.

2. The subdivision's streets will be constructed in accordance with County standards.

3. Upon completion of the project, it is anticipated that the maintenance of the traffic-calming islands will be the responsibility of the homeowners association.

4. The applicant will be responsible for the initial upkeep of the drainage system and retention basin. Upon completion of the project, the long-term maintenance of these improvements will be the responsibility of the homeowners association.

5. A traffic impact analysis report and preliminary drainage report have been prepared for the project and will be included in the Environmental Assessment (EA). With regard to your comments about vehicular access points for the subdivision, a copy of your letter has been provided to the project's civil engineer for consideration, as well as for follow-up coordination with your department and the Maui Fire Department.

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

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Don Fujimoto, Hanohano LLC
Keith Niiya, Austin Tsutsumi & Associates, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
dowling\pukalani\dpwem.res

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

DEC 01 2003

COUNTY OF MAUI
DEPARTMENT OF PLANNING

November 25, 2003

Mr. Glenn Tadaki
Munekiyo & Hiraga, Inc.
305 High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Tadaki:

Re: Early Consultation Requirements for the Proposed Kualono Subdivision at TMK: 2-3-011: 001 and 002, Pukalani, Maui, Hawaii

The Planning Department has reviewed the project summary for the proposed 49 lot residential Kualono Subdivision. The project is within the State Agricultural District and within the County Interim District. The Makawao Pukalani Kula Community Plan designates the properties for Single Family Residential Use.

The project summary states that a District Boundary Amendment from the State Agricultural District to the State Urban District will be filed for the project. The applicant is advised that a change in zoning will also be needed for the project as the property is within the Interim District. Issues relating to the proposed project may include:

1. The availability of water for this project.
2. Traffic.
3. The project is proposed to have only one access. The impacts associated with this access along the highway should be discussed.
4. The use of the retention basin as a park site may not be acceptable to the County Parks Department. The applicant should have preliminary discussions with the Parks Department on this issue.
5. Archaeological and cultural issues, in particular the existing heiau, should be discussed with Department of Land and Natural Resources State Historic Preservation Division.

Thank you for your cooperation. If additional clarification is required, please contact Ms. Ann T. Cua, Staff Planner, of this office at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:ATC:lar
c: Clayton I. Yoshida, AICP, Planning Program Administrator
Ann T. Cua, Staff Planner
Project File
General File
(K:\WP_DOCS\PLANNING\EA\2003\KualonoSubdiv\PreConsultationLetter.wpd)

MUNEKIYO & HIRAGA, INC.

December 22, 2003

Michael W. Foley, Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11:01 and 02

Dear Mr. Foley:

Thank you for providing us with your November 25, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. Information on the existing water system in the area, as well as proposed water system improvements will be included in the Environmental Assessment (EA).

2. A traffic impact analysis report has been prepared and will be included in the EA.

3. A copy of your letter has been forwarded to the project's civil engineer for consideration, as well as for follow-up coordination with the Department of Public Works and Environmental Management and the Maui Fire Department.

4. A meeting with the Department of Parks and Recreation will be scheduled to discuss park dedication requirements for the project.

5. A plan for the preservation of the existing heiau will be prepared and submitted to the State Historic Preservation Division for review and approval.

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

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Don Fujimoto, Hanohano LLC
Warren Unemori, Warren S. Unemori Engineering, Inc.
dowling/pukalani/planning.res

LINDA LINGLE
GOVERNOR

DEC 05 2003

PATRICIA HAMAMOTO
SUPERINTENDENT

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

OFFICE OF BUSINESS SERVICES

December 4, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Mr.Tadaki:

SUBJECT: Kualono Subdivision
Pukalani, Maui, TMK: 2-3-11: 01 and 02

The Department of Education (DOE) has reviewed your preliminary description of a 49-lot single-family subdivision in Pukalani, Maui. While your description makes no reference to the exact zoning of the subdivision, we understand the land is zoned R-3, which permits the construction of accessory dwellings or ohana units.

It is reasonable to expect that at least one accessory dwelling will be built. With the building of one primary residential unit per lot and at least one accessory dwelling, the subdivision will be of sufficient size to make a fair-share contribution offsetting the subdivision's impact on neighboring schools.

The DOE will request the County of Maui and/or the State Land Use Commission to impose an educational fair-share contribution. If prior to our request the developer can adequately demonstrate that no accessory units will be built, then we will not request a fair-share contribution.

If you have any questions, please call me at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Sincerely yours,

Rae M. Loui
Assistant Superintendent

RML:hy

c: FSSB

MUNEKIYO & HIRAGA, INC.

December 22, 2003

Rae M. Loui, Assistant Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Ms. Loui:

Thank you for providing us with your December 4, 2003 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

The proposed project will not include accessory dwellings or ohana units. Provisions in this regard will be included in the CC&Rs for the project.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Don Fujimoto, Hanohano LLC
dowling/pukalani/doeltr.res

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

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

DEC 17 2003

DEPARTMENT OF PARKS & RECREATION

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

December 12, 2003

Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: PROPOSED KUALONO SUBDIVISION
TMK 2-3-11:01 and 02

We have reviewed the proposed residential subdivision and reserve comments until details for the proposed park are submitted.

Thank you for the opportunity to review and comment. Should there be any questions, please contact Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

GLENN T. CORREA
Director

c: Patrick Matsui, Chief of Planning and Development

JAN 20 2004

ALAN M. ARAKAWA
Mayor

GEORGE Y. TENGAN
Director

JEFFREY T. PEARSON, P.E.
Deputy Director

DEPARTMENT OF WATER SUPPLY

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

January 13, 2004

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku HI 96793

Dear Mr. Tadaki:

SUBJECT: Proposed Kualono Subdivision - develop 49-lot residential subdivision on 28.7 acres, landscaping, infrastructure and park/retention basin on 2.1 acre portion of the property
TMK (2) 2-3-011:001 & 002

Thank you for the opportunity to comment on this project proposal.

Source Availability and Consumption
The project area is served by the Upcountry / Makawao system. Water for the system comes from Haiku Aquifer and streams in the Koolau System.

The EA should identify sources and expected water consumption for the project. Anticipated daily demand for this project once built-out is approximately 86,000 gallons based on statewide system standard guidelines.

System Infrastructure
Six inch and four inch waterlines abut the northeastern side of the property and a 12-inch waterline is situated in proximity of the project site. The applicant will be required to comply with DWS Rules and Regulations for Subdivisions as well as provide domestic, fire, and irrigation services in accordance with standards. Fire, domestic and irrigation calculations prepared, signed and stamped by a certified architect or engineer will be required during the building permit process. The approved fire flow calculation methods for use include Guidance for Determination of Fire Flow- Insurance Service Office, 1974 and Fire Flow- Hawaii Insurance Bureau, 1991.

The project is located within the Upcountry area affected by the "Shortage of Water Source Capacity Affecting Upcountry Areas". Since November 2, 1994 a priority list of premises has been maintained by the department by the date received. If this project is not on the Upcountry Waiting List for water meters, we suggest that the applicant contact our Engineering Division in order to get on the list. In the event that source is available, the applicant needs to improve the system and possibly construct 100,000 gallon storage.

Conservation
We encourage the applicant to consider the following water conservation measures and integrate them in the project design and construction as well as convey information to future homeowners, where applicable:

Use brackish and/or reclaimed water sources for dust control during construction, if such alternative is available.

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. Refer to the attached handout, "The Costly Drip".

Use Climate -adapted Plants: The project is located in the Maui County Planting Plan - Plant Zone 4. We encourage the applicant to utilize appropriate native and non invasive species and avoid the use of potentially invasive plants. Native plants adapted to the area, conserve water and protect the watershed from degradation due to invasive alien species. Attached is a list of appropriate plants for the zone as well as potentially invasive plants to avoid.

Limit Irrigated Turf: Limit irrigated turf by 25% or less of total landscaped area. Select turf species with low water use requirements. Low-water use shrubs and ground covers can be equally attractive and require substantially less water than turf.

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

Pollution Prevention

The project overlies the Makawao aquifer which has a sustainable yield of 7 MGD. We encourage the applicant to adopt Best Management Practices (BMPs) designed to minimize infiltration and runoff from construction and vehicle operations. We recommend that future homeowners be provided copy of Hawaii's Pollution Prevention Information (HAPPI) material on household Wastewater treatment systems as installation of individual wastewater systems will be the responsibility of individual lot purchasers. We have attached sample BMPs for principle operations as well as HAPPI information materials for reference. Additional mitigation measures are enumerated below and should be implemented during construction:

- Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the water
- Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work
- Retain ground cover until the last possible date
- 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
- Avoid fertilizers and biocides, or apply only during periods of low rainfall to minimize chemical run-off.
- Keep run-off on site
- Construct drainage control features, such as berms
- Maintain drainage structures, detention, silting and debris basins
- Control dust by proper stockpiling and use non-potable water for dust control
- Cover open vehicles carrying soils, gravel or other particulate matter

Should you have any questions regarding system infrastructure and requirements, please call our Engineering Division at 270-7835 and for questions on conservation and resource matters, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

George Y. Tengan
Director

eam
c: engineering division
applicant, with attachments
The Costly Drip
Maui County Planting Plan-Plant Zone 4-Saving Water in the Yard- What and How to Plant in your Area
A Checklist of Water Conservation Ideas for Home and Yard
Ordinance 2108- A Bill for an Ordinance Amending Chapter 16.20 of the Maui County Code, Pertaining to the Plumbing Code
Selected BMP's from "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters"-EPA
HAPPI-Home 11 - Household Wastewater Systems

MUNEKIYO & HIRAGA, INC.

January 22, 2004

George Y. Tengan, Director
Department of Water Supply
County of Maui
200 High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11: 01 and 02

Dear Mr. Tengan,

Thank you for providing us with your January 13, 2004 early consultation comments on the proposed project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. Information on water source and estimated water use will be included in the project's Draft Environmental Assessment (EA).

2. Water system infrastructure for the proposed project will designed in accordance with the department's Rules and Regulations for Subdivisions. The construction of single-family homes will be the responsibility of individual lot purchasers. As such, water meter sizing worksheets will be submitted to the department by lot owners in connection with the processing of their building permit applications.

3. The water conservation measures referenced in your letter will be considered and appropriate measures implemented.

4. Appropriate Best Management Practices will be utilized during construction to minimize infiltration and runoff from construction-related activities.

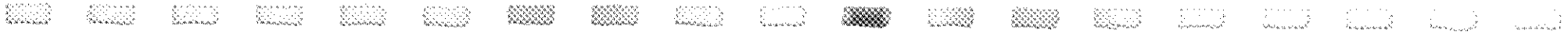
305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

Thank you again for providing us with your comments. Please feel free to call me should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Don Fujimoto, Hanohano LLC
dowling/pukalani/dwsltr.001



XII. LETTERS RECEIVED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIOD AND RESPONSES TO SUBSTANTIVE COMMENTS

The Draft Environmental Assessment (EA) for the proposed project was published in the March 8, 2004 edition of the Environmental Notice. Copies of the Draft EA were provided to agencies, organizations, and individuals for review and comment. The 30-day public comment period for the Draft EA expired on April 7, 2004. Letters received during the Draft EA public comment period, as well as responses to substantive comments, are included in this section.

MAR 15 2004

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

March 11, 2004

Regulatory Branch

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

Dear Mr. Fujimoto:

This letter responds to the request for comments on the Draft Environmental Assessment (DEA) for the Proposed Kualono Subdivision project, dated January 2004. Based on the information provided in the DEA I have determined that there are no waters of the United States, including wetlands, at the project site, therefore a Department of the Army permit will not be required for this project.

Please place us on the mailing list for the final EA. A copy of this letter is being sent to: Mr. Glen Tadaki, Planner, Munekiyo & Hiraga, Inc., 305 High Street, Suite 104, Wailuku, Hawaii 96793; the Office of Environmental Quality Control (OEQC), 235 Beretania Street, Suite 702, Honolulu, Hawaii 96813; and the State Land Use Commission, P.O. Box 2359, Honolulu, Hawaii 96804-2359.

If you have any questions concerning this matter, please contact Mr. William Lennan of my staff at 808-438-6986 or FAX 808-438-4060, and reference File No. **200400025** for this project.

Sincerely,

for George P. Young, P.E.
Chief, Regulatory Branch

MAR 22 2004

POLICE DEPARTMENT
COUNTY OF MAUI

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE
YOUR REFERENCE ti

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

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

March 18, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, HI 96793

Dear Mr. Fujimoto:

SUBJECT: Proposed Kualono Subdivision
TMK 2-3-11:01 and 02

We reviewed the Draft Environmental Assessment and have no recommendations or comments to offer at this time.

Thank you for giving us the opportunity to comment on this project. We are returning the Assessment which was submitted for our review.

Very truly yours,

Assistant Chief Sydney Kikuchi
for: Thomas M. Phillips
Chief of Police

Enclosure

c: Michael Foley, Maui County Planning Department
Anthony J.H. Ching, State Land Use Commission
Gwen Ohashi Hiraga, Munekiyo & Hiraga, Inc.

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

MAR 31 2004

ALAN M. ARAKAWA
Mayor

ALICE L. LEE
Director

HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

March 22, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

Dear Mr. Fujimoto:

SUBJECT: PROPOSED KUALONO SUBDIVISION
TMK 2-3-11:01 and 02

As requested by Mr. Glenn Tadaki of Munekiyo & Hiraga, Inc. in his March 5, 2004 letter, we are sending the original of our comments on the draft Environmental Assessment to you.

As you know, we are currently discussing the preparation of an affordable housing agreement for the subject project with Hanohano LLC.

Thank you for the opportunity to comment.

Very truly yours,

Alice L. Lee

ALICE L. LEE
Director

ETO:hs

c: Office Environmental Quality Control
State Land Use Commission
✓Munekiyo & Hiraga, Inc.
Housing Administrator

APR 02 2004

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

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

DEPARTMENT OF PARKS & RECREATION

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

March 31, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

Dear Mr. Fujimoto:

SUBJECT: PROPOSED KUALONO SUBDIVISION
PUKALANI, MAUI
TMK: 2-3-11:01 and 02

We will reserve comments on the subject project until further details of the proposed park dedication can be worked out with the applicant. Our concerns are as follows:

1. The park be privately owned and maintained.
2. The drainage area not be included in the calculation for park dedication.
3. Details of the park, retention basin and heiau area.

Should you have any questions, please feel free to contact me, or Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

GLENN T. CORREA
Director

c: Office of Environmental Quality Control
Anthony J.H. Ching, State Land Use Commission
Gwen Ohashi Hiraga, Munekiyo & Hiraga, Inc.
Patrick Matsui, Parks Planning & Development

MUNEKIYO & HIRAGA, INC.

May 14, 2004

Glenn Correa, Director
Department of Parks and Recreation
County of Maui
700 Hali`a Nakoa Street, Unit 2
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Mr. Correa,

Thank you for providing us with your March 31, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

The applicant and Kulamalu LLC (an affiliate company) are in the process of dedicating 9.7 acres of land to the County of Maui for a public park in the Kulamalu Project area. The park dedication agreement for this land is currently being reviewed by the County.

Pursuant to recent discussions between the applicant and the Department of Parks and Recreation, the department has concurred with the applicant's proposal to acquire and utilize park credits from the Kulamalu Project to satisfy its park dedication requirements for the subject project. A letter of understanding between the applicant and the County is being prepared to memorialize the use of the Kulamalu Park credits for the proposed project.

In light of the foregoing, the department's comments regarding park ownership and maintenance, exclusion of the retention basin area, and details of the park, heiau, and retention basin are now moot as the park dedication requirements for the project will be addressed through the use of the park credits.

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

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/dpr.res

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

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

OFFICE OF BUSINESS SERVICES

April 2, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Hawai'i 96743

Dear Mr. Fujimoto:

Subject: Draft Environmental Assessment (DEA)
Kualono Subdivision, Pukalani, Maui TMK: 2-3-11:01 & 02

The Department of Education (DOE) has reviewed the Draft Environmental Assessment (DEA) for a 49-lot subdivision in Pukalani, Maui. The DOE requests a school fair-share contribution for any residential project of 50 or more units. In December 2003, the DOE commented in a letter included in the DEA that if at least one accessory dwelling was built in the subdivision, then the project was large enough to generate a request for a school fair-share contribution. We received a response (also included in the DEA) that accessory dwelling or ohana units would not be permitted and that the prohibition would be included in the Covenants, Conditions and Restrictions (CC&Rs) for the project.

Because the engineering and traffic reports were all done under the assumption that there will only be 49 dwelling units, the DOE will accept that the ohana unit prohibitions will be included in the CC&Rs. The DOE will not request a fair-share contribution condition as no accessory dwellings can be built in the project.

The DOE has no further comment on this project. We appreciate the opportunity to review the report. If you have any questions, please call me at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Sincerely yours,

Rae M. Loui
Assistant Superintendent

RML:mp

c: Donna Whitford, CAS/Baldwin, Maui, Kekaulike Complexes
Anthony J. H. Ching, SLUC
Genevieve Salmonson, OEQC

MUNEKIYO & HIRAGA, INC.

May 24, 2004

Rae M. Loui, Assistant Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Ms. Loui,

Thank you for providing us with your April 2, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

As stated in your letter, provisions which prohibit ohana units will be included in the CC&Rs for the project. The applicant is also willing to accept a condition from the State Land Use Commission to this effect.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/doe.res

APR 06 2004

United States Department of Agriculture

USDA

NRCS Natural Resources Conservation Service

Our People...Our Islands...In Harmony

210 Imi Kala Street, Suite #209, Wailuku, HI 96793-2100

Date: April 5, 2004

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki,

SUBJECT: Proposed Kualono Subdivision; TMK: 2-3-011: 001, 002

The proposed retention basin should have proper freeboard designed. An operation and maintenance plan is recommended for the basin.

Thank you for the opportunity to comment.

Sincerely,

Neal S. Fujiwara
District Conservationist

MUNEKIYO & HIRAGA, INC.

May 24, 2004

Ranae Ganske-Cerizo, Acting District Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Ms. Ganske-Cerizo:

Thank you for providing us with your agency's April 5, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

The proposed retention basin will provide a 3-foot freeboard which will double the design capacity of the basin from 1.3 to 2.6 acre/feet. A preliminary plan and cross-section of the retention basin with the freeboard will be included in the Final EA.

The applicant, in conjunction with the project's civil engineer, will prepare an operation and maintenance plan for the retention basin which will be included in the CC&Rs for the subdivision. The long-term operation and maintenance of the retention basin will be the responsibility of the homeowners association.

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

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/nrcs2.res

PHONE (808) 594-1888

APR 07 2004

FAX (808) 594-1865

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

HRD04/1185

April 5, 2004

Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, HI 96793

RE: Request for Comment and Recommendation on Proposed Kualono Subdivision *Draft Environmental Assessment,* Pukalani, Maui, TMKs: 2-3-011: 001 and 002

Dear Don Fujimoto,

The Office of Hawaiian Affairs is in receipt of your March 5, 2004, request for comments on the above project. OHA offers the following comments, concerns and recommendations about the proposed subdivision and its cultural, environmental, economic and social impacts.

Heiau

According to the Draft Environmental Assessment, the existing, culturally significant heiau on the proposed subdivision site would be preserved in place and surrounded by a 100-foot open space buffer and a 30-foot diameter stone wall. It is unclear whether this would be enough of a buffer to such an important site, particularly because a major access road will run next to the buffer, and the buffer is included in the surface water runoff retention basin.

The retention basin "will be constructed within the park/open space area set aside at [sic] northwesterly portion of the project site. The retention basin will be designed to accommodate the additional runoff volume generated by the proposed development. A retention basin with a capacity of 57,123 cubic feet or 1.3 Acre-Feet will be required to handle the additional runoff generated by the project" (pp.59-60). Open space around the heiau, ostensibly to be used as a protective buffer for a culturally and historically sacred site, cannot be equated to open space for the provision of park space and drainage.

This triple use of land raises multiple concerns, particularly after reading Munekiyo & Hiraga, Inc.'s December 19, 2003, response to Maui County's Department of Public Works and Environmental Management. That letter reads, in part: "The applicant will be responsible for the

initial upkeep of the drainage system and retention basin. Upon completion of the project, the long-term maintenance of these improvements will be the responsibility of the homeowners association." Because this drainage basin is so close to the heiau, strict guidelines for management and maintenance of this area must be created and implemented.

Furthermore, guidelines for maintenance and preservation of the heiau should include Native Hawaiian stewardship opportunities. Appendix C, the Cultural Impact Assessment, states that Hanohano LLC will hold ownership of the site, and potentially relegate the preservation and restoration of the heiau to a Hawaiian group in the future. OHA would like to see definitive consultation and plans for this transfer of management.

The cultural landscape in which this heiau resides must be considered, respected and preserved. According to "Maka`eha I Ka Malia," in Appendix C:

> The Kualono Subdivision is located in and around very culturally important areas. It borders the ancient `ili of Maka`eha and `A`apueo, which is separated by the Kaluapulani Gulch. The Kaluapulani gulch is located several hundred yards (in the Kihei direction) from this project site that is being assessed. Numerous petroglyphs have been recorded in Kauapulani gulch, and they are considered to be the best in the State Of [sic] Hawai`i. Members of the Polynesian Voyaging Society took rubbings from a petroglyph of a double hulled sailing canoe and used it to fashion the sails for the Hkule`a, the modern sailing canoe that traveled all over the Polynesian Triangle.
>
> I have been through these gulches on many occasions, and have found a lot of evidence that the ancient Hawaiian people used these gulches for making adzes, shaping stone implements, pounding herbs, and many other uses that are too numerous to mention. Also, a lot of the native flora still exists in these gulches.
>
> The most intriguing feature on this property is the heiau. . . .

Archaeological monitoring and preservation plans for the heiau must be provided before work commences. As described above, this area is obviously still relevant and useful to the continuing renaissance of Hawaiian culture. Probable relationships to multiple, significant petroglyphs in Kaluapulani and Kalialinui Gulches, and the importance of sight lines from the heiau to Maui's north and south shores and the spread of central Maui must be included in the cultural landscape preservation plan. The extensive sight lines of this heiau bespeak its probable cultural and historical importance. The report's comment that few heiau and cultural sites are left in the area after the paniola era makes preservation of those remaining sites even more of a priority.

OHA also requests assurances from the developer that should this project go forward, and should *iwi* or Native Hawaiian cultural or traditional deposits be found during ground disturbance or

excavation, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

District Boundary Amendment from Agricultural to Urban

Throughout the document, the authors reiterate the demand for housing in this section of Maui. Demand should not replace planning, and planners should look first to the capacity of people which the environment, existing infrastructure and public services can handle in the respective area. Residential subdivisions on agricultural lands substantially increase the need for water, traffic management and public services. These items too often are not only not mandated before development, but are not even considered or anticipated in a thorough, proactive manner.

Furthermore, decisions on developments should not be based solely on economics – such as short-term benefits to the construction industry, and long-term property tax revenue increases – but should be based on planning required for necessary support services; infrastructure capacity, requirements and limitations; water and land use impacts; and conservation, preservation and constitutionally mandated public trust rights.

Although these 28.695 acres represent only 0.0001 percent of lands available to Maui for State Agricultural district use, one must actually examine the cumulative impacts on the constitutionally mandated preservation of agriculture and agricultural lands before construction commences. The Draft EA states, "The conversion of the subject property's fallow agricultural lands for single-family residential purposes is not anticipated to have an adverse effect on the existing inventory of lands available for agricultural use" (p. 48). This statement becomes irrelevant when analyzed in reference to the State Legislature's current assessment of proposed legislation to re-evaluate all agricultural lands.

The lands requested for this zone change are designated as Prime Agricultural lands. It is in the State's best interest to keep agricultural lands in agriculture. OHA suggests that any decision before the Land Use Commission on reclassification be held until after the legislature passes new legislation. If the LUC cannot hold its decision, it should consider Rural classification for this property so that these lands can serve as a buffer between agricultural lands and the surrounding urban properties.

When reviewing a petition to reclassify land, the LUC shall specifically consider, *inter alia*, the impact of the proposed reclassification on six areas of State concern, including "Maintenance of valued cultural, historical, or natural resources" (HRS § 205-17(3)(B)); "Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources" (HRS § 205-17(3)(C)); "Provision for employment opportunities and economic development" (HRS § 205-17(3)(E)); and "Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups" (HRS § 205-17(3)(F)). This comment letter argues that current proposals preservation of an existing heiau and cultural landscape are not adequate, that these lands are Prime Agricultural lands that should not be reclassified before the legislature completes its description of "important agricultural lands," that economic determinations made by the applicant developer were based on short-term analysis instead of examining long-term implications, and that this subdivision in no way provides

housing opportunities for any income group but the upper tier, a group that is already well provided for on Maui.

Potable and Waste Water

OHA recommends that Maui County condition the project on requirements to implement water conservation measures wherever possible, including the use of brackish and/or reclaimed water for irrigation and non-potable water uses; native plantings; community consultation on drainage issues to prevent excessive flooding issues; and minimization of air quality impacts and soil erosion. The water conservation measures listed in the January 13, 2004, letter from the Maui County Department of Water Supply should be conditions required. The developer's response of January 22, 2004, that the measures would "be considered and appropriate measures implemented" is not good enough, considering Maui's current water problems.

Affordable Housing

The General Plan of Maui County states an ongoing need for affordable housing. Appendix E, the Economic Impact Analysis of this Draft EA states, "The development will offer moderate and above home building opportunities within the expanding Upcountry community." The lots alone in this subdivision are expected to cost between $250,000 and $350,000, with the subsequent houses to be built on the lots costing upwards of $425,000. This is not affordable housing. The report instead describes the subdivision as being "expected to appeal to existing homeowners seeking to trade up."

Environmental Accuracy Concerns

Although the Cultural Impact Assessment describes the subdivision as containing several native plants (p. 6, Appendix C), the Draft EA states that there are "no rare, threatened, or endangered species of flora or fauna or important habitats on the subject property" (p. 34). The latter statement seems inadequate, at the least. Furthermore, OHA questions the quality of anything reported in the Environmental Site Assessment, in Appendix D, because that assessment found no cultural or historic sites on the property, and instead labeled the existing heiau as a "rockpile" on its map.

Conclusions

1. This project requires an Environmental Impact Statement because there cannot be a Finding of No Significant Impact until, among other things, the cultural impacts of this project have been fully researched and examined, which has not yet occurred. OHA particularly awaits the results of the archaeological mitigation and preservation plan, which is to be completed and reviewed by the Department of Land and Natural Resources, State Historic Preservation Division; and
2. The Land Use Commission should not make a decision to reclassify these Prime Agricultural Lands as Urban until after the State Legislature has completed its definitions for designating Important Agricultural Lands, and until the LUC resolves the impacts of the proposed reclassification on the above areas of State concern, per HRS § 205-17(3).

Thank you for the opportunity to comment. If you have further questions, please contact Heidi Guth at 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Clyde W. Namu`o
Administrator

Cc: Office of Environmental Quality Control
State Land Use Commission
Munekiyo & Hiraga, Inc.

MUNEKIYO & HIRAGA, INC.

May 24, 2004

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

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Mr. Namu'o,

Thank you for your April 5, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to provide the following information in response to your comments.

Heiau

The conceptual development plan for the subdivision has been revised to eliminate the street plug that was proposed adjacent to the heiau (Site 2701). See Exhibit "A".

A preservation plan for the heiau has been prepared by Archaeological Services Hawaii. A copy of the preservation plan will be included in the Final Environmental Assessment (EA) and is also provided herewith for your information. See Exhibit "B". The plan includes long-term measures for the preservation of the heiau, as well as interim measures to mitigate potential impacts to the heiau during construction activities. Given the location and significance of the heiau, an archaeological monitoring plan for any work within the vicinity of the heiau will be prepared and submitted to the State Historic Preservation Division (SHPD) for review and approval. The applicant acknowledges that the approval of the monitoring plan and the preservation plan are required prior to the start of construction. Should any cultural finds be located during ground-altering construction activities, the applicant will comply with State regulations governing the discovery of finds, including cessation of work in the vicinity of the find, protection of the find from further damage, and notification to the appropriate agencies.

The heiau and retention basin have been demarcated as separate, dedicated areas. Refer to Exhibit "A". The heiau, with its 100-foot buffer and open space area, will encompass 1.353 acres, while the retention basin and its open space area will cover 0.740 acre. A

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

dry-stacked, handcrafted stone wall will be placed 60 feet from the heiau (except along its south side where the wall will follow the property line). The portion of the buffer zone within the wall will be planted with Native plant species, while the remaining part of the buffer zone will be planted with grass. Access to the heiau will be restricted to the Native Hawaiian group that is selected as the curator for the heiau. The retention basin will be located down slope from the heiau and beyond the 100-foot buffer surrounding the site. A 3-foot freeboard has been incorporated into the design of the retention basin. See Exhibit "C". With the freeboard, the design capacity of the retention basin has been increased from 1.3 acre-feet to 2.6 acre-feet thereby providing additional storage volume if needed. A stone wall will be placed around the retention basin for safety and security purposes. A (draft) maintenance plan has been prepared for the subdivision's drainage system (including the retention basin) by the project's civil engineer. See Exhibit "D". The provisions for the maintenance of the drainage system will be included in the CC&Rs for the subdivision. Upon its completion, the homeowners association will be responsible for the maintenance of the drainage system.

Stewardship opportunities for the heiau will be afforded to Native Hawaiian groups. Selection of the curator group will be determined through consultation with the SHPD, as well as with kupuna that are recognized as being knowledgeable about the protection and preservation of this important site.

District Boundary Amendment

Senate Bill 3052, which proposed the establishment of a process for identifying important agricultural lands, was not reported out of conference committee during this past legislative session. In accordance with Chapter 205-17(3), HRS, the effect of the proposed reclassification on the six (6) areas of State concern has been assessed in Chapter IV of the Draft EA.

The proposed project will fill the present demand for moderate income housing as it will provide housing opportunities for homeowners desiring to trade-up from their existing homes. As noted in the attached letter from John Childs & Company, the preparer of the project's Market Study, the proposed project is expected to have the most appeal to trade-up buyers that have built-up equity in their present homes. See Exhibit "E". The letter also notes that interviews with real estate brokers reveal that local residents comprised the primary new housing market segment for product similar to the lots proposed by the Kualono Subdivision.

Water Conservation

The applicant acknowledges your comments regarding the implementation of water conservation measures wherever possible. The applicant will convey and encourage houselot buyers to utilize water conservation measures including, but not limited to, the use of low-flow fixtures, maintenance of fixtures to prevent leaks, use of rain sensors on automated irrigation controllers, elimination of single-pass cooling systems, and the use of climate-adapted plants.

Affordable Housing

As indicated by the attached letter from the Maui County Department of Housing and Human Concerns, the affordable housing requirements for the subdivision will be addressed through a $125,000.00 cash contribution by the applicant. See Exhibit "F". These funds will be provided as a donation to Habitat for Humanities for its use in providing affordable housing units. An Affordable Housing Agreement to memorialize this contribution will be prepared and submitted to the DHHC for review and approval.

Environmental Accuracy

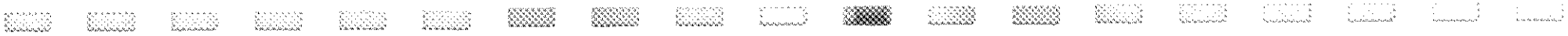
The attached letter from CKM Cultural Resources, the preparer of the project's Cultural Impact Assessment, clarifies that there are no rare, threatened or endangered species of plant and animal life or important habitats on the subject property. See Exhibit "G". With regard to the Phase I Environmental Site Assessment prepared by Vuich Environmental Consultants (VEC), we would like to note that the second paragraph of Page 20, the legend for Figure 2, and the caption for Photo No. 8 have been revised by VEC to correctly identify the heiau. See Exhibit "H". Copies of the revised pages are attached hereto and will also be included in the Final EA.

Thank you again for providing us with your comments. Please feel free to call me at (808) 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
Attachments
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/oha.res



MUNEKIYO & HIRAGA, INC.

May 25, 2004

Dick Mayer, Vice-President
Kula Community Association
P.O. Box 417
Kula, Hawaii 96790

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Mr. Mayer,

Thank you for your April 7, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. During the early consultation process for the preparation of the Draft EA, a request for comments and a project summary were sent to the Pukalani Community Association, as well as to the Kula Community Association. Copies of the Draft EA were provided to both community associations for review and comment, as well as to the Makawao Public Library for purposes of public review. Opportunities for public review and comment have been provided through the early consultation and Draft EA process.

2. Copies of the Draft EA were provided to various government agencies for review and comment including the State Department of Education (DOE) and to the Maui Police Department (MPD). In its letter dated March 18, 2004, the MPD indicated that it had no comments or recommendations to offer on the Draft EA. In a letter dated April 2, 2004, the DOE indicated that it will not request a fair-share contribution for school facilities since the engineering and traffic reports for the project were prepared on the basis of 49 dwelling units and that the applicant will include provisions in the CC&Rs which will prohibit ohana units. In the past, the DOE practice was to assess a fair-share contribution for school facilities for projects with fifty or more residential units.

3. In addition to prohibiting ohana units in the CC&Rs for the project, the applicant is willing to accept a condition from the State Land Use Commission to this effect.

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4. The base maps for Figure 5 (Soil Classification Map), Figure 6 (ALISH Map), and Figure 7 (Flood Insurance Rate Map) were produced by government agencies with expertise in these areas. While these maps do not reflect any changes since they were produced, they are the only available authoritative maps available for such purposes.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/kca.res

APR 08 2004

LINDA LINGLE
GOVERNOR OF HAWAII

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

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 6, 2004

A04-745KUALONO.RCM2
LD-NAV

Munekiyo & Hiraga, Inc
Glenn Tadaki, Planner
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

Subject: Petition: A04-746/Kualono, LLC
Location: Pukalani, Maui, Hawaii
TMK: (2) 2-3-011: 001 and 002

Thank you for the opportunity to review and comment on the subject matter.

The Department of Land and Natural Resources' (DLNR) Land Division made available or distributed a copy of the document pertaining to the subject matter to the following DLNR Divisions for their review and comment:

- Historic Preservation
- Division of Forestry and Wildlife
- Division of State Parks
- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Maui District Land Office
- Land-Planning and Development

Enclosed please find a copy of the Engineering Division and Commission on Water Resource Management's comment.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer.

If you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 1-808-587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: MDLO
LUC

LINDA LINGLE
GOVERNOR OF HAWAII

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

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 6, 2004

A04-745KUALONO.RCM1
LD-NAV

Mary Lou Kobayashi, Administrator
Department of Business, Economic Development
& Tourism
Office of Planning
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Dear Ms. Kobayashi:

Subject: Petition: A04-746/Kualono, LLC
Location: Pukalani, Maui, Hawaii
TMK: (2) 2-3-011: 001 and 002

The Department of Land and Natural Resources' (DLNR) Land Division made available or distributed a copy of the document pertaining to the subject matter to the following DLNR Divisions for their review and comment:

- Historic Preservation
- Division of Forestry and Wildlife
- Division of State Parks
- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Maui District Land Office
- Land-Planning and Development

Enclosed please find a copy of the Engineering Division and Commission on Water Resource Management's comment.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer.

If you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 1-808-587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: MDLO

LINDA LINGLE
GOVERNOR OF HAWAII

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

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

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BUREAU OF CONVEYANCES
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CONSERVATION AND COASTAL LANDS
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2004 MAR 24 P 3:19

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 10, 2004
KUALONOSUB231101.COM
LUC-CP A03-745

LD-NAV
Suspense Date: 3/22/04

MEMORANDUM:

TO:

*XXX Historic Preservation
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
Division of Boating and Ocean Recreation
*XXX Engineering Division
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (RD)
*XXX Land-Planning and Development

FROM: Deirdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Kualono Subdivision House Lots
Location: Pukalani, Island of Maui, Hawaii
TMK: 2nd/ 2-3-011: 001 and 002
Applicant: Hanohano, LLC
Authority: State Land Use Commission
Consultant: Munekiyo and Hiraga, Inc.

Please review the DEA (January 2004) pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One (1) copy of the document is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments.

(X) Comments attached.

Division Engineering

Signed: Eric T. Hirano

Date: 3/24/04

Title: ERIC T. HIRANO, CHIEF ENGINEER

2004 MAR 24 AM 7:00 ENGINEERING

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/NAV

Ref.: Kuala Hs Sub 23 1101.com

COMMENTS

(X) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone 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) 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.

( ) 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 Mr. Andrew Monden of the Planning Branch at 587-0229.

Signed: Eric T. Hirano
ERIC T. HIRANO, CHIEF ENGINEER

Date: 3/24/04

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2004 MAR 12 P 3:42
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
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DEPUTY DIRECTOR - WATER

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LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 10, 2004
KUALONOSUB231101.COM
LUC-CP A03-745

LD-NAV
Suspense Date: 3/22/04

MEMORANDUM:

TO:

*XXX Historic Preservation
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
Division of Boating and Ocean Recreation
*XXX Engineering Division
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (RD)
*XXX Land-Planning and Development

FROM: Deirdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Kualono Subdivision House Lots
Location: Pukalani, Island of Maui, Hawaii
TMK: 2nd/ 2-3-011: 001 and 002
Applicant: Hanohano, LLC
Authority: State Land Use Commission
Consultant: Munekiyo and Hiraga, Inc.

Please review the DEA (January 2004) pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note:** **One (1) copy of the document is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no comments.

( ) Comments attached.

Division _____

Signed: _____

Date: MAR 11 2004

Title: MICHAEL G. BUCK, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE

0502

LINDA LINGLE
GOVERNOR OF HAWAII

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

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

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2004 MAR 15 P 1:47

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HONOLULU, HAWAII 96809

March 10, 2004
KUALONOSUB231101.COM
LUC-CP A03-745

LD-NAV
Suspense Date: 3/22/04

MEMORANDUM:

TO:

*XXX Historic Preservation
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
Division of Boating and Ocean Recreation
*XXX Engineering Division
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (RD)
*XXX Land-Planning and Development

TO
ADMINISTRATOR
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FROM: Deirdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Kualono Subdivision House Lots
Location: Pukalani, Island of Maui, Hawaii
TMK: 2nd/ 2-3-011: 001 and 002
Applicant: Hanohano, LLC
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Consultant: Munekiyo and Hiraga, Inc.

Please review the DEA (January 2004) pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One (1) copy of the document is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓ We have no comments. ( ) Comments attached.

Division State Parks Signed:

Date: 3/12/04 Title:

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 10, 2004
KUALONOSUB231101.COM
LUC-CP A03-745

LD-NAV
Suspense Date: 3/22/04

MEMORANDUM:

TO:

*XXX Historic Preservation
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
Division of Boating and Ocean Recreation
*XXX Engineering Division
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (RD)
*XXX Land-Planning and Development

FROM: Deirdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Kualono Subdivision House Lots
Location: Pukalani, Island of Maui, Hawaii
TMK: 2nd/ 2-3-011: 001 and 002
Applicant: Hanohano, LLC
Authority: State Land Use Commission
Consultant: Munekiyo and Hiraga, Inc.

Please review the DEA (January 2004) pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One (1) copy of the document is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments.

( ) Comments attached.

Division MDLO

Signed: James K. Kyn

Date: 3-12-04

Title: District Land Agent

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON

MEREDITH J. CHING
CLAYTON W. DELA CRUZ
JAMES A. FRAZIER
CHIYOME L. FUKINO, M.D.
STEPHANIE A. WHALEN

ERNEST Y.W. LAU
DEPUTY DIRECTOR

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

March 22, 2004

2004 MAR 23 P 3:32

TO: Ms. Dede Mamiya, Administrator
Land Division

FROM: Ernest Y.W. Lau, Deputy Director
Commission on Water Resource Management (CWRM)

SUBJECT: Kualono 40-unit houselot subdivision, Pukalani, Maui

FILE NO.: KUALONOSUB231101.COM

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas, which are important for the maintenance of streams and the replenishment of aquifers.

[X] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

[ ] We recommend coordination with the Land Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

[ ] We are concerned about 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.

[ ] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] We are concerned about the potential for degradation of instream uses from development on highly erodible slopes adjacent to streams within or near the project. We recommend that approvals for this project be conditioned upon a review by the corresponding county's Building Department and the developer's acceptance of any resulting requirements related to erosion control.

[ ] If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).

[ ] If the proposed project alters the bed and banks of a stream channel, the project may require a stream channel alteration permit.

[X] OTHER:

The project requirements are stated as 49,400 gpd, based on county guidelines, and that the source is adequate. The applicant states that source for this well was applicant-developed, although neither the source nor the source developer is identified.

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

LINDA LINGLE
GOVERNOR OF HAWAII

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04 MAR 11 A8:15

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LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 10, 2004
KUALONOSUB231101.COM
LUC-CP A03-745

LD-NAV
Suspense Date: 3/22/04

MEMORANDUM:

TO:

*XXX Historic Preservation
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
Division of Boating and Ocean Recreation
*XXX Engineering Division
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (RD)
*XXX Land-Planning and Development

FROM: Deirdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Kualono Subdivision House Lots
Location: Pukalani, Island of Maui, Hawaii
TMK: 2nd/ 2-3-011: 001 and 002
Applicant: Hanohano, LLC
Authority: State Land Use Commission
Consultant: Munekiyo and Hiraga, Inc.

Please review the DEA (January 2004) pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One (1) copy of the document is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments. ( ) Comments attached.

Division_____ Signed:_____

Date:_____ Title:_____

MUNEKIYO & HIRAGA, INC.

May 25, 2004

Dierdre S. Mamiya, Administrator
Land Division
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Ms. Mamiya,

Thank you for your letter dated April 6, 2004 transmitting comments from your various divisions on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

With regard to the Engineering Division's comments, we concur that the subject property is located in Flood Zone C, an area of minimal flooding.

In response to the Commission on Water Resource Management's comments, we note that information about the proposed project was furnished to the Maui County Department of Water Supply (DWS) on May 3, 2004 to incorporate the project into the County's Water Use and Development Plan. An affiliate company, Kulamalu LLC (fka, Kulamalu, Limited Partnership), developed the Kaupakalua Well (State Well No. 5318-01). The well site is located on a portion of TMK 2-7-15:34 in Kaupakalua. For developing this well source, the source developer received a capacity allocation of 738,000 gallons per day (gpd) from the County of Maui. A portion of the remaining allocation (approximately 270,300 gpd) will be purchased from Kulamalu LLC to satisfy the average daily water demand for the proposed project. It is also noted that based upon the assigned source allocation of 800 gallons per day (gpd) agreed upon by the applicant and the DWS, the estimated average daily water demand for the proposed project is calculated to be 39,200 (gpd).

We note that the Maui District Land Office, the Division of State Parks, and the Division of Forestry and Wildlife also reviewed the Draft EA and had no comments.

Thank you again for your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/dlnr.res

APR 0 8 2004

LINDA LINGLE
GOVERNOR OF HAWAII

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

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

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DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

April 6, 2004

Glenn Tadaki
Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

LOG NO: 2004.1064
DOC NO: 0404CD06

Dear Mr. Tadaki,

SUBJECT: Chapter 6E-42 Historic Preservation Review – Draft Environmental Assessment for the Proposed Kualono Subdivision Makaeha Ahupua`a, Makawao District, Island of Maui TMK: (2) 2-3-011:001 and 002

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the proposed Kualono Subdivision, which was received by our staff March 8, 2004.

Based on the submitted Draft EA, we understand the proposed undertaking consists of the consolidation of parcels 1 and 2 into a single 28.695 acre property. The 28.695 acre consolidated parcel will then be subdivided for the construction of a 49 single-family residential lots. In addition to landscaping and infrastructure, an approximately 2.1 acre park/retention basin is proposed to be constructed along the project's south western boundary. There is an existing *heiau* located within the area designated for the proposed park/retention basin. The subject properties are currently vacant and vegetation cover includes scattered trees, grasses, and shrubs.

In 2003, Archaeological Services Hawaii, conducted an archaeological inventory of the subject properties. During the survey one previously identified historic site (SIHP 50-50-05-2701, an unnamed *heiau*) was identified in the area where the proposed park/retention basin is to be located. From the submitted Draft EA we understand the heiau will be preserved with a proposed 100-foot buffer surrounding the site. We have reviewed and recommended revisions for the report documenting the findings of the survey (*Archaeological Inventory Survey of the Proposed Kualono Residential Subdivision, Pukalani, Makawao District, Maui Island* [TMK: 2-3-11: 1 and 2]. Pantaleo. 2003). To date we have not received the requested revisions so it is difficult for us to provide a final comment at this time.

We also note with concern, however, that according to the DEA, SIHP 2701 (unnamed *heiau*) will be preserved in place within a proposed park/retention basin; the DEA indicates that a 100-foot buffer has been proposed. We question the appropriateness of such a preservation concept, especially in the absence of any accepted preservation plan that spells out interim and long-term preservation measures. Given the lack of such a plan, we can only express our concerns about the potential adverse effect the creation and use of a retention basin, or park facilities, may have on the *heiau*.

In view of these facts, we recommend that the following conditions be appended to any approved permit or land use:

(1) A final, acceptable inventory survey report shall be submitted to the State Historic Preservation Division for review and approval, prior to beginning any construction.
(2) An acceptable preservation plan for SIHP 50-50-05-2701 shall be submitted to the State Historic Preservation Division for review and approval. No construction may begin until the State Historic Preservation Division signifies its approval of the preservation plan in writing.

If these conditions are attached to any permit or approval issued for the proposed development, we believe that any effects may be mitigated through implementing such conditions.

If you have any questions, please call Cathleen A. Dagher at 692-8023.

Aloha,

P. Holly McEldowney

P. Holly McEldowney, Administrator
State Historic Preservation Division

CD:jen

c: Michael Foley, Director, Dept of Planning, 250 South High Street, Wailuku, HI 96793
Cultural Resources Commission, Planning Dept, 250 S. High Street, Wailuku, HI 96793
Anthony Ching, Executive Director, State Land Use Commission
Mary Lou Kobayashi, Director, Office of Planning, DLNR
Dierdre Mamiya, Administrator, Land Division

MUNEKIYO & HIRAGA, INC.

May 24, 2004

P. Holly McEldowney, Administrator
State Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Ms. McEldowney,

Thank you for providing us with your April 6, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. The requested revisions to the archaeological inventory survey were submitted to the State Historic Preservation Division (SHPD) for review and approval on April 16, 2004. The SHPD's approval of the revised inventory survey is currently pending the completion of its review.

2. The retention basin will be relocated further makai so that it lies beyond the limits of the 100-foot buffer zone around Site 2701 (heiau).

3. Ground-altering construction activities within the 100-foot buffer zone will be limited to excavating the foundation for a dry-stacked, handcrafted stone wall which will be placed 60 feet from the heiau (except along its south side where the wall will follow the property line). The portion of the buffer zone within the wall will be planted with native plant species, while the remaining part of the buffer zone will be planted with grass.

   In its December 24, 2003 letter to Archaeological Services Hawaii regarding its review of the archaeological inventory survey for the project, the SHPD indicated that archaeological monitoring is not warranted for the entire parcel. Refer to the attached. After defining the site boundaries of Site 2701 (heiau), the SHPD indicated that monitoring may be appropriate in the vicinity of the heiau; however, if the site boundaries are well within the limits of the preservation area, monitoring

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

may not be warranted. The SHPD also indicated that the developer can elect to conduct monitoring on a voluntary basis.

With regard to archaeological monitoring, the applicant will monitor all ground-altering construction activities in the vicinity of the heiau. An archaeological monitoring plan will be prepared and submitted to the SHPD prior to the commencement of construction. The applicant acknowledges that the approval of the monitoring plan is required before construction can commence.

4. A preservation plan for Site 2701 is being completed and will soon be submitted to the SHPD for review and approval. The applicant acknowledges that the approval of the preservation plan is required prior to the start of construction.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
Attachment
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/shpd.res

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

December 24, 2003

Jeffrey Pantaleo
Archaeological Services Hawai'i, LLC
16 South Market Street, Suite G
Wailuku, Hawai'i 96793

LOG NO: 2003.2665
DOC NO: 0312MK22

Dear Mr. Pantaleo,

SUBJECT: Chapter 6E-42 Historic Preservation Review - Archaeological Inventory Survey Proposed Kualono Residential Subdivision Makaeha Ahupua'a, Makawao District, Maui
TMK (2) 2-3-11:1 and 2

Thank you for the opportunity to review this report which our staff received on October 30, 2003 (Pantaleo 2003, *Archaeological Inventory Survey of the Proposed Kualono Residential Subdivision, Pukalani, Makawao District, Maui Island [TMK 2-3-11:1 and 2].* ASH, LLC ms).

The background section acceptably establishes the ahupua'a settlement pattern and predicts the likely site pattern in the project area. Land Grant information for the parcel is provided. The summary of previous archaeological work in the area provides a baseline for the current work. Please see attachment for details.

The survey has adequately covered the project area documenting no new historic properties in the project area. Subsurface testing (26 backhoe trenches) were also negative for evidence of cultural deposits. One previously recorded historic property (Site 50-50-05-2701) was mentioned in the text. Please see attachment for comments.

Please see attachment regarding significance assessments for Site 50-50-05-2701.

Please see attachment regarding proposed mitigation measures for the project area.

We will await the recommended revisions to the report. 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,

P. Holly McEldowney, Administrator
State Historic Preservation Division

MK:jen

Attachment

c: Michael Foley, Director, Department of Planning, County of Maui, FAX 270-7634
Bert Ratte, County of Maui, Land Use and Codes, FAX 270-7972
Glen Ueno, County of Maui, Land Use and Codes, FAX 270-7972
Jeffrey Pantaleo, Principal Investigator, ASH, LLC, FAX 837-0171

Attachment
Requested Revisions to
Archaeological Inventory Survey of the Proposed Kualono Residential Subdivision, Pukalani, Makawao District, Maui Island [TMK 2-3-11:1 and 2]

As per our rules, please include the following in the revised report:

1. Historic background information
   a. Please provide additional information on land use and site patterns for the project area, and ahupua'a during the post 1850 times as revealed in later literature or through oral history.
   b. Please provide a summary of documents reviewed during the research.
2. Archaeological background information
   a. Areal extent of prior survey coverage indicated on a map. We note that the previous work conducted is indicated on a map, but the areal extent is not plotted.
   b. We appreciate the inclusion of the site in the background section discussion. Please see below "Summary of Findings" for additional comments.
3. Summary of findings
   a. Please revise this section to include pertinent information summarized from previous work on Site 50-50-05-2701
   b. A map or maps locating Site 50-50-05-2701, its boundaries, with at least one site location map being a portion of the relevant USGS quad map. In 1990, when this heiau was investigated, researchers did not routinely define site boundaries. Since it is located on the parcel surveyed here, it is appropriate to include boundary information in this report.
4. Significance assessments
   a. Please reassess, or minimally describe the previously accepted significance assessment for Site 50-50-05-2701, since it is not described in detail in the text.
   b. This may simply indicate, in summary form, the assessment of the Site as significant under Criterion "D" and "E".
5. Recommendations
   a. We do not concur that monitoring is warranted for the entire parcel.
   b. After definition of site boundaries for Site 50-50-05-2701, it may be appropriate for monitoring in the vicinity of the site. If the site boundaries are well within the to be proposed preservation area, monitoring may not be warranted. Should the developer elect to monitor, this should be stated in the text.

APR 0 8 2004

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 7, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Hawai'i 96793

Ms. Gwen Hiraga
Munekiyo & Hiraga Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Mr. Anthony Ching
State Land Use Commission
P.O. Box 2359
Honolulu, Hawai'i 96804-2359

Dear Messrs. Fujimoto & Ching, and Ms. Hiraga:

The Office of Environmental Quality Control has reviewed the draft environmental assessment (DEA) for the proposed Kualono Subdivision situated in the judicial district of Makawao, tax map key number 2-3-11:01, 02, and offers the following comments for your consideration and response.

1. Due Diligence and Phase I Site Environmental Assessment: We have reviewed Appendix D of the DEA and note that the site was formerly in pineapple agriculture. Observations were recorded pertaining to hazardous substances and petroleum products in conjunction with identified uses. Pineapple culture in Hawai'i has almost always used nematicides in soil preparation prior to planting; these chemicals include the dibromochloropropanes, and other chlorinated hydrocarbons. Please disclose if soil sampling was performed to determine if there are any residual levels of chemicals related to pineapple culture. If not, please disclose the reasons as to why such sampling and analysis was not performed.

Thank you for the opportunity to comment. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist, at (808) 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

MUNEKIYO & HIRAGA, INC.

May 24, 2004

Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Ms. Salmonson,

Thank you for providing us with your April 7, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

As indicated by the preparer of the Phase I Environmental Site Assessment (ESA), soil sampling is not within the scope of a Phase I ESA. Refer to the attached. The Phase I ESA for the project was prepared in accordance with the guidelines of the American Society of Testing and Materials (ASTM E-1527-00).

Although unlikely, the Phase I ESA indicates that there is a possibility that residual amounts of pesticides and herbicides could accumulate in concentrations that could pose a potential impact. As such, a soil sampling survey of the subject property will be conducted prior to development as part of a Phase II ESA in order to identify residual levels of these substances that were used during past pineapple cultivation activities. Should the Phase II work determine that levels exceed acceptable regulatory limits, Phase III ESA remedial work will be undertaken prior to the construction of the project. The applicant will convey the findings of the Phase II ESA to prospective purchasers as part of the sales disclosure process.

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

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
Attachment
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/oeqc.res

Vuich Environmental
Consultants, Inc.

RECEIVED
MAY 20 2004
Dowling Company, Inc.

May 20, 2004

Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

Dear Mr. Fujimoto,

In regards to your inquiry into soil sampling for the Kualono project and the scope of a Phase I ESA, we have the following to offer.

1. A Phase I ESA conducted under ASTM standards consists of four main components:
   - Records Review;
   - Site Reconnaissance;
   - Interviews; and
   - Report.
2. A Phase I ESA may recommend soil sampling be conducted based on information received during the investigation, however, soil sampling is not within the scope of a Phase I ESA.

VEC can conduct a soil sampling survey on the Kualono project lands prior to the commencement of development activities. At your request, VEC can submit to you a proposal to conduct soil sampling.

Please feel free to give me a call if you have any questions.

Sincerely,

Jeffrey Kermode

Maui (Main) Office: 1498 Lower Main Street, Suite C, Wailuku, Maui, Hawaii 96793 ● (808) 249-2777 Phone (808) 249-2776 Fax
Oahu Office: Hanua Industrial Complex, 91-110 Hanua Street, Unit 317, Kapolei, Oahu, Hawaii 96707
(808) 682-1611 Phone ● (808) 682-1616 Fax ● Inter-Island: (800) 572-1165 ● www.vuichenvironmental.com

APR 16 2004

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EPO-03-115A

April 14, 2004

Mr. Glenn Tadaki
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: Proposed Kualono Subdivision
TMK: 2-3-011:01 and 02

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer. If you have any questions about these comments please contact Ryan Davenport at 586-4346.

Wastewater Branch

We have reviewed the subject document, which proposes to develop 28.695 acres of land at Pukalani Maui, Hawaii into 49 single-family residential house lots for the proposed Kualono Subdivision.

We have the following comments to offer. The subject project is located in the Critical Wastewater Disposal Area (CWDA) as determined by the Maui County Wastewater Advisory Committee where no new cesspools will be allowed. As the County sewer service system is not within the vicinity of the proposed subdivision, we concur with the use of treatment individual wastewater systems (IWS) as a means of wastewater treatment and disposal.

At this writing, we have a Septic Tank File # 5445 for the subject property. Mr. Alejo Narciso of 3367 Anuwanu Place, Pukalani, Maui submitted wastewater plans to the Department on December 22, 2003. These plans were approved on December 24, 2003 for a five (5) bedroom home. No further correspondence or contact has been made since then. A final inspection report by the design engineer must be submitted to the Department before use of the wastewater system can be granted. For further details on the treatment IWS, please contact Mr. Roland Tejano of our Maui District Health Office at (808)984-8232.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at telephone (808)586-4294.

Hazard Evaluation & Emergency Response Office

1. A phase I Environmental Site Assessment (ESA) should be conducted for developments or redevelopments. If the investigation shows that a release of petroleum, hazardous substance, pollutants or contaminants occurred at the site, the site should be properly characterized through an approved Hawaii State Department of Health (DOH)/Hazard Evaluation and Emergency Response Office (HEER) soil and or groundwater sampling plan. If the site is found to be contaminated, then all removal and remedial actions to clean up hazardous substance or oil releases by past and present owners/tenants must comply with chapter 128D, Environmental Response Law, HRS, and Title 11, Chapter 451, HAR, State Contingency Plan.

2. All lands formerly in the production of sugarcane should be characterized for arsenic contamination, If arsenic is detected above the US EPA Region (preliminary remediation goal (PRG) for non-cancer effects, then a removal and or remedial plan must be submitted to the Hazard Evaluation and Emergency Response (HEER) Office of the State Department of Health for approval. The plan must comply with Chapter 128D, Environmental Response Law, HRS, and Title 11, Chapter 451, HAR, State Contingency Plan.

3. If the land has a history of previous releases of petroleum, hazardous substances, pollutants, or contaminants, we recommend that the applicant request a "no further action" (NFA) letter from the Hawaii State Department of Health (DOH)/ Hazard Evaluation and Emergency Response (HEER) Office prior to the approval of the land use change or permit approval.

If you have any questions please contact the HEER Office at 586-4249.

Clean Air Branch

Control of Fugitive Dust:

There is a significant potential for fugitive dust emissions during all phases of construction. Proposed construction activities will occur in proximity to public areas and major thoroughfares, thereby exacerbating potential dust problems. It is recommended that a dust control management plan be developed which identifies and addresses all activities that have a potential to generate fugitive dust. Implementation of adequate dust control measures during all phases of development and construction activities is warranted.

Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust.

The contractor should provide adequate measures to control dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:

a) Plan the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Provide an adequate water source at the site prior to start-up of construction activities;
c) Landscape and provide rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimize dust from shoulders and access roads;
e) Provide adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Control dust from debris being hauled away from the project site.

If you have any questions on fugitive dust issues, please contact Mr. Barry Ching of the Clean Air Branch at 586-4200.

Sincerely,

June F. Harrigan-Lum

JUNE F. HARRIGAN-LUM, MANAGER
Environmental Planning Office

c: CAB
WWB
HEER
Hanohano LLC
State Land Use Commission

MUNEKIYO & HIRAGA, INC.

May 25, 2004

June F. Harrigan-Lum, Manager
Environmental Planning Office
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Ms. Harrigan-Lum,

Thank you for providing us with your April 14, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. The applicant confirms that individual wastewater systems will be utilized for wastewater treatment and disposal as all subdivision houselots will be a minimum of 10,000 square feet in size. There are no structures on the subject property. Follow-up with the Maui County Department of Public Works and Environmental Management (DPWEM) has revealed that the septic tank approval for Alejo Narciso was granted in conjunction with a building permit (B2004/0141) which was issued on January 26, 2004 for a dwelling on a parcel identified by TMK 2-3-11:09. The design and installation of the individual wastewater systems will be in accordance with the applicable provisions of Chapter 11-62, HAR pertaining to "Wastewater Systems".

2. A Phase I Environmental Site Assessment (ESA) of the subject property was conducted in accordance with the guidelines of the American Society of Testing and Materials (ASTM E-1527-00). A copy of the Phase I ESA was included in the Draft EA as Appendix D. The Phase I ESA notes that while the subject property was utilized for pineapple cultivation for several decades until the early 1990s, there is no evidence of any historic misuse or significant spills of hazardous or regulated substances on the site. Although unlikely, the Phase I ESA indicates that there is a possibility that residual amounts of pesticides and herbicides from former pineapple cultivation could accumulate in concentrations that could pose a potential

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

impact. Although not within the scope of a Phase I ESA, a soil sampling survey of the subject property will be conducted prior to development as part of a Phase II ESA in order to identify residual levels of these substances that were used during past pineapple cultivation activities. Should the Phase II work determine that levels exceed acceptable regulatory limits, Phase III ESA remedial work will be undertaken prior to the construction of the project. The applicant will convey the findings of the Phase II ESA to prospective purchasers as part of the sales disclosure process.

3. Chapter 20.08 of the Maui County Code relating to "Soil Erosion and Sedimentation Control" requires the preparation and implementation of Best Management Practices (BMPs) for all grading, grubbing, and stockpiling activities. Drainage, dust control, vegetation, erosion control, sediment control, material and waste management, and the timing of control measure implementation for these activities are required to be addressed by BMPs. As the subject property will require grading and grubbing, BMPs will be prepared and submitted to the DPWEM for review and approval in connection with the processing of grading and grubbing permit applications for the project. All construction activities will comply with the provisions of Chapter 11-60, HAR regarding "Fugitive Dust". Dust control measures, such as those described in your letter, will be included in the BMPs and implemented during construction activities.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/dohhnl.res

APR 26 2004

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EPO-03-115B

April 23, 2004

Mr. Glenn Tadaki
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: Proposed Kualono Subdivision
TMK: 2-3-011:01 and 02

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer. If you have any questions about these comments please contact Ryan Davenport at 586-4346.

Wastewater Branch

We have reviewed the subject document which requests an amendment to the land use district classification, from an agricultural district to the urban district of approximately 28.695 acres of land, situated at Keahua, Kula, Island of Maui, State of Hawaii. The petitioner also proposes to subdivide the Property into forty-nine (49) house lots, one (1) or more roadway lots and a lot for use as an archaeological preserve, park and retention basin (the "Subdivision").

At this time, we resubmit our comments of March 31, 2004.

The subject project is located in a Critical Wastewater Disposal Area (CWDA) as determined by the Maui County Wastewater Advisory Committee where no new cesspools will be allowed as a means of wastewater disposal. As the County sewer service system is not within the vicinity of the proposed subdivision, **we concur with the use of treatment individual wastewater systems (IWS) as a means of wastewater treatment and disposal provided that all house lots are a minimum of 10,000 square feet in size.**

At this writing, we have a Septic Tank File # 5445 for the subject property. Mr. Alejo Narciso of 3367 Anuwanu Place, Pukalani, Maui submitted wastewater plans to the Department on December 22, 2003. These plans were approved on December 24, 2003

for a five (5) bedroom home. No further correspondence or contact has been made since then. A final inspection report by the design engineer must be submitted to the Department before use of the wastewater system can be granted. For further details on the treatment IWS, please contact Mr. Roland Tejano of our Maui District Health Office at (808)984-8232.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at telephone (808)586-4294.

Sincerely,

June F. Harrigan-lum

JUNE F. HARRIGAN-LUM, MANAGER
Environmental Planning Office

c: WWB
Hanohano LLC
State Land Use Commission

MUNEKIYO & HIRAGA, INC.

May 24, 2004

June F. Harrigan-Lum, Manager
Environmental Planning Office
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Ms. Harrigan-Lum,

Thank you for providing us with your April 23, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

The applicant confirms that individual wastewater systems will be utilized for wastewater treatment and disposal as all subdivision houselots will be a minimum of 10,000 square feet in size. There are no structures on the subject property. Follow-up with the Maui County Department of Public Works and Environmental Management has revealed that the septic tank approval for Alejo Narciso was granted in conjunction with a building permit (B2004/0141) which was issued on January 26, 2004 for a dwelling on a parcel identified by TMK 2-3-11:09.

The applicant confirms that wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems".

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

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/doh.res

ALAN M. ARAKAWA
Mayor

GEORGE Y. TENGAN
Director

JEFFREY T. PEARSON, P.E.
Deputy Director

MAY 04 2004

DEPARTMENT OF WATER SUPPLY

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

April 28, 2004

Hanohano LLC
2005 Main Street
Wailuku HI 96793
Attention: Mr. Don S. Fujimoto

Dear Mr. Fujimoto:

SUBJECT: Proposed Kualono Subdivision Draft Environmental Assessment - develop 49-single family residential lots on 28.695 acres, landscaping, infrastructure and park/retention basin on 2.094 acre portion of the property; TMK (2) 2-3-011:001 & 002

Thank you for the opportunity to comment on this project proposal.

On March 21,1996, Kulamalu Inc. entered into an agreement with the Board of Water Supply entitled "Agreement Concerning the Construction of Storage Tank, Transmission Line and Appurtenances, and Development of Well." The agreement states that in consideration of the developer's participation in the water system development improvements, BWS will allocate and reserve source and storage capacity for the exclusive use of the developer on the Kulamalu Parcels. Storage credits will be for the exclusive use on Kulamalu Parcels above 1,320 feet elevation The source credits may be used for the development of Kulamalu Parcels and any excess not needed may be assigned for use by any property served by Boards' Haiku or Upcountry water system below the elevation of 2,000 feet (i.e., the system served by the Maluhia tank and the Wailoa Ditch).

The agreement also states that "Whenever Kulamalu desires to use any credits hereunder or allocate said credits specifically to a portion of, or development within a property, Kulamalu will notify the Board by means of a signed statement in substantially the form attached as Schedule G".

The applicant indicated that there are allocations remaining. We ask that credits be allocated for this project prior to acceptance of the EA. In the event that credits are inadequate for this project or has been exhausted, DWS will not recommend final subdivision approval. The the applicant will need to be placed in the Upcountry meter priority list and wait for meters. If storage is inadequate, the applicant has to construct storage tank or pay the storage portion of the Water System Development Fee. Similarly, if transmission is inadequate, the applicant has to construct or pay the transmission portion of the Water System Development Fee for transmission improvements. Determination of storage and transmission requirements will be done when the applicant applies for subdivision approval. Please note that the storage tank has not been officially accepted by the department. The applicant is encouraged to contact our Engineering Division at 270-7835 to discuss the matter further.

The applicant met with DWS staff on February 13, 2004 to discuss source allocation for the project and agreed to the following:

1. DWS will assign a source allocation of 800 gpd per lot; separate meters are required for the roadway landscaping and the park;
2. No meters larger than 5/8-inch per residential lot will be allowed. All lots except for the roadway and the park, are considered to be residential lots;
3. The applicant shall state in its design guidelines that each lot owner shall submit to the Department of Water Supply a fixture unit count of their home prior to obtaining building permit approval.

4. The applicant shall include in their association CC&R a provision prohibiting ohana units; and
5. The applicant shall include in its design guidelines provisions encouraging the practice of water conservation measures.

Based on the assigned allocation, the project would have an average daily demand of 42,000 gallons. Using Statewide System per acre standard guidelines, this project would use about 82,550 gpd.

We would like to reiterate the integration of conservation measures as well as Best Management Practices (BMPs) in the project design and construction. These information were provided in our comment letter dated January 13, 2004.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

George Y. Tengan
Director

eam

c: engineering division
applicant
Office of Environmental Quality Control (OEQC)
State Land Use Commission
Munekiyo & Hiraga, Inc.

MUNEKIYO & HIRAGA, INC.

May 24, 2004

George Y. Tengan, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Mr. Tengan,

Thank you for providing us with your April 28, 2004 letter commenting on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to note the following.

1. Kulamalu Inc., an affiliate of the applicant, will notify the Board of Water Supply in writing of its intent to allocate source credits to Hanohano LLC.

2. As there are sufficient source credits available, a request for the transfer of credits will be submitted to the department for the necessary processing. Pursuant to your recent discussions with the applicant, the final transfer of credits is contingent upon the applicant's purchase of the subject property and obtaining all the requisite land use approvals for the project.

3. Documents for the dedication of the storage tank were submitted to the department on November 19, 2001 for review and comment. To date, Kulamalu Inc. has not received any comments from the department.

4. As stated in your letter, the applicant agrees to the five (5) points of its February 13, 2004 meeting with the department and is willing to accept them as conditions of approval for its district boundary amendment.

5. Based upon the assigned source allocation of 800 gallons per unit a day (gpud) agreed upon by the applicant and the department, the estimated daily water demand for the project is calculated to be 39,200 gpud. Irrigation demand will be based on requirements for the project's common area landscaping.

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6. The applicant will convey and encourage prospective purchasers to utilize water conservation measures including, but not limited to the use of low-flow fixtures, maintenance of fixtures to prevent leaks, use of rain sensors on automated irrigation controllers, elimination of single-pass cooling systems, and the use of climate-adapted plants. To minimize infiltration and runoff from construction-related activities, Best Management Practices will be prepared in accordance with County standards and will be included in the civil drawings and grading permit application submittals for the subdivision.

Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling/pukalani/dws.res

ALAN M. ARAKAWA
Mayor

JUN 0 3 2004

GEORGE Y. TENGAN
Director

JEFFREY T. PEARSON, P.E.
Deputy Director

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

May 28, 2004

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

Subject: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11:1,2 Pukalani, Hawaii

We received your May 24, 2004 letter responding to the department's comments on the subject EA. In response to your comment (number 3) regarding the dedication of the storage tank, please be advised the dedication is delayed due to a change being made to the cost participation between the Board of Water Supply and Kulamalu for the tank. The proposed change will have the Kulamalu being responsible for an additional 20 percent of the cost of the tank. The department is working with Kulamalu to complete the amendment to the agreement to participate in the construction of the tank. Dedication of the tank will be completed with the execution of the agreement and final payment of the monies by both parties in accordance to the agreement.

If you have any questions, please contact Herbert Chang at 270-7835.

Sincerely,

George Y. Tengan
Director

GT/an/hc

cc: Department of Planning - County of Maui
Planning Division - DWS

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

JUN 08 2004

COUNTY OF MAUI
DEPARTMENT OF PLANNING

June 4, 2004

Mr. Glenn Tadaki
Munekiyo & Hiraga, Inc.
305 High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Tadaki:

Re: Maui County Cultural Resources Commission Comments on the Archaeological Preservation Plan for a Heiau Structure Located Within the Kualono Subdivision, at TMK: 2-3-011: 001 and 002, Pukalani, Maui, Hawaii

At its regular meeting on June 3, 2003, the Maui County Cultural Resources Commission reviewed the above Preservation Plan for a Heiau structure located within the Kualono Subdivision as part of their advisory review on the project's Draft Environmental Assessment. The Commission offered the following comments on the Draft EA:

1. The Commission appreciates the applicant's efforts in locating the retention basin beyond the limits of the 100-foot buffer for the heiau. It was noted that the retention basin is situated downslope and at a lower elevation than the heiau.

2. An appropriate buffer zone should be determined in cooperation with the State Historic Preservation Division (SHPD). Currently the buffer area is proposed to be 100 feet except for the West Boundary which can only accommodate a 15-foot buffer area up to the property line.

3. An acceptable preservation plan should be reviewed and approved by the SHPD and in place prior to construction.

4. The Commission supports the proposal to place plaques in the vicinity of the heiau site to identify both the site and access to the site.

5. A view easement restriction (dealing with landscaping and buildings) should be placed on lots that may impact view planes from the heiau site.

6. That no irrigation should be used within the 60-foot buffer area. Irrigation is appropriate, however, within the additional 40-foot buffer area for maintenance purposes.

Thank you for your cooperation. If additional clarification is required, please contact Ms. Ann T. Cua, Staff Planner, of this office at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:ATC:jmu
c: Wayne A. Boteilho, Deputy Planning Director
Clayton I. Yoshida, AICP, Planning Program Administrator
Ann T. Cua, Staff Planner
Dawn Duensing, Staff Planner
Kivette Caigoy, Staff Planner
Project File
General File
(K:\WP_DOCS\PLANNING\EA\2003\KualonoSubdiv\CRCcommentLtr.wpd)

MUNEKIYO & HIRAGA, INC.

June 10, 2004

Michael W. Foley, Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Mr. Foley:

Thank you for your letter transmitting the Maui County Cultural Resources Commission's (CRC) advisory comments on the preservation plan for Site 2701 (heiau).

On behalf of the applicant, Hanohano LLC, we would like to note that the CRC's suggestions will be evaluated and appropriately incorporated into the final preservation plan for the heiau.

Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:yp
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC
dowling\pukalani\planning.deares

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

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-846

APR 30 2004

COPY

April 28, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, HI 96793

Dear Mr. Fujimoto:

Subject: Proposed Kualono Subdivision
Pukalani, Maui
TMK: 2-3-11:01 and 02

Thank you for allowing us to comment on the subject project.

In reviewing the information transmitted and our records, Maui Electric Company (MECO) at this time has no objections to the proposed project.

MECO encourages the project's consultant meet with us as soon as practical so that we may discuss the electrical requirements of this project.

If you have any questions or concerns, please call Fred Oshiro at 872-3202.

Sincerely,

Neal Shinyama

Neal Shinyama
Manager, Energy Delivery

NS:fo/lkh

References

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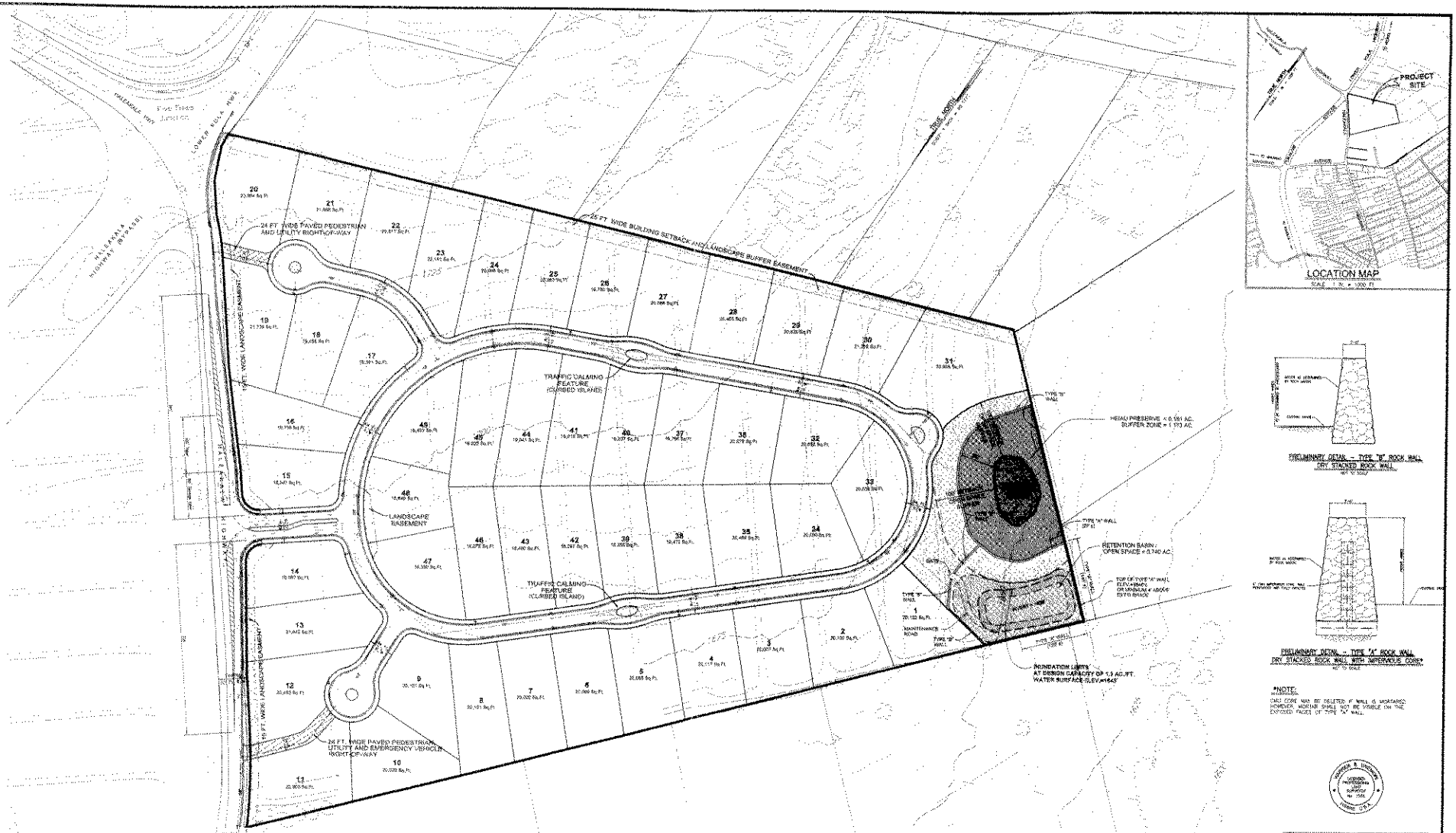


CONCEPTUAL DEVELOPMENT PLAN
KUALONO SUBDIVISION

CONSOLIDATION OF T.M.K. : (2)2-3-11 : PARCELS 1 AND 2
AND RESUBDIVISION INTO LOTS 1 TO 49, INCLUSIVE

BEING A PORTION OF DEED OF MINISTER OF INTERIOR TO W. H. BAILEY

KEAHUA KULA MAUI HAWAII

SCALE: 1 IN. = 50 FT.

OWNERS: DOWLING COMPANY, INC.

ADDRESS: 2005 EAST MAIN STREET
WAILUKU, MAUI, HAWAII 96793

GENERAL INFORMATION
(GROSS AREA)

TMK: 2-3-11 : 01 = 14.401 ACS.
TMK: 2-3-11 : 02 = 14.294 ACS.
TOTAL = 28.695 ACS

ZONING: R-3 RESIDENTIAL (PER COUNTY ORDINANCE)
MIN. LOT SIZE = 10,000 S.F.
MIN. LOT WIDTH = 70 FT.
NO. OF HOUSELOTS = 49
HEIAU SETBACK, OPEN SPACE
AND RETENTION BASIN = 40K/695 AREA = 2.09 ACS.±

RETENTION BASIN SPECIFICS:

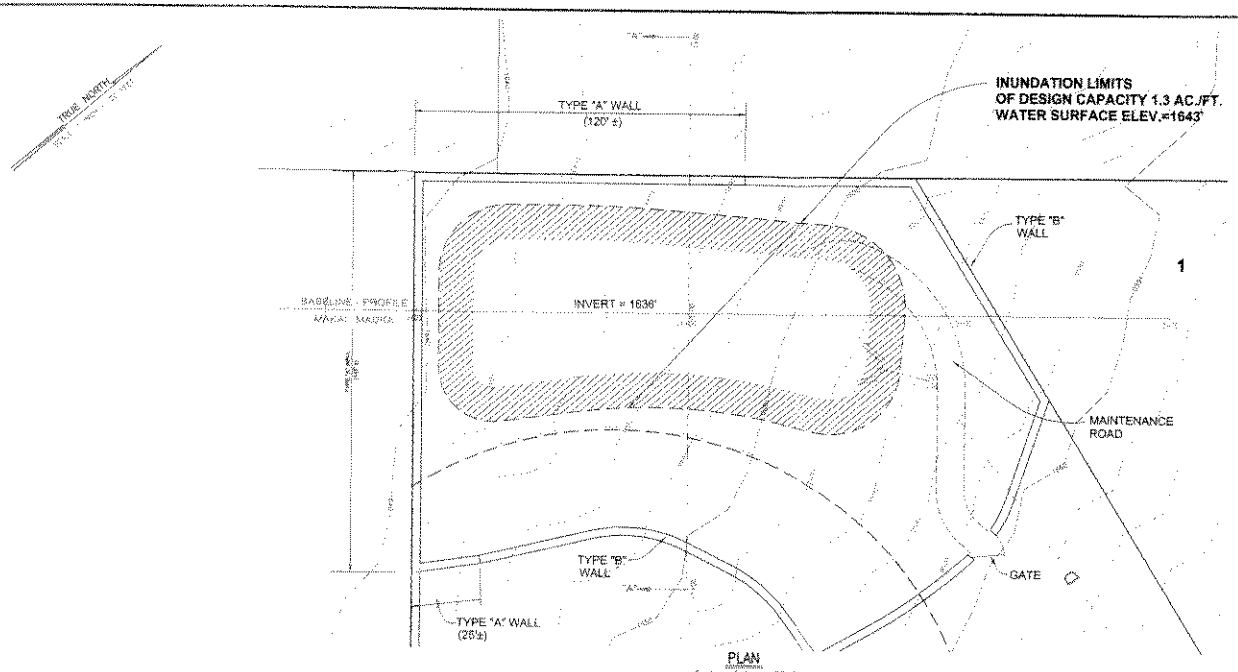
TOP OF TYPE "A" WALL - ELEV. =	1646 FT
BASIN INVERT ELEV. =	1636 FT
WATER SURFACE ELEVATION @ DESIGN CAPACITY W/3 FEET FREEBOARD =	1643 FT
DESIGN CAPACITY OF BASIN =	1.3 AC./FT.
CAPACITY TO TOP OF WALL =	2.6 AC./FT.
FACTOR OF SAFETY =	2

T.M.K.: (2)2-3-11 : 01 AND 02

This map was prepared by _____ Expiration date _____
or under my supervision. _____ of Licensee

WARREN S. UNEMORI - ENGINEERING, INC.
Wells Street Professional Center - Suite 202
2145 Wells Street - Wailuku, Maui, Hawaii 96793
PHONE (808)242-4663 FAX (808)244-4656

July 16, 2003
Revised: October 13, 2004
Revised: May 7, 2004

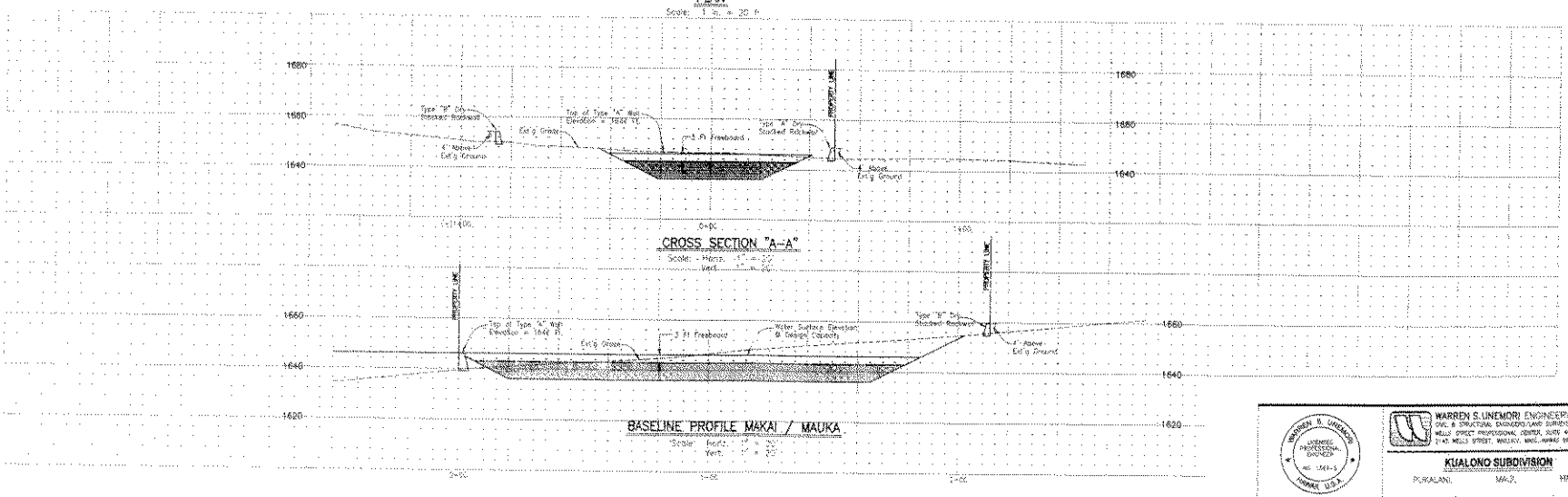


PLAN

Scale: 1" = 20'

RETENTION BASIN SPECIFICS:

TOP OF TYPE "A" WALL - ELEV.	= 1646 FT.
BASIN INVERT ELEV.	= 1636 FT.
WATER SURFACE ELEVATION @ DESIGN CAPACITY W/3 FEET FREEBOARD	= 1643 FT.
DESIGN CAPACITY OF BASIN	= 1.3 AC./FT.
CAPACITY TO TOP OF WALL	= 2.6 AC./FT.
FACTOR OF SAFETY	= 2



BASELINE PROFILE MAKAI / MAUKA

Scale: Horiz. 1" = 20'
Vert. 1" = 20'

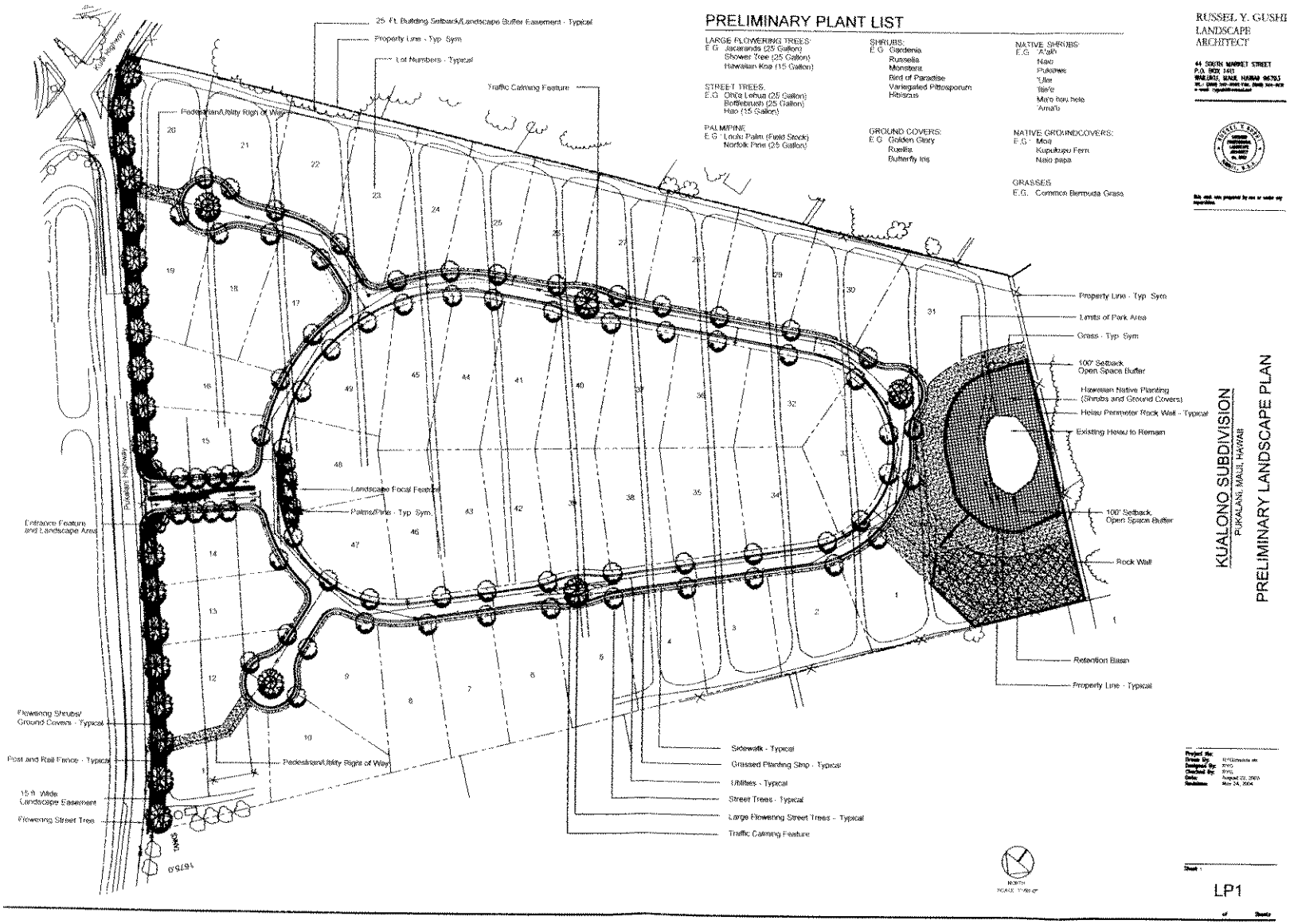
WARREN S. UNEMORI ENGINEERING, INC.
CIVIL & STRUCTURAL ENGINEERS / LAND SURVEYORS
WELLS STREET PROFESSIONAL CENTER, SUITE 403,
2145 WELLS STREET, WAILUKU, MAUI, HAWAII 96793

KUALONO SUBDIVISION

POKALANI MAUI HAWAII

TITLE: PLAN & PROFILE – PROPOSED BASIN

DESIGNED BY: WSU	DRAWN BY: WSU	CHECKED BY:	JOB NUMBER: 03046
DATE:	SCALE: AS NOTED	APPROVED BY:	SHEET NO. 1



PRELIMINARY PLANT LIST

LARGE FLOWERING TREES:
E.G. Jacarandra (25 Gallon)
Showes Tree (25 Gallon)
Hawaiian Koa (15 Gallon)

STREET TREES:
E.G. Orit'a Lehua (25 Gallon)
Bottlebrush (25 Gallon)
Hao (15 Gallon)

PALMPINE
E.G. Loloi Palm (Field Stock)
Norfolk Pine (25 Gallon)

SHRUBS:
E.G. Gardenia
Russelia
Monstera
Bird of Paradise
Variegated Pittosporum
Hibiscus

GROUND COVERS:
E.G. Golden Glory
Ruellia
Butterfly Iris

NATIVE SHRUBS
E.G. 'A'ali'i
Naio
Pukiawe
'Ulei
'Ilie'e
Mare hau hele
'Ama'u

NATIVE GROUNDCOVERS:
E.G. Moli
Kupukupu Fern
Naio papa

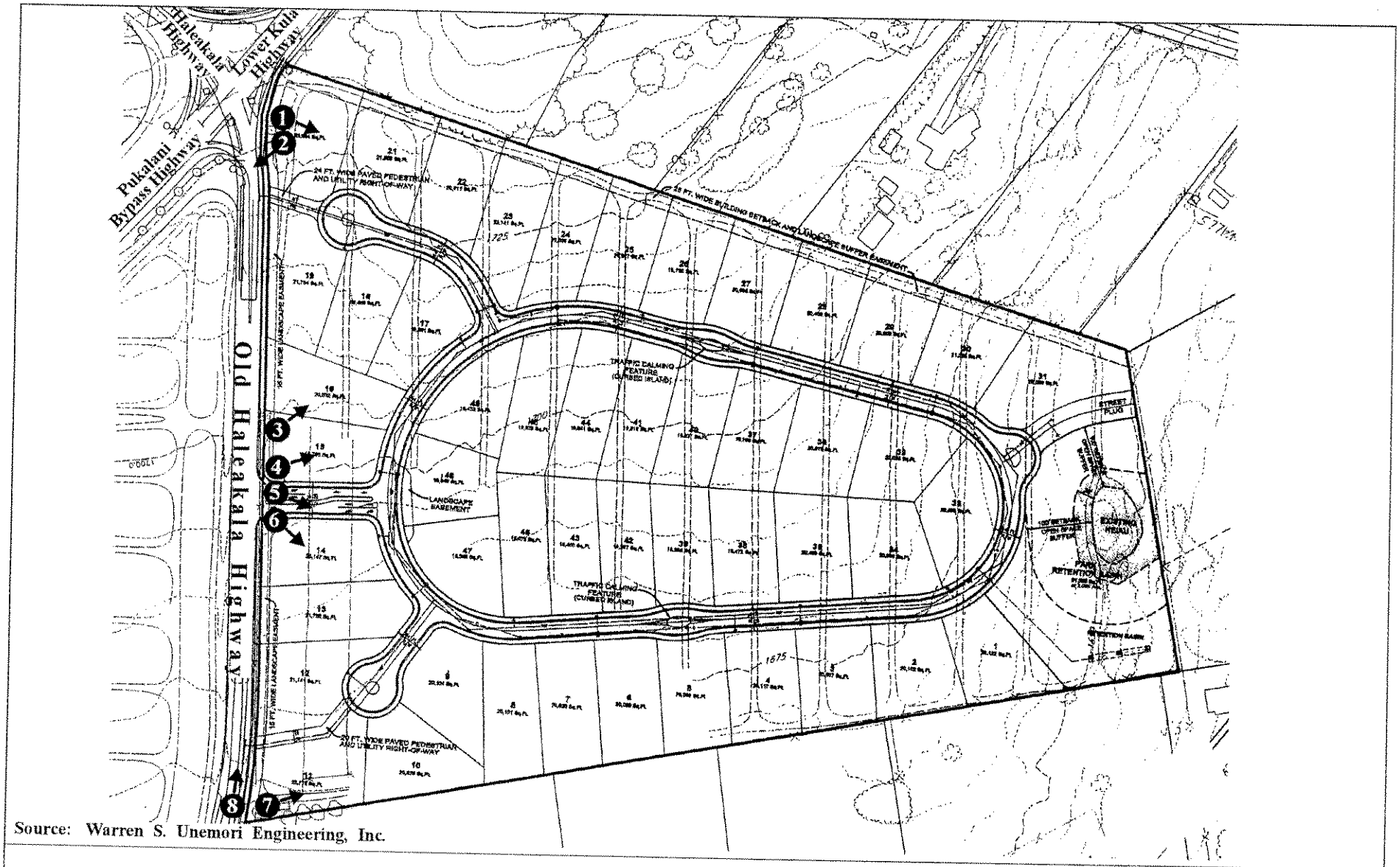
GRASSES
E.G. Common Bermuda Grass

RUSSEL Y. GUSHI
LANDSCAPE
ARCHITECT
44 SOUTH MARKET STREET
P.O. BOX 1441
WAILUKU, MAUI, HAWAII 96793

KUALONO SUBDIVISION
PUKALANI, MAUI, HAWAII

PRELIMINARY LANDSCAPE PLAN

Sheet
LP1
of



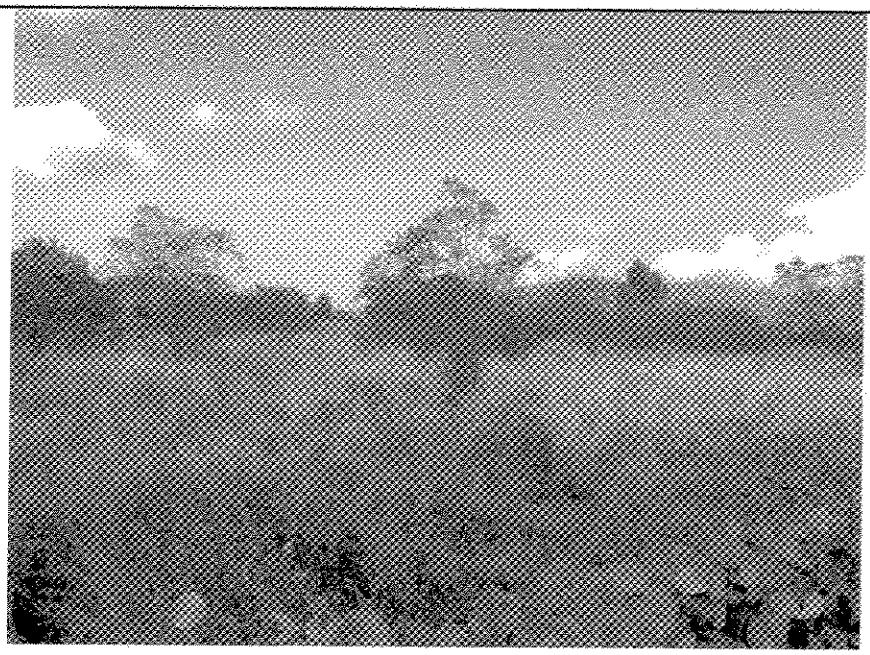
Source: Warren S. Unemori Engineering, Inc.

Proposed Kualono Subdivision
(TMK 2-3-11:01 and 02)
Photographic Reference Map

NOT TO SCALE

Prepared for: County of Maui, Office of Economic Development

MUNEKIYO & HIRAGA, INC.



Photograph No. 1

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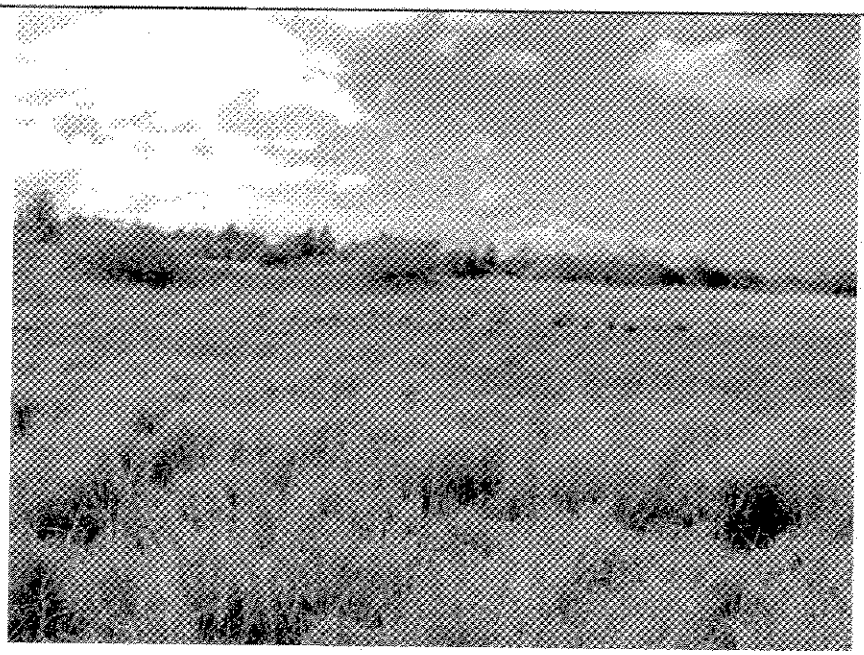
Photograph No. 3



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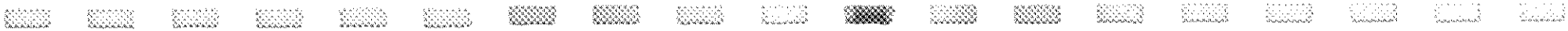

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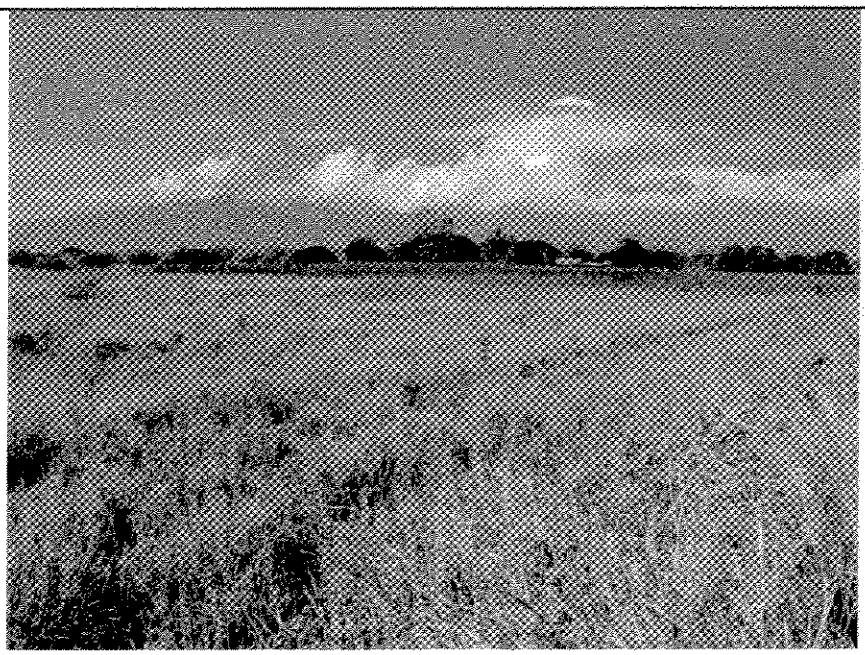

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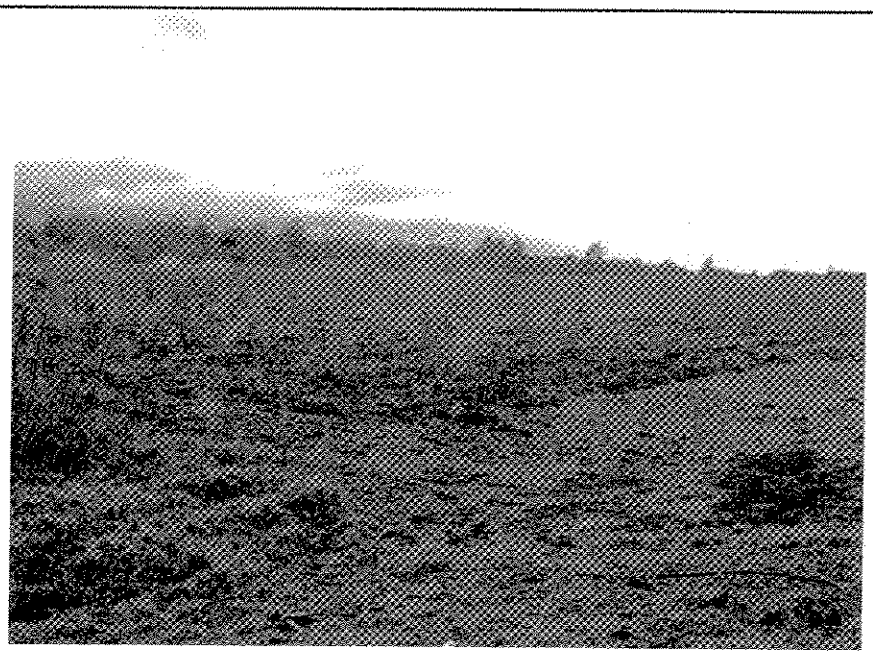

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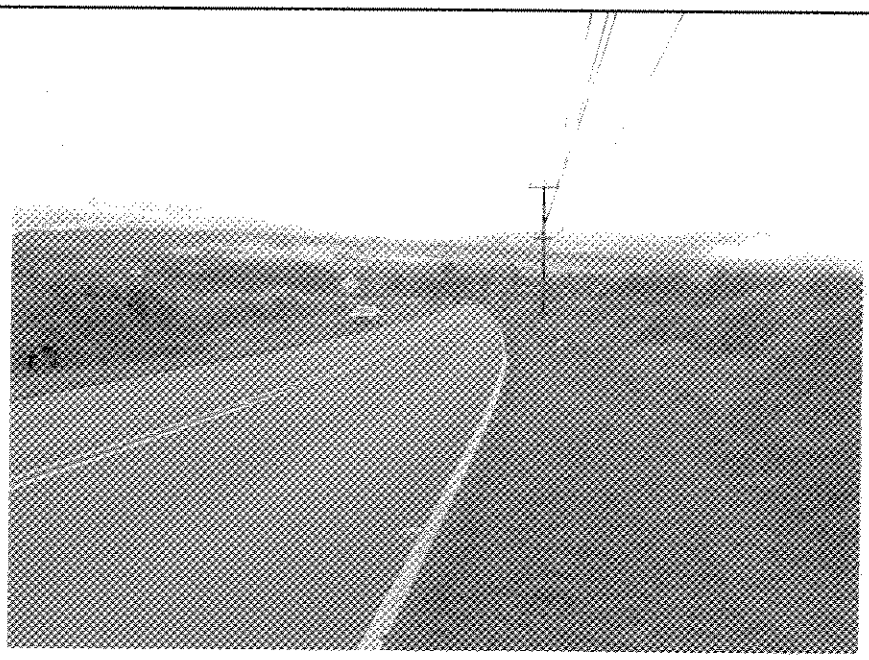

Photograph No. 8

ASH

ARCHAEOLOGICAL INVENTORY SURVEY OF THE PROPOSED KUALONO RESIDENTIAL SUBDIVISION PUKALANI, MAKAWAO DISTRICT, MAUI ISLAND (TMK 2-3-11:1 and 2)

by

Jeffrey Pantaleo, M.A.

for
Dowling Company, Inc.
P.O. Box 1417
Wailuku, Hawaii 96793

October 2003

Archaeological Services Hawaii, LLC
16 South Market St., Suite G
Wailuku, Hawaii 96793

ABSTRACT

Archaeological Service Hawaii, LLC (ASH), of Wailuku, conducted an archaeological inventory survey at the request of the Dowling Company, Inc. The project area (formerly named Hanohano Subdivision) is a 28.695-acre parcel of land proposed for the Kualono Residential Subdivision in Pukalani, Makaeha *ahupua'a*, Makawao District, Maui Island (TMK 2-3-11:1 and 2). A portion of the project area, approximately 2.5-acres, will be excluded from the development to preserve a *heiau* SIHP 50-50-05-2701.

Historical and archaeological background research was conducted to enhance site predictability and interpretation. Following the surface survey, which resulted in no findings, subsurface testing using backhoe trenching was conducted in 26 selected localities. No significant cultural remains were encountered in any of the trenches. Three stratigraphic layers were revealed during trenching, indicating the extent of previous ground disturbance from large-scale, commercial agricultural activities. Layer I was the till zone from pineapple cultivation, consisting of a silt to clayey silt with abundant roots and rootlets and black sheeting and irrigation lines. Underlying the till zone was Layer II, compact clay to clayey silt to silty clay with minimal rocks and rootlets. Underlying Layer II was Layer III, silt to silty clay to clay with abundant rocks and saprolitic material. Basalt outcrop was exposed in T12.

Site 50-50-05-2701 is recommended for *in situ* preservation. A Preservation Plan is currently being prepared, which states the short and long-term mitigation measures for this site. The developers have agreed to set aside 2.5 acres for Site 2701, and a 60 to 100 foot no-build buffer zone has been proposed around the *heiau* to further protect this feature. The only construction related activities within the buffer zone are the retention basin, clearing of the former access road, and landscaping if desired. Mr. Charles Kaluwehi Maxwell of CKM Consultants has prepared a Cultural Impact Study (CIS) for the project area. This study is presented under separate cover.

Due to the negative results of the current inventory survey, no further archaeological fieldwork is warranted prior to commencing construction activities. However, due to the presence of Site 2701 and other significant historic properties in the area including the Kaluapulani and Kalialinui Gulch petroglyphs (Sites 1061, 1062 and 4179) and a Chinese Cemetery (Site 5173), archaeological monitoring during construction activities is recommended to ensure protection of the site and ascertain if subsurface cultural deposits are present below the till zone. Prior to commencing any construction activities, an archaeological Monitoring Plan and Preservation Plan shall be prepared for approval by SHPD.

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INTRODUCTION

At the request of the Dowling Company, Inc., Archaeological Service Hawaii, LLC (ASH), of Wailuku, conducted an archaeological inventory survey of a 28.695-acre parcel of land proposed for the Kualono Residential Subdivision in Makaeha *ahupua'a*, Makawao District, Maui Island. A portion of the project area, approximately 2.5-acres that includes a 60-100-foot buffer zone, will be excluded from the development to preserve Site 50-50-05-2701. Fieldwork was conducted on July 21 and 22, 2003, by Jeffrey Pantaleo, M.A., and Ian Bassford.

PROJECT LOCATION

The project area is situated in Makaeha *ahupua'a*, Makawao District, Maui Island (Fig. 1). It is bounded by Old Haleakala Highway to the east, Kaluapulani Gulch to the south, existing residences to the north, and open land to the west (TMK 2-3-11:1, 2)(Fig. 2).

ENVIRONMENT

The project area is situated on the northwestern slope of Haleakala, on a plateau between Kailua Gulch to the northeast and Kaluapulani Gulch to the south. Terrain of the project area, artificially altered by pineapple cultivation, is relatively level. Elevation in the project area ranges from c. 1620 to 1740 feet above mean sea level. Rainfall averages between 20 to 50 inches annually, with most occurring during the months of October to April.

Soil in the project area includes the Haliimaile series of silty clay soils, 3-7% slopes. These soils were developed in material weathered from basic igneous rocks and are well-drained soils located on gently to strongly sloping terrain. Permeability is moderately rapid, runoff is slow but increases with the slope, and the erosion hazard is high if not controlled. The surface layer is dark reddish-brown silty clay and the underlying subsoil is a dark reddish-brown silty clay and very dark grayish-brown clay. This soil is used for sugarcane, pineapple, pasture, and homesites (Foote et al. 1972:35-36).

Currently, the flora within the project area includes Guinea grass (*Panicum maximum*), lantana agave (*Lantana camera* L.), *kiawe* (*Prosopis pallida*), koa haole (*Leucaena leucocephala*), and fallow pineapple (*Ananas comosus*); and *wilelaiki* or Christmas-berry (*Schinus terebinthifolius*) along the peripheral areas (Neal 1965)(Fig. 3).

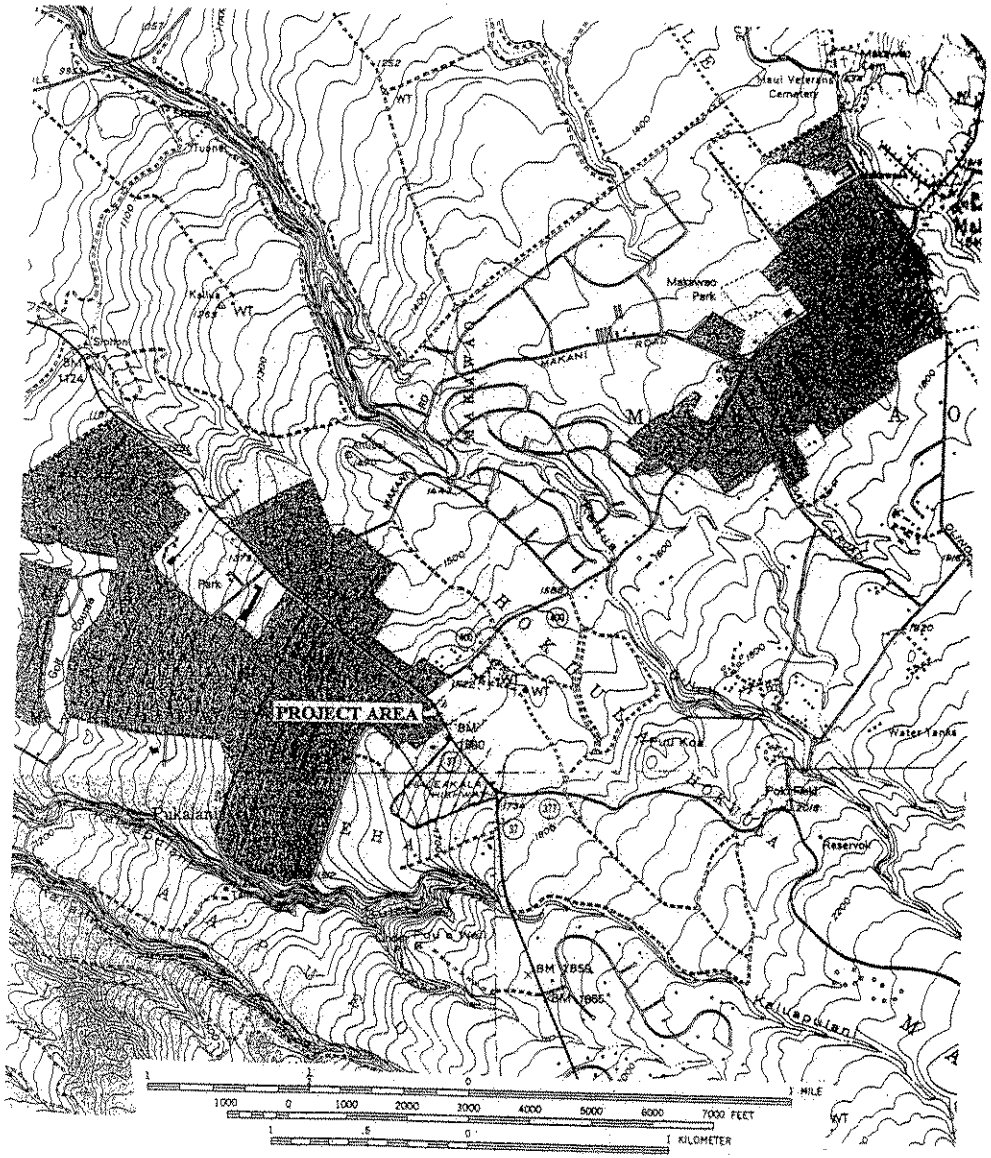


Figure 1. Location of Project Area on USGS Puu O Kali and Kilohana Quadrangles

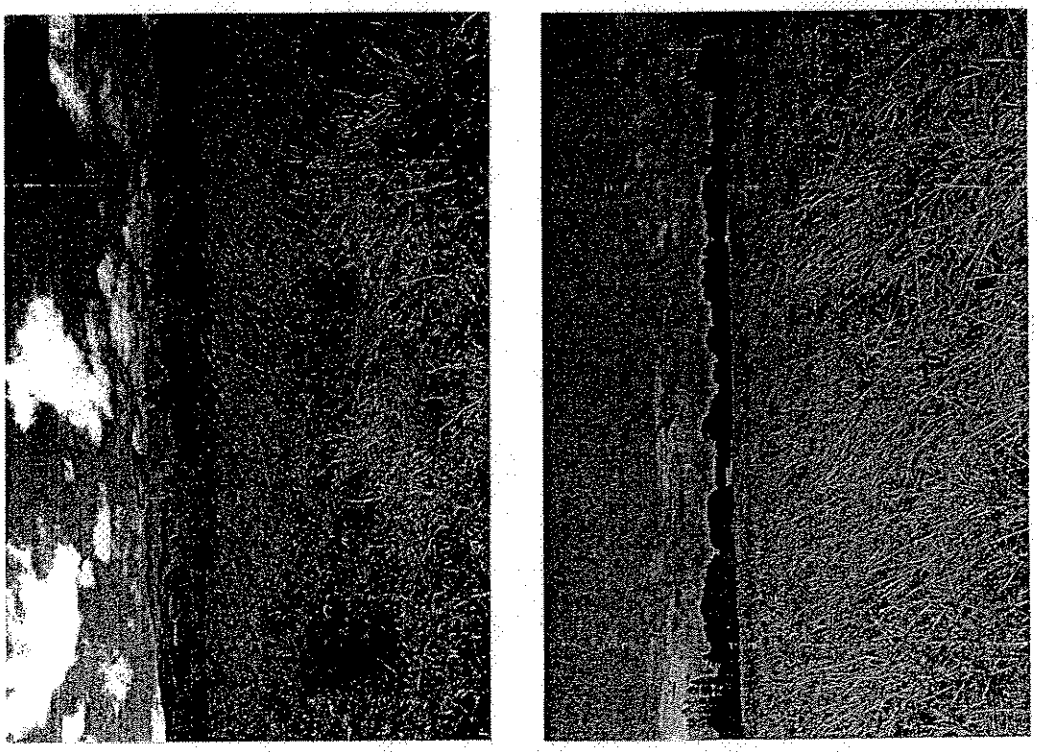


Figure 3. Top: Overview of Project Area, View to South. Bottom: Project Area, View to North

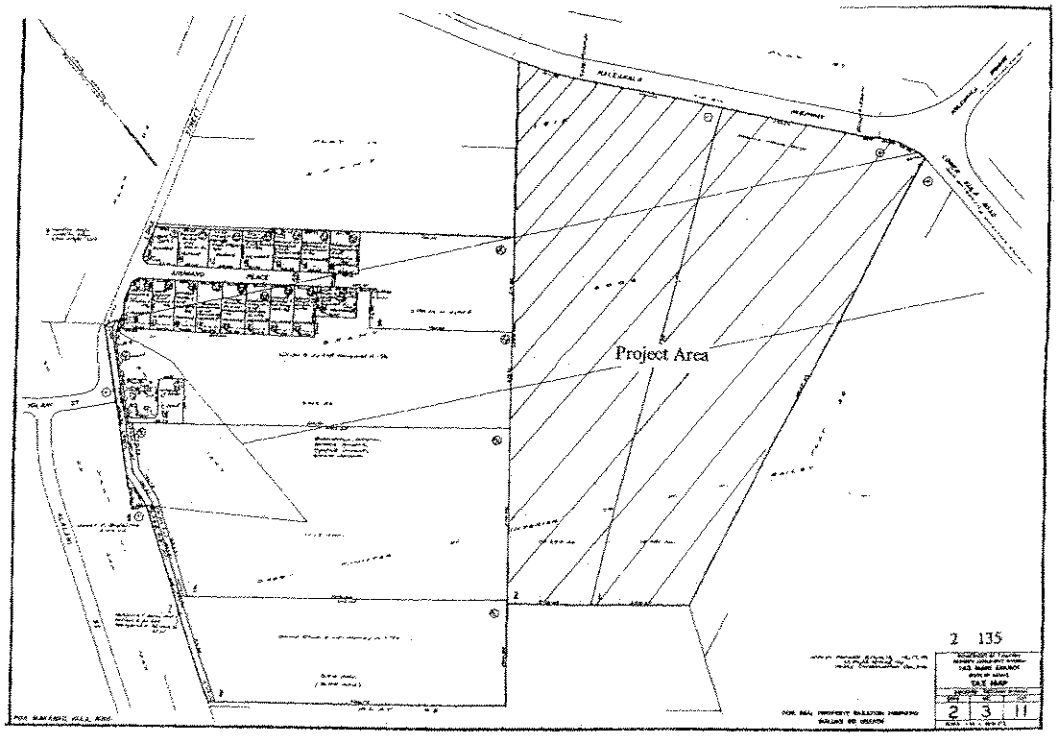


Figure 2. Project Area on TMK Map

HISTORY

Historical research of Makaeha *ahupua'a* and Makawao was summarized in Wong Smith (Appendix in Donham 1990) and Sinoto and Pantaleo (2001). The reader is referred to these studies for detailed information. A brief summary of the history and land use of the subject project area is included here.

The *ahupua'a* of Makaeha, literally meaning "sore eyes," was once part of the traditional district of Kula (Pukui 1974:139). The boundaries depicted in the USGS quadrangle maps are most likely modern since they appear to incorporate the smaller land divisions of Kukuiaeo, Kaau, Makaeha, Kohoilo, and Aapueonui. With the exception of Kukuiaeo, which is listed as an *ahupua'a* in the *Indices of Awards*, it is difficult to determine if the other three smaller divisions were at one time *ahupua'a* or represented smaller land divisions or *ili*. Makaeha, like other *ahupua'a* in this region, is not a typical *ahupua'a* encompassing the uplands to the coast, but are cut off from the sea by Wailuku *ahupua'a* and modern district (Wong Smith 1990).

Legendary and mythological references regarding traditional occupation and use of Makaeha *ahupua'a* and Makawao are scarce. Seasonal resource exploitation probably involved the gathering and harvesting of hardwoods like *koa* (*Acacia koa*), other plants, and animals. References regarding Makawao and Kula include the following (Pukui 1983):

> *Ka ua 'Ukiu o Makawao*
> The 'Ukiu rain of Makawao (Pukui 1983:173)
>
> *Keiki holoholo kuaua o Makawao*
> The lad of Makawao who goes about in the rain.
> Said of a native of that place who is not afraid of being wet (Pukui 1983:184)
>
> *Kula unahi pikapika he'e.*
> Kula people, scalers of the suckers of the tentacles of the octopus.
> Said in fun of the people of Kula, Maui. A kula cheifess who lived inland did not know what the suckers on an octopus were and tried to scale them as one scales fish.
>
> *O Kula I ka hoe hewa.*
> Kula of the ignorant canoe paddlers.
> Said of Kula, Maui, whose people did not know how to paddle canoes because they were uplanders. (Pukui 1983:270)

Early historic land-use patterns probably reflect that of the late historic period, including dry land agriculture for yam and sweet potato. While prehistoric permanent settlements, such as those to the east and south, have not been clearly indicated in the region, the Kula region, more to the southeast, is said to have sustained a relatively large pre-Contact permanent population. As discussed by Handy and Handy in *Native Planters in Old Hawaii*:

> All the country below the west and south slopes of Haleakala, specifically Kula, Honua'ula, Kahikinui, and Kaupo, in old Hawaiian times depended on the sweet potato. The leeward flanks of Haleakala were not as favorable for dry or upland taro culture…however, some upland taro was grown up to an altitude of 3000 feet (1972:276).
>
> Kula was always an arid region, throughout its long, low seashore, vast stony *Kula* lands, and broad uplands. Both on the coast, where fishing was good, and on the lower westward slopes of Haleakala, a considerable population existed. So far as we could learn, Kula supported no Hawaiian taro, and the fishermen in this section must have depended for vegetable food mainly on *poi* brought from the wetlands of Waikapu and Wailuku to westward across the plain to supplement their usual sweet-potato diet. In recent times, however, Chinese taro has been raised at a considerable elevation. Kula was widely famous for its sweet-potato plantations. *'Uala* was the staple of life here (1972:510-511).

Makawao literally means "forest beginning" (Pukui et al. 1974:142). Early accounts of Makawao consist of descriptions of the area or accounts of notable events that took place. The rain of Makawao is mentioned often in poetical sayings as well as in journals of early visitors (Wong Smith in Donham 1990:A-1). The Hawaiian historian Kamakau mentioned the following event that he estimated to have taken place around 1785:

> When Kekaulike heard that Alapa'i, the ruling chief of Hawaii was at Kohala on his way to war against Maui, he was afraid and fled to Wailuku in his double war canoe named Ke-aka-milo…and the fleet landed at Kapa'ahu at the pit of 'Aihako'ko in Kula [old name for Makawao]. Here on the shore the chiefs prepared a litter for Kekaulike and bore him upland to Haleki'i in Kukahua (1961:69)

By around the 1800s, agriculture in the Kula area underwent a transformation from subsistence to commercial. The arrival of whalers created a demand for fresh produce including vegetables, meat, and fruit. At first only sweet potatoes were available in this region, but by the mid-1830s, Irish potatoes were in demand and being cultivated. Since the potatoes were so well suited to this region in Kula, it was soon called the "potato district" (Kuykendall 1965:313).

The Irish potato blight and the California gold rush of 1849 started a potato "boom" and an annual yield of 20,000 barrels of commercial Irish potatoes was estimated in the years between 1847 and 1854. The gold rush also created a market for potatoes, other vegetables, and sugar and molasses. The potato boom was short-lived, but sugarcane and pineapple would have a profound effect upon land-use and tenure over a large part of Maui.

Makawao was involved in an experimental program of land awards created by King Kamehameha III, prior to the Great Mahele (Wong Smith 1990). In 1845 and 1846, land in the Makawao District was sold for $1 per acre with the transactions being registered as grants. About 900-acres, in parcels ranging from 5 to 10 acres, were purchased by native Hawaiians. The homesteaders gained title to their lands, and much of the remaining government lands were leased to *haole* ranchers. Around this time, immigrant Chinese farmers began leasing lands in Kula, either from the Hawaiian homesteaders or ranchers. A sizeable Chinese population flourished in Kula by the mid-1850s.

Grants 1215 and 4006 were awarded in the current project area. Grant 1215, consisting of 24-acres, was awarded to Lono on August 1, 1853, for $24.00. Grant 4006, consisting of 27.97-acres, was awarded to Joe de Freitas Phillipe on February 12, 1897, for $335.65. No land use was indicated in these Grants.

PREVIOUS ARCHAEOLOGY

The number and scope of archaeological work conducted in Kula, Maui, to date have been limited. Winslow Walker (1931) conducted a survey of prominent *heiau* sites on Maui, which included the Kula region. Previous archaeological studies undertaken within the boundaries of the current project area include CKM Cultural Resources (1996, 2003) and Kennedy (1990, 1991). Pertinent studies conducted in the immediate vicinity include Bordner (1980), Donham (1990, 1992), Fredericksen et al. (1991, 1995, 1999), and Sinoto et al. (2001). Figure 4 shows the location of these projects.

Walker (1931) recorded Site 224, *Mo'omuku Heiau*, in Omaopio; however, the location of this *heiau* was not provided. This large *heiau* was constructed on top of a small hill with a view of the water on both sides of Maui. It measured approximately 108 by 90 feet (33 by 27 meters), with walls measuring between 2-4 feet (0.6-1.2 meters) high.

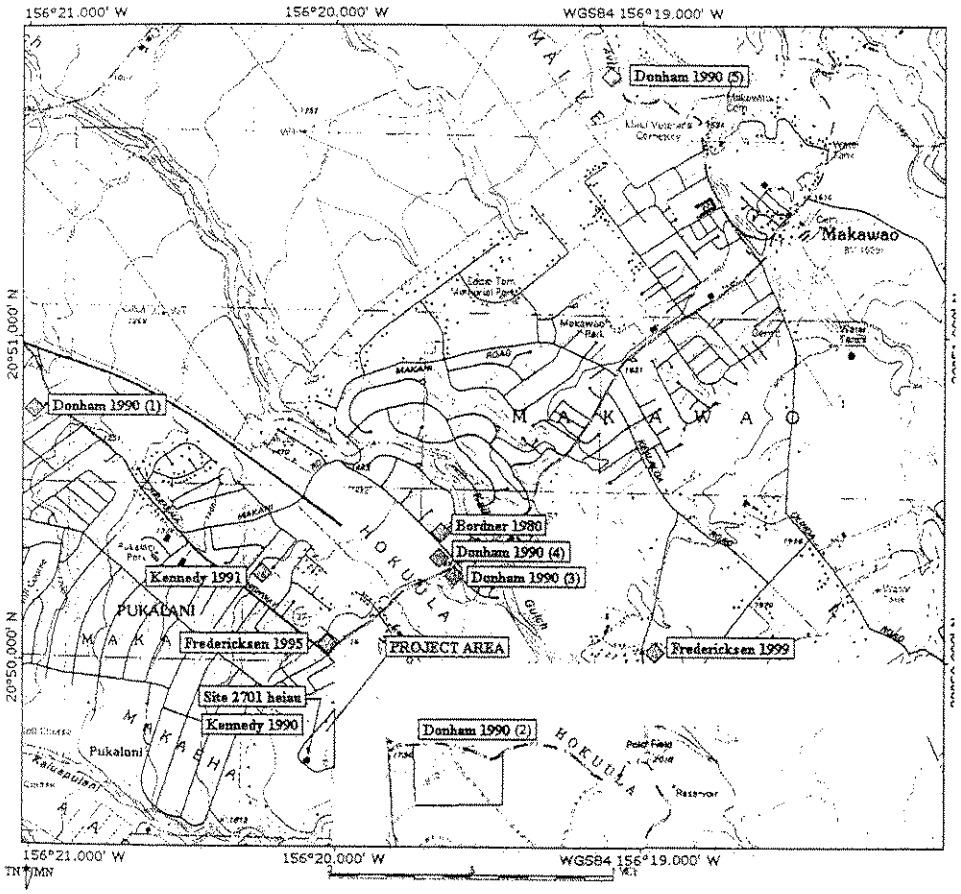


Figure 4. Previous Archaeological Work

Archaeological Consultants of Hawaii, Inc., conducted archaeological investigations at a suspected *heiau* site near Pukalani (Kennedy 1990), located within the current project area. Five test units were excavated to determine function and chronological placement of this site. Two radiocarbon dates were obtained from TU3, located in the interior of the structure. Layer II, level 1, dated 110 +/- 60 B.P., and Layer III, level 1, dated 200 +/- 60 B.P. Other cultural remains recovered during testing included a basalt flake, volcanic glass, and *kukui*. Based on the results of testing, together with informant testimony, this site was interpreted as a pre-Contact religious structure or *heiau* and assigned State Site 50-50-05-2701.

Archaeological Consultants of Hawaii, Inc., conducted an archaeological inventory survey and test results for the proposed Pukalani Highlands property located at Pukalani, *ahupua'a* of Kailua, Maui Island (Kennedy 1991). Sites 2497 through 2499 were recorded during the survey. Site 2497 was a platform, 2498 was a possible *heiau* based on recovered artifacts and coral, and Site 2499 was a rock mound. However, testing was limited to outside these structures to minimize disturbance and preserve its integrity.

CKM Cultural Resources (Maxwell Sr. 1996) conducted historical and cultural research at Site 2701, *heiau*, located within the Kualono project area. The purpose of this study was to ascertain the name of the *heiau*, determine its cultural significance, and provide a name for the project area. Based on interviews with individuals and kupuna familiar with the project area and the *heiau*, combined with background archival research, it was proposed that this site is either a *luakini* or *po'okanaka heiau*, and may have been previously identified by Walker (1931) as Site 224-*Moomuku Heiau*.

CKM Cultural Resources (Maxwell Sr. 2003) completed a cultural impact study to determine the cultural significance of historic and prehistoric resources in the current project area, ascertain the potential impacts of development upon any cultural resources and Site 50-50-05-2701, and present mitigation measures on these potential impacts. Results of this study indicated that Site 2701 is a significant *heiau*, either a *luakini* or *po'okanaka*. This site may have been recorded by Walker (1931) as Site 224 (*Moomuku Heiau*). A 60 to 100-foot buffer zone delineated by large boulders is recommended around the site, and a 30-foot by 4-foot high wall should be constructed around the inner buffer zone. No landscaping should be included within this inner buffer zone; however, native vegetation should be planted in the outer buffer zone. These recommendations will be further expanded upon in the Preservation Plan.

Paul H. Rosendahl Inc. (PHRI) conducted an archaeological inventory survey of five potential upcountry Maui High school sites in Haliimaile, Hokuula, Kailua, and Makaeha *ahupua'a*, Makawao (Donham 1990). Each parcel measured approximately 35 acres and was cultivated in pineapple. No archaeological sites were identified during the survey. Four lithic artifacts, including a basalt flake, an *ulu maika* fragment, a complete basalt adz, an adz fragment, and a ceramic sherd were collected from the surface of Parcel 4. A small piece of waterworn coral and Cellana shells were observed on the surface of Parcel 3. Other cultural remains included ceramic sherds in Parcel 1, a horseshoe and metal in Parcel 2, and a complete basalt quadrangular adz in Parcel 5. No further work was recommended for Parcels 1-3, and 5; however, additional archival work including land tenure research and cartographic sources was recommended for Parcel 4.

Donham (1992) conducted a field inspection of petroglyphs located near the Kula 200 Subdivision in Makaeha, Makawao District. These petroglyphs, on a vertical rock face along the northern bank of a gulch, were reported to SHPD by a resident of the Kula 200 Subdivision. A total of 32 separate glyphs, including canoes and paddlers, long canoes with no sails, human figures, and possible lizard figures, were observed on an approximately 20 m long section of the cliff. These petroglyphs were assigned State Site Number 50-50-11-2920.

Environmental Impact Statement Corporation (Bordner 1980) conducted a reconnaissance survey of the proposed Makawao Subdivision, located between Apana Road and Kailua Gulch. No surface archaeological sites were identified during this investigation. The project area was previously used as a plantation camp; however, no remains of this camp were observed. No further work was recommended.

Aki Sinoto Consulting conducted an archaeological inventory survey of the Upcountry Town Center (also known as the "Pukalani Triangle") in Makaeha *ahupua'a*, Makawao, Maui Island (Sinoto and Pantaleo 2001). The project area, situated north of the current project area, is located between Makawao Avenue, Old Haleakala Highway, and the Pukalani Bypass. State Site 50-50-06-5169, the Corn Mill Camp, was recorded during the survey. No other surface cultural remains were identified. Due to extensive disturbances from pineapple cultivation, eleven backhoe trenches were excavated. No significant subsurface cultural remains were encountered in any of the trenches. Site 5169 was assessed as significant under Criteria A, D, and E of the Hawaii Register of Historic Places, and several of the extant structures associated with the camp were recommended for preservation.

Aki Sinoto Consulting (Sinoto 2001) conducted a cultural impact assessment for the proposed phased development of the Pukalani Triangle in Makaeha *ahupua'a*, Makawao, Maui (TMK 2-3-07:08). No continuing cultural practices are currently occurring within the project area based on the findings of the archaeological inventory survey (Sinoto and Pantaleo 2001) and oral testimonies; however, five intact structures associated with the Corn Mill Camp (Site 50-50-06-5169) are still present within the project area. It was recommended that landscaping and planting in the project area should use native plants for lei-making and medicinal use, and a museum or interpretive space should be dedicated within one of the buildings associated with Site 5169.

Xamanek Researches conducted additional archaeological data collections of problematical features on a parcel in Pukalani (Fredericksen et al. 1991). Three sites (2497-2499) were previously recorded by Archaeological Consultants of Hawaii, Inc. (Kennedy 1991). Sites 2497 was a rock-filled platform, and Site 2498 was a possible *heiau*, and 2499 was a rock mound. Each feature was plan view mapped and tested. A series of probes were excavated along the southern end of Sites 2497 and 2498, and a 6.0 by 1.0 m trench (TR1) and a 1.0 by 1.0 m unit (TU1) were excavated at Site 2499. No subsurface cultural remains or bedrock were encountered in the probes at Sites 2497 and 2498. At Site 2499, numerous prehistoric artifacts including a rounded stone, an adz tip, basalt flakes, polished basalt flakes, a hamerstone, a polishing stone, and coral were recovered during excavation in TR1. Historic artifacts included bottle glass, a knife blade, a nail, and a cut bone. No subsurface cultural remains were recovered from TU1. It was concluded that the distribution and mixing of prehistoric and historic artifacts at Site 2499 indicates post-Contact activities such as agricultural clearing.

Xamanek Researches conducted an inventory survey on a 1.78-acre parcel of land located in the *ahupua'a* of Hoku'ula, Makawao District (Fredericksen and Fredericksen 1995). State Site 50-50-05-3929, a rock aggregation, was recorded during the survey. Two manually excavated units and one backhoe trench were excavated at this site. Historic material including metal, bottle glass, plastic and black mulch sheeting, sawn bovine bone, ceramics, kukui nut, waterworn pebbles, and marine shell were recovered from Trench #1 and Test Unit #1. Backhoe Trench #9 was excavated across the rock pile to obtain a stratigraphic profile. A three-layer stratigraphic sequence was revealed during trenching. Layers I and II were mixed with historic material, and Layer III was the basal layer absent of cultural material. A total of 22 backhoe trenches were excavated throughout the parcel. No subsurface cultural remains were encountered in these trenches, and no further archaeological work was recommended at Site 3929.

Xamanek Researches conducted an archaeological inventory survey for the Kulamalu water tank and waterline improvements in Hoku'ula *ahupua'a*, Makawao District (Fredericksen and Fredericksen 1999). State Sites 50-50-10-4677 through 4681 were recorded during the survey. Sites 4677 and 4680 were historic retaining walls; Site 4678 was an excavated cave shelter; Site 4679 was a shelter cave; and Site 4681 was a probable historic grave. All of these sites are located beyond the waterline corridor, and will not be impacted during construction of the waterline and tank. Since these sites will not be impacted by the proposed development, no further work was recommended.

SETTLEMENT PATTERN AND SITE EXPECTABILITY

The typical configuration of Makaeha, as well as some of the surrounding *ahupua'a*, in being truncated from the sea, would certainly have influenced the types of sites and their distribution. As indicated in the preceding sections, no extensive permanent settlements were indicated within this specific area until the historic period. Until that time, the prevailing land-use pattern was most likely associated with the seasonal exploitation of upland forest resources in the form of assorted plants and animals, as well as ceremonial and or religious purposes (i.e. the petroglyph sites and the *heiau*). Thus, sites associated with such endeavors would consist of rockshelters, small temporary habitation structures such as C-shapes, and trails. Although the Kula area further east and south were known for extensive dryland agricultural pursuits associated with permanent habitation settlements, the current project area, in terms of elevation may have been peripheral or marginal in productivity for prehistoric agricultural activities. Thus, features related to such activity would be limited in extent and consist of small plots and gardens in selected areas in the vicinity of gulches and drainages, where the terrain was more suitable. The paucity of prehistoric period sites is most certainly attributable to the extensive terrain alteration that took place with the advent of large-scale commercial agricultural ventures during the historic period.

By the mid-1800s, much of the upland forests had been cleared for agriculture and cattle grazing. The current project area is devoid of forest trees and interspersed with exotic species associated with secondary growth following large-scale clearing. Thus, the most likely cultural remains to be encountered in the study area would be historic features and artifacts associated with agricultural pursuits. Some 900 acres of homestead grants were awarded in the Makawao District in a pre-Mahele experimental program and some remains associated with such homesteads could be encountered.

METHODS

Archaeological and historical background researches were undertaken to determine the nature and extent of potential cultural resources in the project area. These researches were conducted at the State Historic Preservation Division (SHPD) library at the Department of Land and Natural Resources (DLNR) in Kapolei, and the Bureau of Conveyances and Land Management Branch of DLNR in Honolulu.

The surface survey entailed initially conducting systematic, walk-through transects spaced at 5-10 meters apart depending on vegetation density and ground visibility throughout the parcel. Since the parcel had been previously disturbed by pineapple cultivation, subsurface testing through backhoe trenching was deemed appropriate. A total of 26 backhoe trenches were excavated in selected areas throughout the project area. The backhoe excavations were undertaken with the supervision of the archaeologist and terminated when sterile subsoil or outcrop was reached. Each trench was numbered and its location marked with flagging tape and plotted on a base map provided by the client. Representative profiles were recorded and soils were described. Color photographs on 35mm format were taken of project area and trench overviews.

During the course of this project, all accepted standard archaeological procedures and practices were followed. Field notes, maps, and photographs, are being curated by Archaeological Services Hawaii, LLC, in Wailuku.

RESULTS OF SURVEY

No surface cultural remains or areas of exposed deposits were identified on the surface of the project area. Due to extensive previous disturbances throughout the parcel from pineapple cultivation, backhoe trenches were excavated.

A total of twenty-six backhoe trenches were systematically excavated throughout the parcel to determine presence/absence and extent of subsurface cultural remains (Fig. 5). Table 1 presents dimensions and stratigraphic information for each trench. Representative stratigraphic columns are depicted on Figure 6. Figures 7-30 show photographic overviews and wall profiles of selected trenches.

No subsurface cultural remains or deposits were encountered in any of the trenches. One piece of coral was collected during trenching at T6. Generally, three stratigraphic layers were exposed during trenching. Layer I was the till zone from pineapple cultivation, consisting of a silt to clayey silt with abundant roots and rootlets and black sheeting and irrigation lines. Underlying the till zone was Layer II, compact clay to clayey silt to silty clay with minimal rocks and rootlets. Underlying Layer II was Layer III, silt to silty clay to clay with abundant rocks and saprolitic material. Basalt outcrop was exposed in T12.

The stratigraphic components of T1 through T26 are as follows:

Layer I: till zone consisting of dark brown to very dark brown (10YR 2/2 – 3/2; 7.5YR 2.5/2) silt to clayey silt with black sheeting and irrigation lines from pineapple cultivation, abundant roots/rootlets and moderate amounts of rocks; fine grain, non-sticky to slightly sticky, non-plastic

Layer II (T1-3, 6-11, 13-19, 21, 23-26): brown to dark brown to very dark grayish-brown to dark yellowish-brown (10YR 4/3 – 10YR 3/3 – 7.5YR 2/4 – 10YR 3/4 – 10YR 3/2) compact clay with moderate amounts of rocks and rootlets; fine grain, sticky, plastic; non-cultural

Layer II in T4 and T22 was a dark brown (10YR 3/3) clayey silt with abundant rocks and rootlets; fine grain, loose, powdery, slightly sticky, slightly plastic; non-cultural. Layer II in T5 and T20 was a dark yellowish-brown (10YR 3/4) compact silty clay with minimal amounts of rocks and rootlets; fine grain, slightly sticky, slightly plastic; non-cultural. Layer II in T12 was a dark yellowish-brown (10YR 3/6) silt with saprolitic material and rocks; fine grain, soft, powdery, non-sticky, non-plastic; non-cultural.

Layer III (T1-3, 11, 24): very dark gray to dark brown to very dark grayish-brown (10YR 3/1 – 3/2 – 3/3) silty clay with minimal amount of rocks and rootlets; fine grain, slightly sticky, slightly plastic; non-cultural

Layer III in T4, 7, and 10 was a yellowish-brown to very dark brown to grayish-brown (10YR 5/6 – 3/1 – 5/2) silt with saprolitic material and rocks; fine grain, loose, non-sticky, non-plastic; non-cultural. Layer III in T5 was a dark gray (10YR 4/1) very rocky silt with minimal rootlets; loose, fine grain, non-sticky, non-plastic; non-cultural. Layer III in T8 was a light gray (10YR 7/1) silty clay with saprolitic material and rocks; mottled, slightly sticky, slightly plastic, fine grain, powdery; non-cultural. Layer III in T12 was bedrock outcrop. Layer III in T13 and T14 was a yellowish-brown to dark brown (10YR 5/6 – 3/3) clayey silt with saprolitic material and rocks; fine grain, slightly sticky, non-plastic; non-cultural. Layer III in T15 was a dark gray to dark brown to dark yellowish brown (10YR 4/1 – 3/3 – 10YR 4/1) silty clay with saprolitic material and rocks; mottled, fine grain, slightly sticky, slightly plastic; non-cultural. Layer III in T16 was a dark brown to very dark grayish brown (10YR 3/2 – 4/1) compact clay with minimal rocks; fine grain, sticky, plastic; non-cultural. Layer III in T19 and 20 was a yellowish brown to very dark grayish brown (10YR 5/6 – 3/2) silty clay with saprolitic material and rocks; fine grain, sticky, slightly plastic; non-cultural. Layer III in T21 and T22 was a grayish brown to very dark grayish brown (10YR 5/2 – 3/2) very rocky silt; loose, fine grain, powdery, non-sticky, non-plastic; non-cultural. Layer III in T23 and T26 was a very dark brown (10YR 3/2) compact clay with minimal rocks; sticky, plastic; non-cultural. Layer III in T24 was a very dark grayish brown (10YR 3/2) silty clay; homogenous, fine, slightly sticky, slightly plastic; non-cultural. Layer III in T25 was a very dark brown (10YR 2/2) clayey silt with minimal rocks and rootlets; slightly sticky, slightly plastic, fine grain; non-cultural.

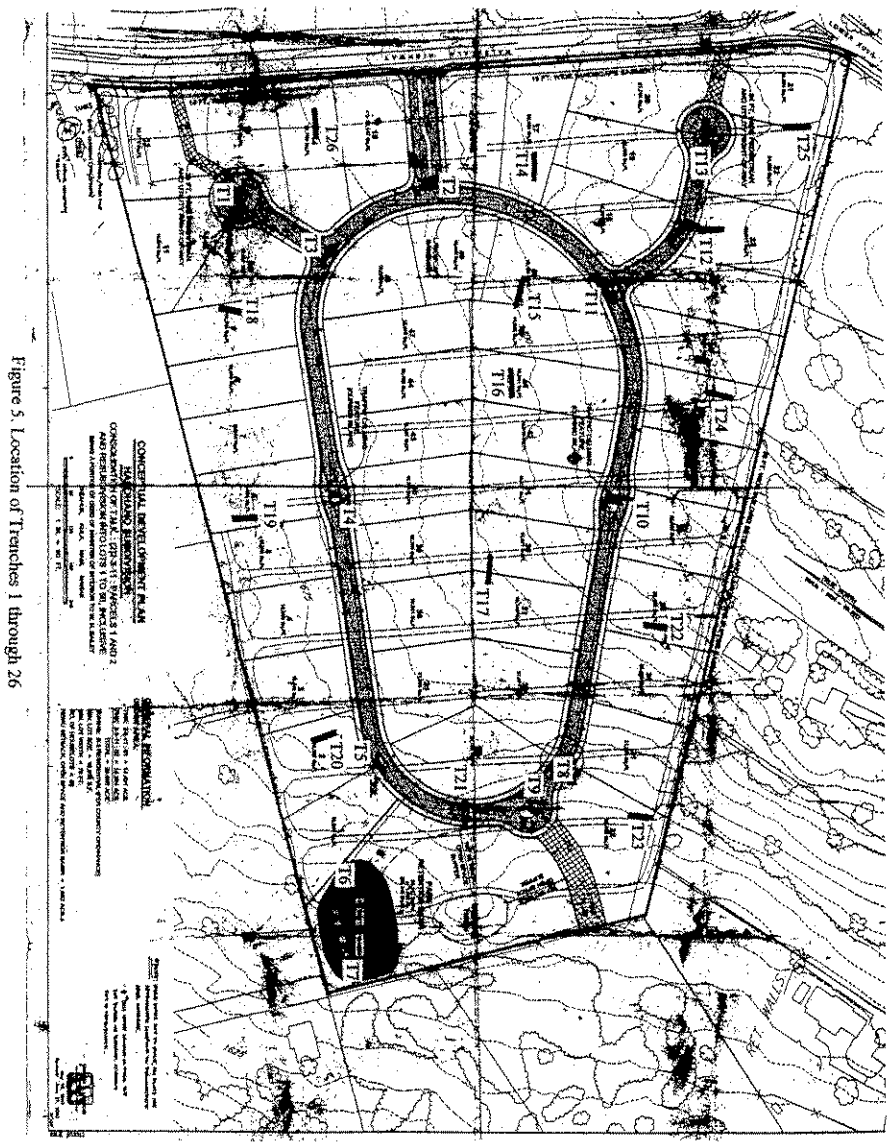


Figure 5. Location of Trenches 1 through 26

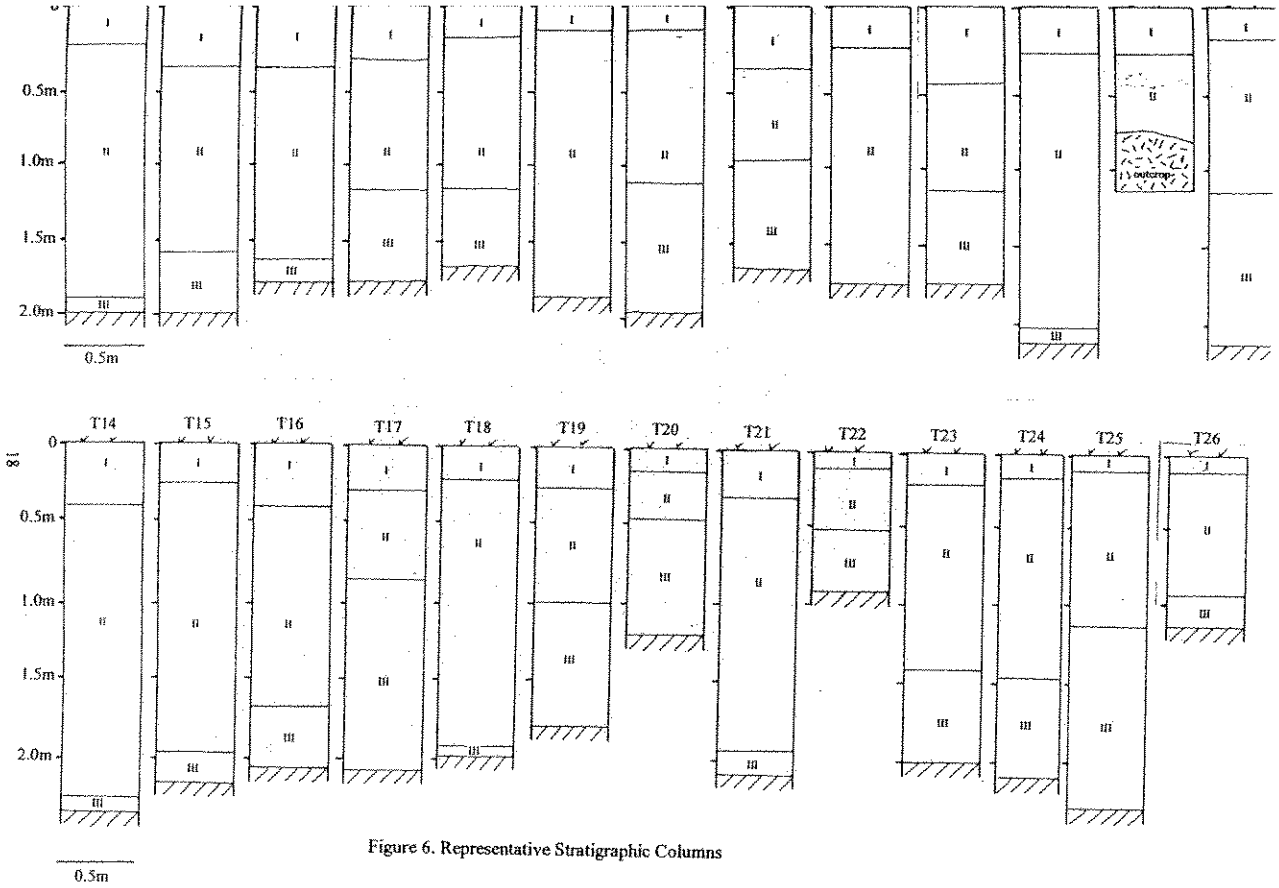


Figure 6. Representative Stratigraphic Columns

Table 1. Dimensions and Stratigraphic Information for T1-T26

TR	Length	Width	Depth	Orient.	Layer I	Layer II	Layer III	Cultural
1	6.0m	0.7m	2.0m	250	till zone	compact clay	silty clay	none
2	6.0m	0.7m	2.0m	108	till zone	compact clay	silty clay	none
3	6.5m	0.7m	2.0m	275	till zone	compact clay	silty clay	none
4	6.0m	0.7m	1.8m	260	till zone	clayey silt	rocky silt	none
5	6.0m	0.7m	1.7m	250	till zone	silty clay	rocky silt	none
6	6.5m	0.7m	1.9m	250	till zone	compact clay		coral
7	6.5m	0.7m	2.6m	350	till zone	compact clay	rocky silt	none
8	6.0m	0.7m	1.7m	330	till zone	compact clay	silty clay	none
9	6.5m	0.7m	1.8m	255	till zone	compact clay		none
10	6.0m	0.7m	1.8m	225	till zone	compact clay	silty clay	none
11	7.0m	0.7m	2.2m	348	till zone	compact clay	silty clay	none
12	5.0m	0.7m	1.2m	310	till zone	silt	outcrop	none
13	6.5m	0.7m	2.1m	230	till zone	compact clay	clayey silt	none
14	6.5m	0.7m	2.4m	250	till zone	compact clay	clayey silt	none
15	6.5m	0.7m	2.2m	275	till zone	compact clay	silty clay	none
16	6.0m	0.7m	2.1m	310	till zone	compact clay	compact clay	none
17	7.4m	0.7m	2.1m	255	till zone	compact clay	silty clay	none
18	6.5m	0.7m	2.0m	315	till zone	compact clay	compact clay	none
19	6.8m	0.7m	1.8m	320	till zone	compact clay	compact clay	none
20	5.5m	0.7m	1.2m	312	till zone	silty clay	silty clay	none
21	6.0m	0.7m	2.1m	223	till zone	compact clay	rocky silt	none
22	5.5m	0.7m	0.9m	328	till zone	clayey silt	rocky silt	none
23	6.0m	0.7m	2.2m	315	till zone	compact clay	compact clay	none
24	5.5m	0.7m	2.1m	320	till zone	compact clay	silty clay	none
25	6.5m	0.7m	2.3m	310	till zone	compact clay	clayey silt	none
26	6.0m	0.7m	2.2m	195	till zone	compact clay	compact clay	none

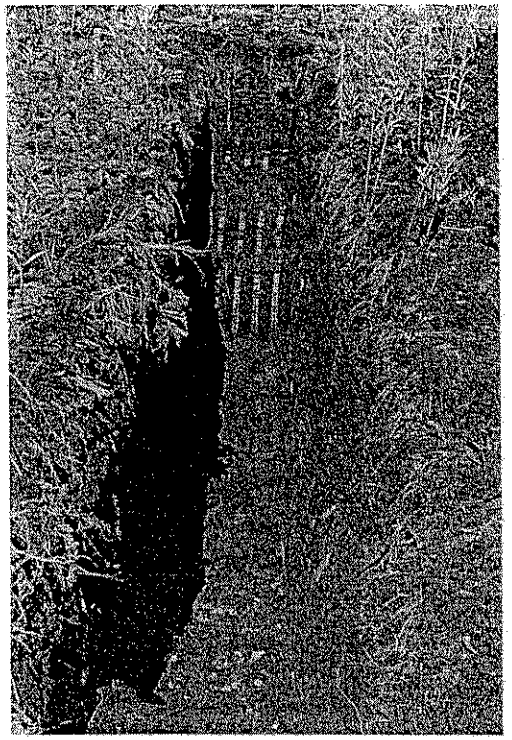


Figure 7. Overview of T1, View to West

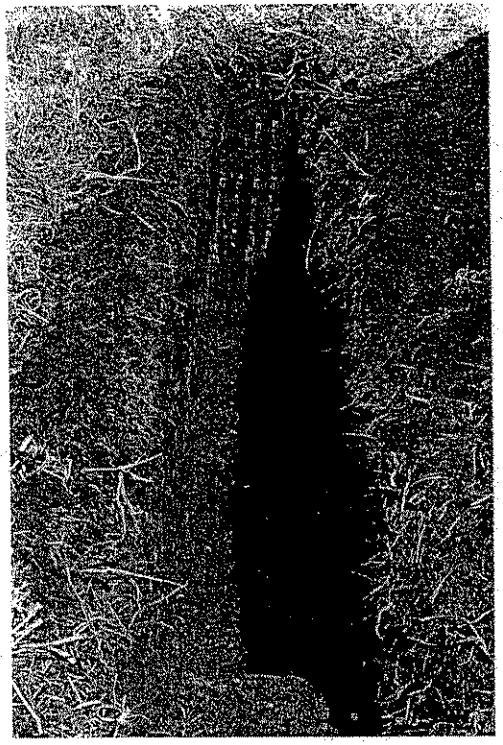


Figure 8. Overview of T2, View to West

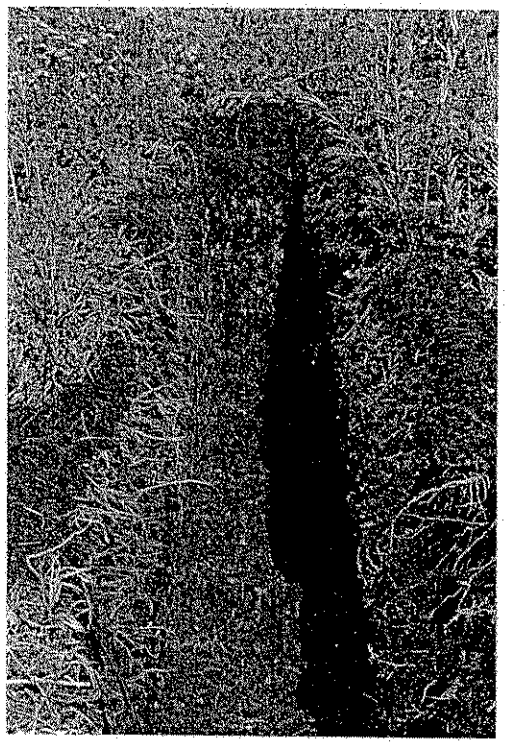


Figure 9. Overview of T3, View to West

Figure 10. Overview of T4, View to West

Figure 11. Overview of T5, View to West

Figure 12. Overview of T6, View to West

Figure 13. Overview of T7, View to North

Figure 14. Overview of T8, View to North

Figure 15. Overview of T9, View to North

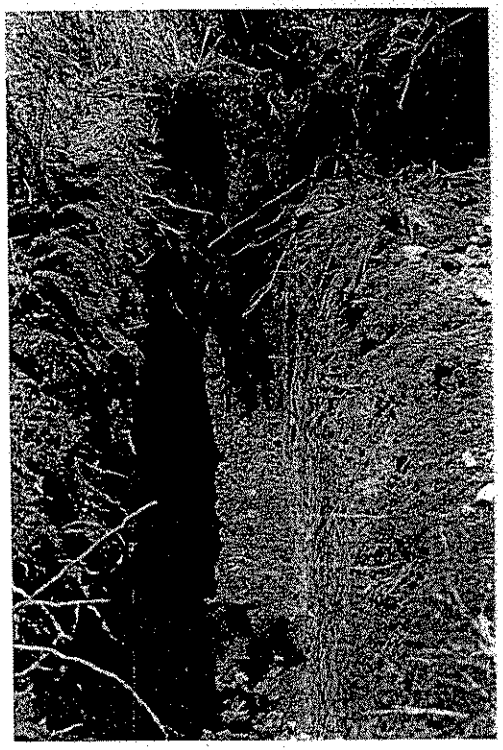


Figure 16. Overview of T10, View to North

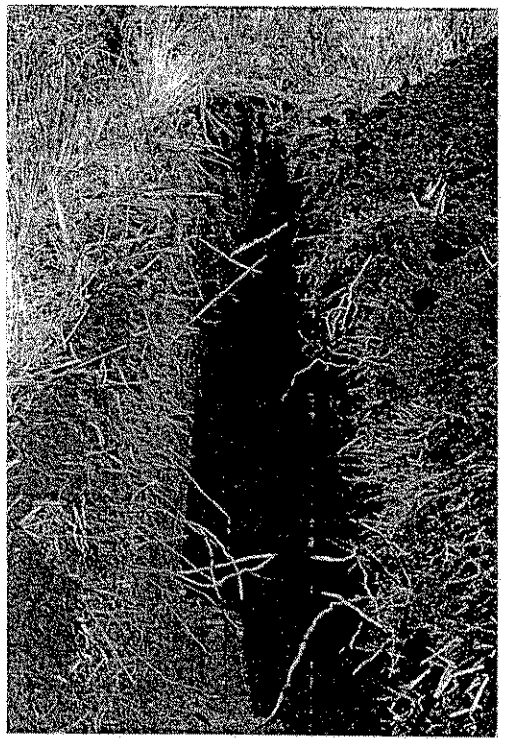


Figure 17. Overview of T11, View to South

Figure 18. Overview of T12, View to South

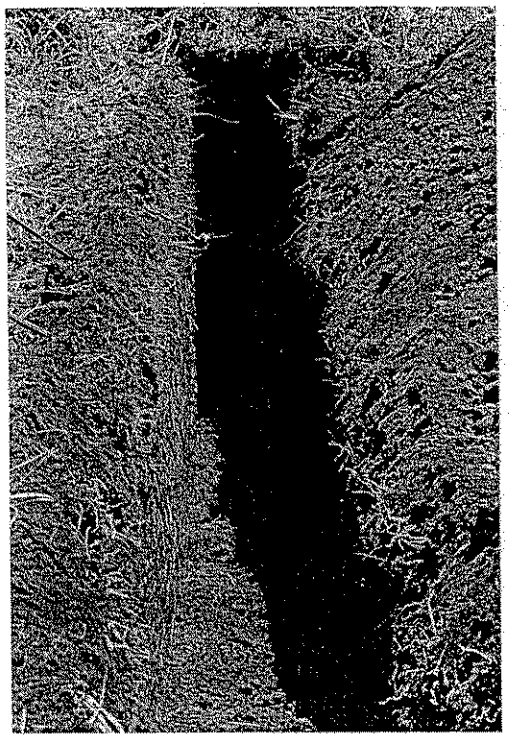


Figure 19. Overview of T13, View to West

Figure 20. Overview of T14, View to West

Figure 21. Overview of T15, View to South

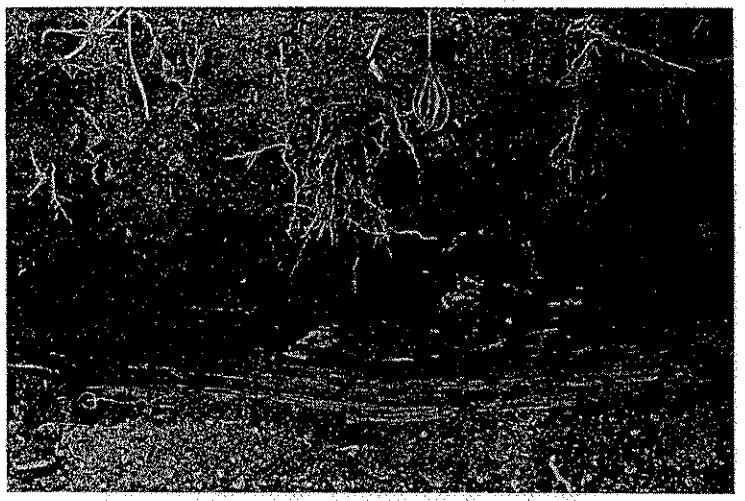
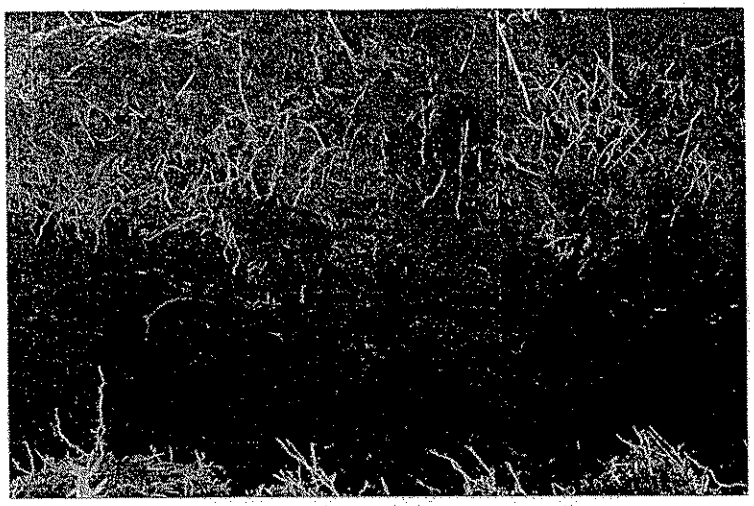


Figure 22. Top: T16, West Wall Profile. Bottom: T17, East Wall Profile



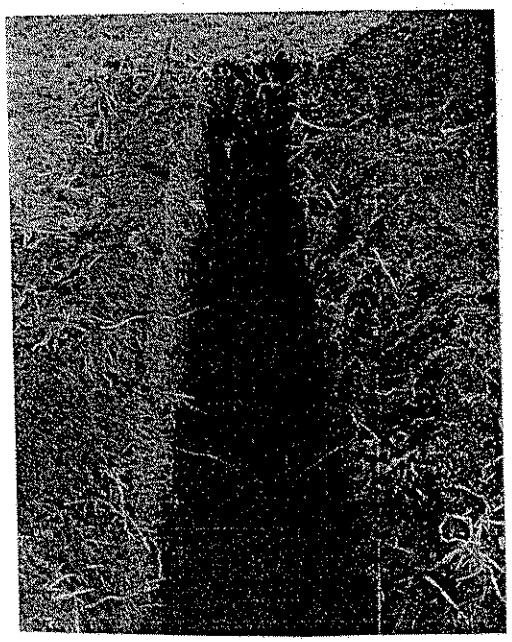


Figure 23. Top: T18, North Wall Profile. Bottom: Overview of T19, View to North

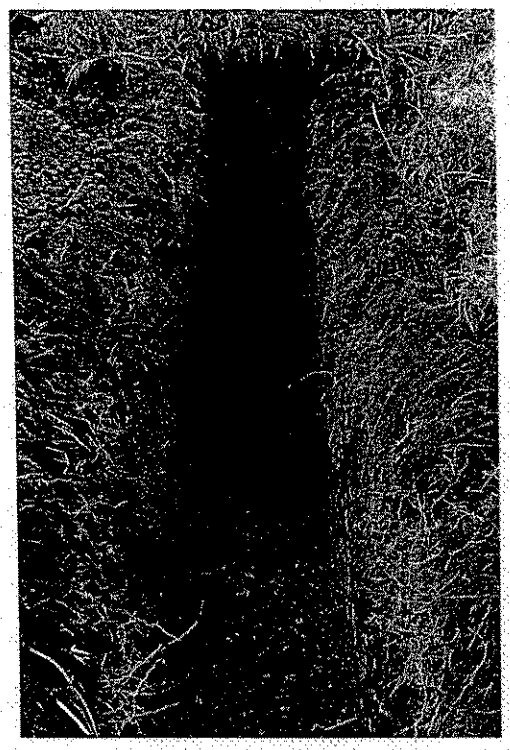


Figure 24. Overview of T20, View to North

Figure 25. Overview of T21, View to East

Figure 26. Overview of T22, View to North

Figure 27. Overview of T23, View to South

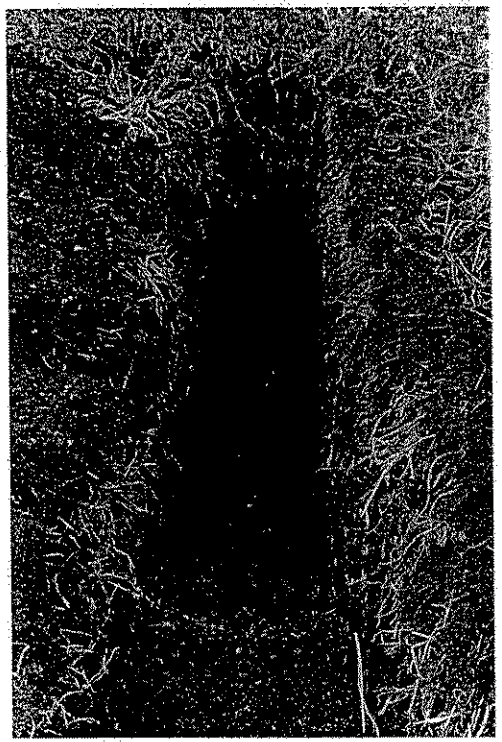


Figure 28. Overview of T24, View to South

Figure 29. Overview of T25, View to North

Figure 30. Overview of T26, View to West

DISCUSSION

State Site 50-50-05-2701 is located within the current project area. This site, previously recorded by Kennedy (1990) as a probable *heiau*, will be preserved and excluded from the current development. A buffer zone will be established around this site to ensure protection. An historical and cultural assessment of this *heiau* suggested that this site could be Walker's (1931) Site 224, *Moomoku Heiau*. However, further research needs to be conducted to determine if Site 224 and Site 2701 are the same.

No significant surface or subsurface cultural remains were encountered during the inventory survey. The results of the current investigation produced no evidence for sedentary cultural activities during the prehistoric and early historic periods in the subject project area, and the background data search also supported this conclusion. However, with the advent of large-scale commercial agricultural activities, the adverse effects of extensive and compounded land clearing and tilling may have effectively impacted and destroyed any remains that may have once existed.

Three trenches were excavated along the exterior boundary of the buffer zone around Site 2701, and two trenches were excavated in the proposed retention basin. One coral fragment was recovered in T6. However, provenience of this isolate could not be established. No other cultural remains were recovered in these trenches.

The results of backhoe testing showed that subsurface cultural remains were absent in all exposed stratigraphic layers. Stratigraphic analysis revealed a three layer stratigraphic sequence. The surface of the entire project area consisted of Layer I, the till zone. Underlying the till zone was Layer II, a compact clay to compact silty clay with saprolitic material. Underlying Layer II was Layer III, varying from silt to silty clay to compact clay. Layer III in T12 was basalt outcrop.

RECOMMENDATIONS

Site 50-50-05-2701 is recommended for permanent in situ preservation. A preservation plan shall be prepared and submitted to the State Historic Preservation Division (SHPD) for concurrence. This plan shall establish a 60-100 foot buffer zone around the site and stipulate temporary protection measures to be implemented during any development activities in the surrounding areas. It is also recommended that additional sources of funding or grants be obtained to further study this site and its possible relationship to the adjacent petroglyphs.

Based on the negative results of subsurface testing in the remaining portion of the parcel, together with evidence for previous disturbances in the subject project area from pineapple cultivation, no further archaeological work is recommended. However, due to the presence of Site 2701 adjacent to the proposed development, archaeological monitoring during construction activities is recommended to ensure protection of the site and to document any subsurface cultural remains or deposits underlying the till zone. Prior to commencing any construction activities, an archaeological monitoring plan shall be prepared for approval by SHPD.

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LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
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BOARD OF LAND AND NATURAL RESOURCES
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

December 24, 2003

Jeffrey Pantaleo
Archaeological Services Hawai'i, LLC
16 South Market Street, Suite G
Wailuku, Hawai'i 96793

LOG NO: 2003.2665
DOC NO: 0312MK22

Dear Mr. Pantaleo,

SUBJECT: Chapter 6E-42 Historic Preservation Review - Archaeological Inventory Survey Proposed Kualono Residential Subdivision Makaeha Ahupua'a, Makawao District, Maui
TMK (2) 2-3-11:1 and 2

Thank you for the opportunity to review this report which our staff received on October 30, 2003 (Pantaleo 2003, *Archaeological Inventory Survey of the Proposed Kualono Residential Subdivision, Pukalani, Makawao District, Maui Island [TMK 2-3-11:1 and 2].* ASH, LLC ms).

The background section acceptably establishes the ahupua'a settlement pattern and predicts the likely site pattern in the project area. Land Grant information for the parcel is provided. The summary of previous archaeological work in the area provides a baseline for the current work. Please see attachment for details.

The survey has adequately covered the project area documenting no new historic properties in the project area. Subsurface testing (26 backhoe trenches) were also negative for evidence of cultural deposits. One previously recorded historic property (Site 50-50-05-2701) was mentioned in the text. Please see attachment for comments.

Please see attachment regarding significance assessments for Site 50-50-05-2701.

Please see attachment regarding proposed mitigation measures for the project area.

We will await the recommended revisions to the report. 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,

P. Holly McEldowney, Administrator
State Historic Preservation Division

MK:jen

Attachment

c: Michael Foley, Director, Department of Planning, County of Maui, FAX 270-7634
Bert Ratte, County of Maui, Land Use and Codes, FAX 270-7972
Glen Ueno, County of Maui, Land Use and Codes, FAX 270-7972
Jeffrey Pantaleo, Principal Investigator, ASH, LLC, FAX 837-0171

Attachment
Requested Revisions to
Archaeological Inventory Survey of the Proposed Kualono Residential Subdivision, Pukalani, Makawao District, Maui Island [TMK 2-3-11:1 and 2]

As per our rules, please include the following in the revised report:

1. Historic background information
    a. Please provide additional information on land use and site patterns for the project area, and ahupua'a during the post 1850 times as revealed in later literature or through oral history.
    b. Please provide a summary of documents reviewed during the research.
2. Archaeological background information
    a. Areal extent of prior survey coverage indicated on a map. We note that the previous work conducted is indicated on a map, but the areal extent is not plotted.
    b. We appreciate the inclusion of the site in the background section discussion. Please see below "Summary of Findings" for additional comments.
3. Summary of findings
    a. Please revise this section to include pertinent information summarized from previous work on Site 50-50-05-2701
    b. A map or maps locating Site 50-50-05-2701, its boundaries, with at least one site location map being a portion of the relevant USGS quad map. In 1990, when this heiau was investigated, researchers did not routinely define site boundaries. Since it is located on the parcel surveyed here, it is appropriate to include boundary information in this report.
4. Significance assessments
    a. Please reassess, or minimally describe the previously accepted significance assessment for Site 50-50-05-2701, since it is not described in detail in the text.
    b. This may simply indicate, in summary form, the assessment of the Site as significant under Criterion "D" and "E".
5. Recommendations
    a. We do not concur that monitoring is warranted for the entire parcel.
    b. After definition of site boundaries for Site 50-50-05-2701, it may be appropriate for monitoring in the vicinity of the site. If the site boundaries are well within the to be proposed preservation area, monitoring may not be warranted. Should the developer elect to monitor, this should be stated in the text.

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

May 28, 2004

Jeffrey Pantaleo
Archaeological Services Hawai'i, LLC
16 South Market Street, Suite G
Wailuku, Hawai'i 96793

LOG NO: 2004.1642
DOC NO: 0405MK28

Dear Mr. Pantaleo,

SUBJECT: Chapter 6E-42 Historic Preservation Review - Revised Archaeological Inventory Survey Proposed Kualono Residential Subdivision Makaeha Ahupua'a, Makawao District, Maui
TMK (2) 2-3-11:1 and 2

Thank you for the opportunity to review this revised report which our staff received on April 18, 2004 (Pantaleo 2003, *Archaeological Inventory Survey of the Proposed Kualono Residential Subdivision, Pukalani, Makawao District, Maui Island [TMK 2-3-11:1 and 2]*.ASH, LLC ms). We previously commented on this report (Log 2003.2665) recommending some revision regarding a previously identified site on the parcel. In our previous letter, we indicated that the background section and the survey coverage were both acceptable. The site description for Site 50-50-05-2701 is also acceptable. All of our comments pertaining to the background, previous archaeology and survey have been addressed.

The survey covered 28.695 acres, and included both surface survey, and subsurface testing in the form of 26 backhoe trenches in selected locations. One historic site, a probable *heiau* (SIHP No. 50-50-05-2701), was identified as being on the property. No other historic sites, or evidence of subsurface deposits, were identified. Site -2701 was assessed as significant under multiple Criteria "D" and "E," and will be preserved within a 2.5-acre preserve area that will not be developed.

We concur with the findings and significant assessment, and also concur with the mitigation recommendations that the site be permanently preserved. We also concur that some monitoring in the vicinity of the *heiau* site may be warranted. We suggest that the preservation plan include recommendations for areas immediately adjacent to the *heiau* for which monitoring is appropriate. This will likely apply to a given distance from the *heiau* site, outside of any proposed and agreed upon buffers.

The report can now be considered adequate and acceptable. We will wait for the mentioned preservation plan, and any other mitigation plans, to be submitted to our office for review and comment. 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,

P. Holly McEldowney, Acting Administrator
State Historic Preservation Division

CD:jen

c: Michael Foley, Director, Department of Planning, County of Maui, FAX 270-7634
Bert Ratte, County of Maui, Land Use and Codes, FAX 270-7972
Glen Ueno, County of Maui, Land Use and Codes, FAX 270-7972
Jeffrey Pantaleo, Principal Investigator, ASH, LLC, FAX 837-0171
Maui Cultural Res Commission, Dept of Plng, 250 S. High St, Wailuku, HI 96793

ARCHAEOLOGICAL PRESERVATION PLAN FOR A HEIAU STRUCTURE LOCATED WITHIN THE KUALONO SUBDIVISION AT TMK: 2-3-11:1 AND 2 MAKAEHA *AHUPUA'A;* MAKAWAO DISTRICT; ISLAND OF MAUI

FOR: Hanohano LLC

BY: Lisa J. Rotunno-Hazuka,
And Jeffrey Pantaleo (MA)

MAY 2004

ARCHAEOLOGICAL SERVICES HAWAII, LLC.
16 S. Market St. Suite G
Wailuku, HI 96793

INTRODUCTION

Under contract to Hanohano LLC., and per requirements set forth in HAR-Title 13, Chapter 277-Rules Governing Requirements for Archaeological Site Preservation and Development, and by SHPD (0404CD06-Appendix A), this Preservation Plan is being developed for a significant *heiau* site, SIHP 2701 in Pukalani. The *heiau* site is located at the extreme southwestern (*makai*) extent of the proposed project area within TMK 2-3-11:1 and 2, Makaeha *Ahupua'a,* Makawao District, Island of Maui.

The *heiau* was originally tested by Archaeological Consultants of Hawaii, Inc., to determine its' authenticity. Local informants claimed the area was a clearing mound created by their grandfather in 1916, others remember it as a religious sacred structure. Testing by Archaeological Consultants of the Hawaii exemplified the presence of several structural components (lined depressions, platforms, terraces) which are indicative of a *heiau.*

The proposed development plans of Kualono Subdivision shall implement conservation (avoidance and in protection) of this significant site. It is anticipated that protection and preservation of Site 2701 shall occur through stewardship opportunities afforded to a local Hawaiian group, selected after consultation with the State Historic Preservation Division and *kupuna* knowledgeable in such matters. Until such time, the site shall be protected with a 60 ft. native planting with irrigation, no access buffer zone immediately surrounding the *heiau* site within the project area. Outside of this 60 ft. buffer, an additional 40 ft. buffer planted with a grassed lawn where no structural features may encroach shall be established. Permitted uses within the 100 ft. buffer shall be a rock wall denoting the 60 ft. buffer line. The grass lined retention basin shall abut the perimeter of the buffers providing a 100 ft. no build zone around the *heiau* within the project area. The sites close proximity, 15 ft. from property line, to the southwestern boundary line, may limit the buffer zone and view planes proposed within this plan.

PROJECT AREA

The project area is composed of two parcels located in Pukalani on a high, flat promontory overlooking Kahului to Makena. More specifically, it is west of the five trees area adjacent to Lower Kula Highway and the Old Haleakala Highway, across from King Kekaulike High School within TMK 2-1-11: parcels 1 and 2, Makaeha *ahupua'a,* Makawao District (Figure 1). Parcel 1 consists of 14.401 acres and parcel 2 contains 14.294 acres for a combined acreage of 28.695

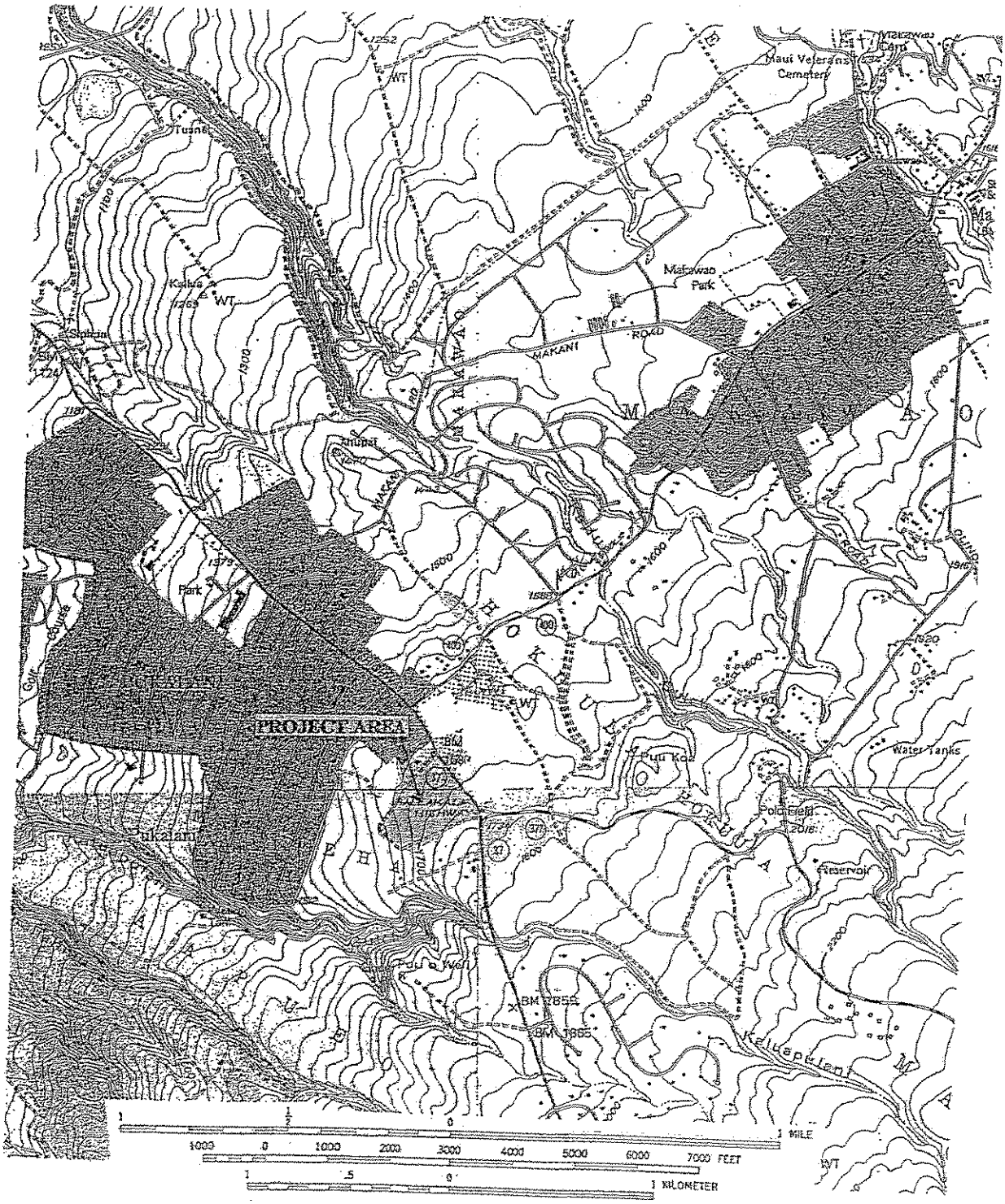
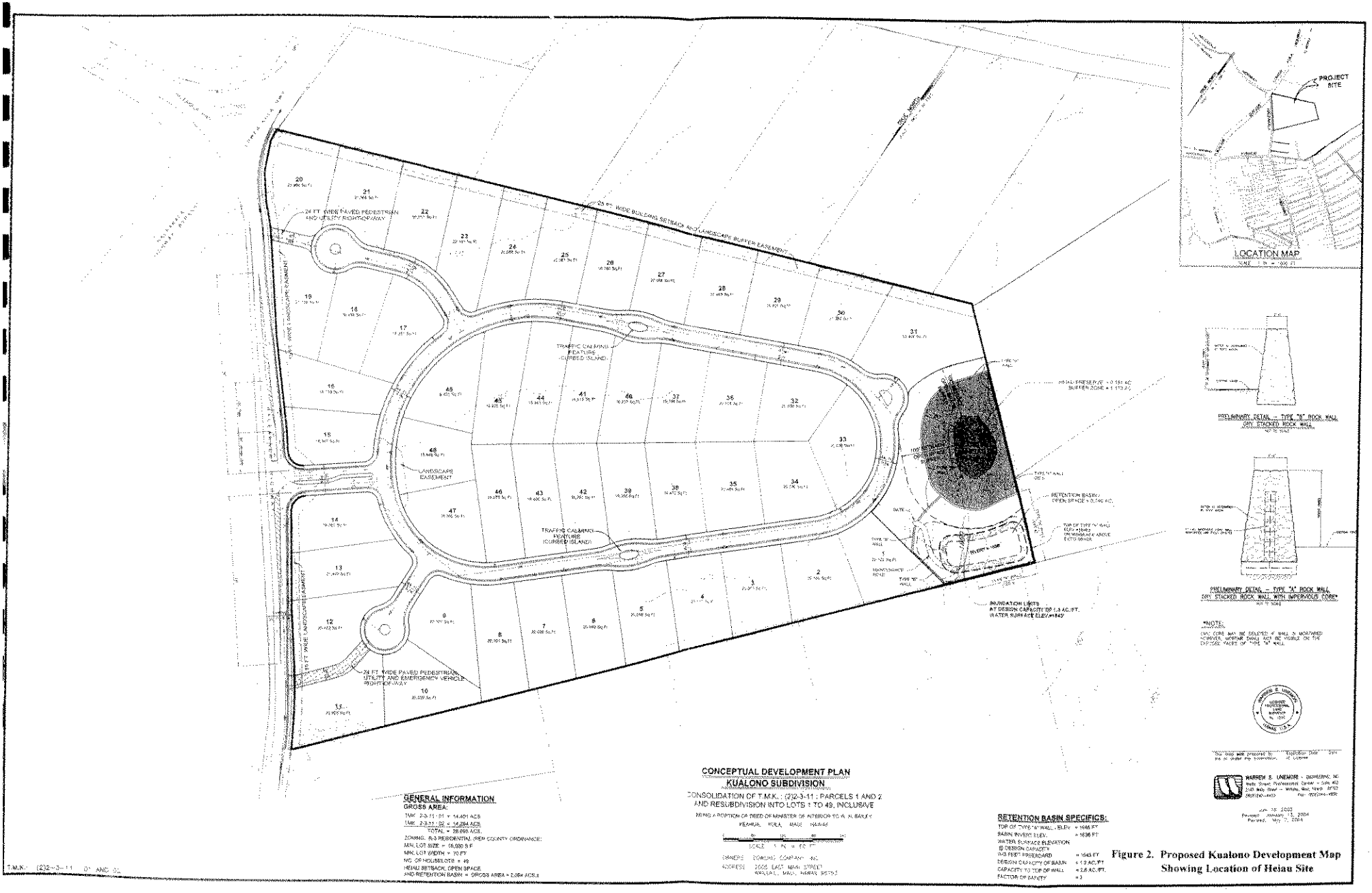


Figure 1. Location of Project Area on USGS Map



CONCEPTUAL DEVELOPMENT PLAN
KUALONO SUBDIVISION
CONSOLIDATION OF T.M.K.: (2)2-3-11 : PARCELS 1 AND 2
AND RESUBDIVISION INTO LOTS 1 TO 49, INCLUSIVE
BEING A PORTION OF GRANT OF MINISTER OF INTERIOR TO A. N. BAILEY
PEAHUA, HOLA, MAUI, HAWAII

SCALE: 1" = 60 FT.

OWNERS: DOWLING COMPANY, INC.
ADDRESS: 2005 EAST MAIN STREET
WAILUKU, MAUI, HAWAII 96793

GENERAL INFORMATION
GROSS AREA:
TMK: 2-3-11 : 01 = 14.401 ACS.
TMK: 2-3-11 : 02 = 14.294 ACS.
TOTAL = 28.695 ACS.
ZONING: R-3 RESIDENTIAL (HCR COUNTY ORDINANCE)
MIN. LOT SIZE = 10,000 S.F.
MIN. LOT WIDTH = 70 FT.
NO. OF HOUSELOTS = 49
HEIAU SETBACK, OPEN SPACE,
AND RETENTION BASIN = GROSS AREA - 5.954 ACS.±

RETENTION BASIN SPECIFICS:

TOP OF TYPE "B" WALL, ELEV.	= 1646 FT.
BASIN INVERT ELEV.	= 1636 FT.
WATER SURFACE ELEVATION @ DESIGN CAPACITY	
W/3 FOOT FREEBOARD	= 1643 FT.
DESIGN CAPACITY OF BASIN	= 1.2 AC.-FT.
CAPACITY TO TOP OF WALL	= 2.6 AC.-FT.
FACTOR OF SAFETY	= 2

HARRIS S. UNEMORI - ENGINEERING, INC.
Wells Street Professional Center • Suite 402
2145 Wells Street • Wailuku, Maui, Hawaii 96793
(808)242-4453 Fax: (808)244-1836

Job No. 2003
Revised: January 13, 2004
Revised: May 7, 2004

T.M.K.: (2)2-3-11 : 01 AND 02

Figure 2. Proposed Kualono Development Map Showing Location of Heiau Site

acres. The project area is relatively flat (from past cultivation) sloping from northeast to southwest, and was formerly cultivated in organic pineapple. Today the project is covered in tall California grasses, Christmas berry, koa haole, castor bean and various other plants and weeds.

DESCRIPTION OF SIHP 2701-*HEIAU*

The site is located along the southwestern boundary line within the project area. It has been slightly altered through years of commercial agriculture and passersby. As originally recorded by Archeological Consultants of Hawaii, Inc., the *heiau* is oval in shape measuring 112 feet by 60 feet with several component features consisting of four depressions, three platforms, a soil/rock depression in the north, a rectangular depression bordered by a faced alignment to the south, and a possible entrance with deteriorated rock stairs (Figure 3-Kennedy 1990: 2). After recording the structure, testing was initiated for the purposes of either refuting or supporting this large rock structure as a *heiau.* Testing within the *heiau* consisted of the excavation of five trenches. Trench 1 was along the southern edge of the *heiau* to ascertain if this area was the constructed edge of the *heiau* or if it was a push pile from pineapple. Test excavations exemplified that this area did not exhibit any formal construction and consisted of a pile of rocks related to agricultural pursuits. Test trenches 2-4 confirmed the presence of construction upon bedrock and the southern edges of the *heiau* appear to be authentic. Trench 5 was placed within the soil depression to determine if it was an internal feature of the *heiau.* Excavations revealed barbed wire and rocks which were not stacked indicating this was not an internal feature of the *heiau.* Cultural materials recovered during these excavations consisted of sparse marine shell, one volcanic glass flake and charcoal, which was sent for radiometric dating returning dates of 100 +/- 60 and 200 +/- 60 B.P. Upon completion of the test excavations, it was determined that Site 2701 was a pre-Contact Native Hawaiian religious structure or *heiau.*

PRESERVATION PLAN

Consultation-This preservation plan has been developed in consultation with Kahu Charles Kauluwehi Maxwell Sr., Chair of Maui/Lana'i Islands Burial Council and Senior Board of Directors of Hui Malama I Na Kupuna O Hawai'i. The plan is presented below.

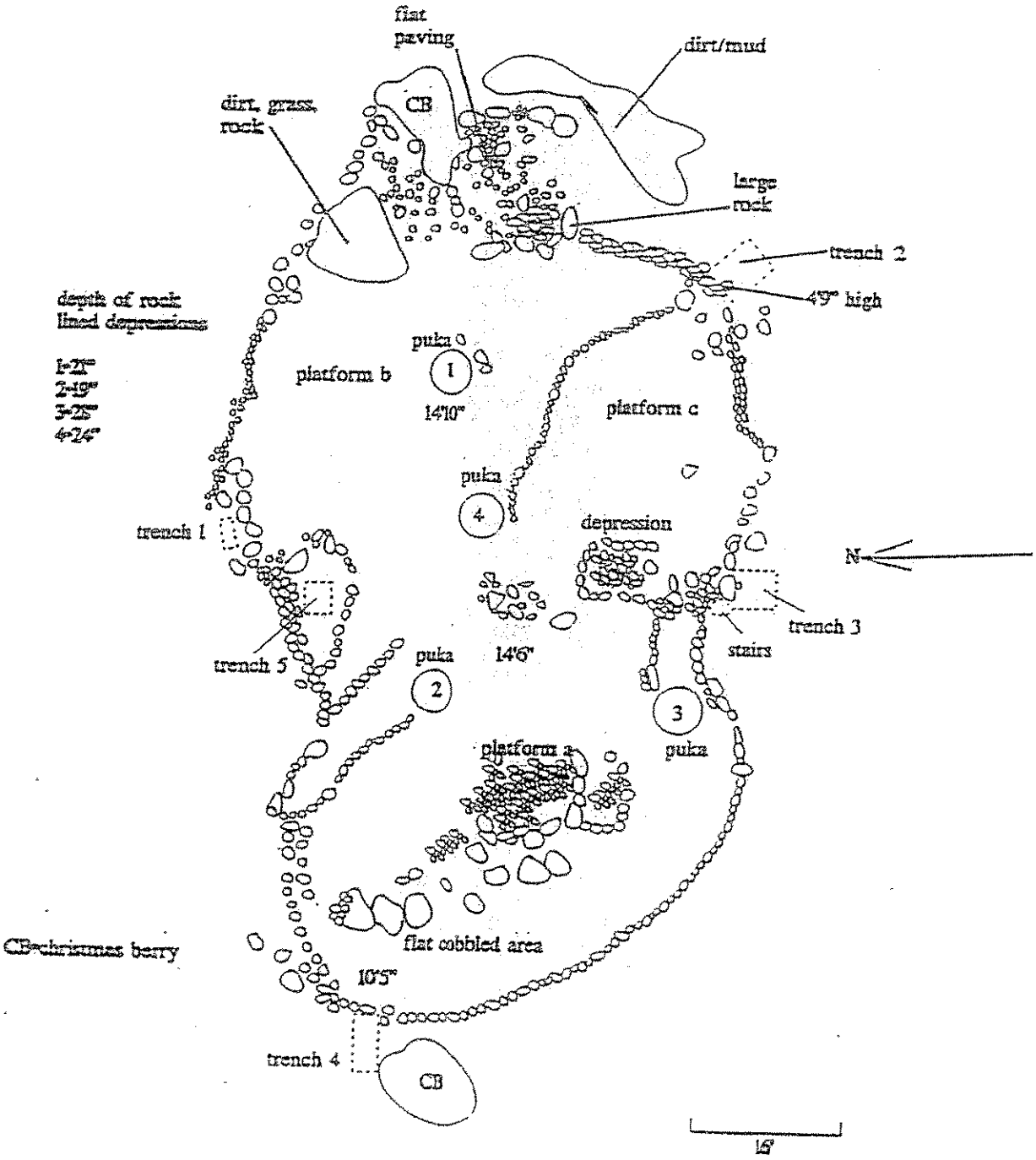


Figure 3. Plan View Map of Heiau as Depicted By Archaeological Consultants of Hawaii, Inc.,

Short Term Measures

This site will be protected during all construction related activities by installing orange construction fencing around the perimeter of the *heiau.* The fencing shall be placed 100 feet from the structures edge and the archaeologist will monitor installation. The archaeologist is to ensure the buffer of 100 ft. is maintained and to document the procedures through photographs. Once installation is complete, the consulting archaeologist will notify Dr. Melissa Kirkendall that interim short-term measures have been implemented. The fencing will need to be altered during construction where the buffer is reduced to the 60 ft. No alterations to the fencing can be imposed without prior authorization from the consulting archaeologist, and no mechanical clearing and/or grubbing shall take place within the 60 ft. buffer.

Long-Term Measures

This significant site shall be protected from a no building zone of 100 ft., and a no access zone of 60 ft (See Figure 2). Permitted uses within the 100 ft. buffer would be a four ft. high rock wall which delineates the 60 ft. boundary. The zone between the 100 ft. and 60 ft. will be referred to as the 40 ft. swath. The 40 ft. swath area will be landscaped in a grass lawn with irrigation and accessible to the residents of the Kualono Subdivision. It is envisioned that this 40-foot swath could be used as an open space. Within the 60 ft. buffer zone only plantings of native grasses, groundcover, bushes and irrigation may be established. Specifics for the preservation of Site 2701 are listed below:

THE BUFFER ZONE OF 100 FT.

Demarcation-The 100 ft. perimeter buffer shall not be demarcated by a structure, yet it will be planted in grass.

Landscaping-Within the swath between 100 ft.-60 ft. buffers, a grass lawn shall be planted.

Access-Access is permitted within the 40 ft. swath between 100 ft. and 60 ft. buffers. It is envisioned that the Kualono residents will utilize the area as an open space, yet the open space is not intended to fulfill any County Park requirements.

Signage-A bronze plaque, which measures 18 inches by 18 inches, should be posted at three locations around the 100 ft. perimeter. The plaque will be inscribed, "Access is permitted to this open space which surrounds a Native Hawaiian Religious Structure-SIHP 50-50-05-2701. Please Respect This Area."

Usage-This area is envisioned to be used as open space by the residents of Kualono. The 40 ft. swath is not intended to fulfill any County park requirements. This buffer area is a no building zone which shall preserve the view planes towards the summit of Haleakala

(*mauka)* and toward the sea (*makai)*. Permitted uses within this swath shall be a 60 ft. boundary line. Outside of this 100 ft. buffer, all uses consistent with a subdivision may be employed.

THE BUFFER ZONE OF 60 FT. IMMEDIATELY ADJACENT TO THE *HEIAU*

Demarcation-The 60 ft. perimeter shall be demarcated by a 4.0 ft. high rock wall placed 60 ft. from the heiau structure.

Landscaping-Only Native plantings and irrigation shall be permitted within the 60 ft. buffer zone. It is envisioned that landscaping will not take place until a Native Hawaiian group accepts stewardship over the site. The Native Hawaiian group will be selected after consultation with the State Historic Preservation Division and *kupuna* recognized as knowledgeable about the protection and preservation of *heiau*. The organization can orchestrate the installation and maintenance of the native plantings. Consultation with persons knowledgeable about pre-Contact environments, and traditional types of landscaping around a *heiau* should be consulted prior to developing and implementing a landscaping plan.

Access-Access within the 60 ft. buffer zone will be restricted to those people deemed appropriate by the State Historic Preservation Division and the Native Hawaiian group. Access will be through an entrance in the rock wall located near the turn around depicted on Figure 2. The entrance will be for pedestrian access only, as it appears that vehicular access within the 60 ft. is not warranted. At the entrance and along the southwestern boundary, bronze plaques shall be placed explaining the significance of and restrictions at the heiau site.

Signage- Bronze plaques measuring 18 inches by 18 inches shall be affixed at two locations (entrance and southwestern boundary) along the rock wall. The plaques may be inscribed with "Native Hawaiian Religious Site 50-50-05-2701, Please Respect This Area-KAPU-Do Not Enter-Access is Controlled Call _____ for Permission."

Usage-The 60 ft. swath and the *heiau* structure shall be utilized for traditional religious purposes deemed appropriate by the State Historic Preservation Division and Native Hawaiian Groups.

Restoration-Native Hawaiian groups, and knowledgeable researchers and archaeologists will hopefully restore this site. Funding for restoration will not be imposed on the residents of Kualono.

MAKA'EHA I KA MĀLIA

(Maka'eha in the Peacefulness)

(Photo by Sheldon Brown)

View of the heiau with Wailuku & Kahului in the background

KUALONO SUBDIVISION
CONSOLIDATION OF TMK (2)2-3-11: PARCELS 1 AND 2, 28.695 ACRES
AND RESUBDIVISION INTO LOTS 1 TO 49, INCLUSIVE
OLD HALEAKALĀ HIGHWAY, PUKALANI, MAUI, HAWAI'I 96768

MITIGATING MEASURES
100 foot buffer zone around heiau, full-time monitoring.

FINAL REPORT

Prepared for:
HANOHANO L.L.C.
2005 Main Street
Wailuku, Hawai'i 96793

Prepared by:
CKM Cultural Resources
157 Alea Place
Pukalani, Maui, Hawai'i 96768

Maka'eha I Ka Mālia

(Maka'eha in the Peacefulness)

TITLE PAGE

KUALONO SUBDIVISION
CONSOLIDATION OF TMK (2)2-3-11: PARCELS 1 AND 2, 28.695 ACRES
AND RESUBDIVISION INTO LOTS 1 TO 49, INCLUSIVE
OLD HALEAKALĀ HIGHWAY, PUKALANI, MAUI, HAWAI'I 96768

Prepared for:
HANOHANO, L.L.C.
2005 Main Street
Wailuku, Hawai'i 96793

MITIGATING MEASURES
100 foot buffer zone around heiau, full-time monitoring

FINAL REPORT

August 2003

KUALONO SUBDIVISION
CONSOLIDATION OF TMK (2)2-3-11; PARCELS 1 AND 2, 28.695 ACRES
AND RESUBDIVISION INTO LOTS 1 TO 49, INCLUSIVE
OLD HALEAKALĀ HIGHWAY, PUKALANI, MAUI, HAWAI'I 96768

TABLE OF CONTENTS

Maka'eha I Ka Mālia
(Maka'eha in the Peacefulness)

ABSTRACT

This study is in accordance with the Office of Environmental Quality Control, which describes resources having Hawaiian Cultural Value. It will describe potential impacts from further development, along with measures that could possibly be employed to mitigate those impacts. The study will evaluate the cultural significance of historic and prehistoric resources identified during an archaeological survey, and assist in the development of a general preservation plan for those resources. It will also address the requirements of the Office of Hawaiian Affairs, in regards to cultural impacts. Specifically, the document will address potential effects on the Hawaiian Cultural and Traditional Customary Rights, as described in the legislation known as Act 50, Sessions Laws of Hawai'i, 2002, and meet the requirements of the HRS Chapter 343, which also requires an environmental assessment of cultural resources, in determining the significance of a proposed project. Also, Articles IX and XII of the State Constitution, other state laws, and the courts of the state, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups.

A Hawaiian cultural resource evaluation revealed that the project site is located on the Old Haleakalā Highway, *mauka*[1] of the old Bullocks of Hawai'i, across from (the *makai*[2] side of) the King Kekaulike High School, in the *'ili*[3] of Maka'eha, *ahupua'a*[4] of Kula, Pukalani, Maui. The proposed project will be to develop 28.695 acres in the Kualono Subdivision.[5] (See Page 57 - Conceptual Master Plan map). The proposed site encompasses approximately 28.695 acres, with an area of 2.1 acres which is set aside for an ancient Hawaiian *heiau*[6] (temple) that is located on the *makai* side of the subdivision. It will contain a 100 foot buffer zone, delineated by large boulders, with a stone wall 30 feet in diameter around the heiau. The proper signage will be in place to identify this site.

[1] mauka: towards the mountain, inland, upland.
[2] makai: towards the sea, in the direction of the sea.
[3] 'ili: Land section within a specific land division.
[4] ahupua'a: ancient land division of Maui (meaning pig alter). Ancient method of setting boundaries by building an alter of rocks and placing a pig's head on top of the alter.
[5] Ridge, region near the top of the mountain.
[6] heiau: pre-Christian place of worship, shrine, some heiau were elaborately constructed stone platforms. A place of high worship.

which is State Historic Preservation identification site 50-50-05-2701. It will be maintained by the community association and be a permanent agreement in the C.C & R. The heiau is a very important feature in this area, as noted by the late Rev. David Ka'alakea, who was taken to the site on August 26, 1996 to bless it. More of what he said will be submitted in the informants section of this report.

The Kualono Subdivision is located in and around very culturally important areas. It borders the ancient 'ili of Maka'eha[7] and 'A'apueo[8], which is separated by the Kaluapulani Gulch. The Kaluapulani Gulch is located several hundred yards (in the Kihei direction) from this project site that is being assessed. Numerous petroglyphs have been recorded in Kaluapulani Gulch, and they are considered to be the best in the State Of Hawai'i. Members of the Polynesian Voyaging Society took rubbings from a petroglyph of a double hulled sailing canoe and used it to fashion the sails for the Hōkule'a, the modern sailing canoe that traveled all over the Polynesian Triangle.

I have been through these gulches on many occasions, and have found a lot of evidence that the ancient Hawaiian people used these gulches for making adzes, shaping stone implements, pounding herbs, and many other uses that are too numerous to mention. Also, a lot of the native flora still exists in these gulches.

The most intriguing feature on this property is the heiau. In the early 90's there was much discussion centered on the heiau. The previous owners claimed that the heiau was a stone pile that was placed in the area by their ancestors, who were Portuguese farmers.

Mr. Joseph Kennedy, of Archeological Consultants of Hawai'i, was hired to do a study of the heiau in question, and submitted a report of his findings on May 23, 1990. This study was conducted for the former owner of this property, 'Āina Lani Development. Mr. Kennedy, in his report, verifies the fact that the heiau in question is a traditional Hawaiian heiau. He recommends that it be preserved under Significance Rating "Criterion E" of the National Register of Historic Places, which means that this is a site having cultural significance. Mr. Kennedy's report will be attached hereto.

There is no other known archaeological research done on this particular heiau that could be found in the Bishop Museum Archives, the Maui Historical Society, and through searching past research material on this area. In 1928, Winslow Walker did a study of a heiau called

[7] Makae'ha translation is "sore eyes".
[8] 'A'apueo: Land of the female owl goddess Pueo

Mo'omuku, when a survey was done of the area, which included the project and surrounding areas. In 1931, S.J. Stokes mentioned about the heiau of Mo'omuku, between Makawao and Kula. A *heiau* located even further from the Kualono Project is located in Makawao town:

> Across from the Makawao Post Office (the old one) stood a large heiau on land once owned by Louis Von Tempski, and *"another just above where Bullock's is now on the Puka-lani road"*. [As stated in the book by Inez Ashdown (Ashdown 1970:58)]

Since the developer, Hanohano L.L.C., has agreed to delineate a 100 foot buffer zone around the heiau, and build a stonewall 30 feet in diameter around the heiau, no further studies (and disturbances) should be done, both in and around the heiau. The home owners association will maintain the native plants within the delineated buffer zone. The developer, Hanohano L.L.C., will retain ownership of the heiau, which can be turned over to some Hawaiian group for preservation and restoration in the future.

Archaeological studies will be conducted of the road footprint and other areas to determine if there is anything that is cultural and historical in nature on this site.

Maka'eha I Ka Mālia

(Maka'eha in the Peacefulness)

August 2003

Maka'eha I Ka Mālia

(Maka'eha in the Peacefulness)

INTRODUCTION

Scope:

The scope of this report will be to compile various historical/cultural accounts, topographical accounts, and facts of Maka'eha, Kualono Subdivision, Kula, Maui, where this proposed project is to occur. Due to the limited resources of information on this specific project area, the report will also include information from adjacent ahupua'a, interviews, and past writings and studies.[1]

Specific Area of Research:

This project site shall be identified as parcel numbers 1 and 2 of TMK 2-3-11. These said parcels reside in the ahupua'a of Kula, in the *'ili*[2] of Maka'eha, at the project named Kualono Subdivision.

Maka'eha, or Maka'ehu[3], has a unique position in all of Maui. From its physical location, one is able to view much of Maui. Like much of its surroundings, Maka'eha is nestled on a ridge, and is encompassed by gulches and plateaus.

Maka'eha literally means sore eyes. It is rich with heritage. Much of the upper plains of the Kula region were dry and arid. This had left few options of plants for farming purposes. However, this area served as one of the best vicinities for plants that could handle such arid conditions. This area was home to King Kihapi'ilani's mala 'uala (sweet potato garden).

Maka'eha (Kualono Subdivision) has a *heiau*[4] located within its peripheries. This, however, will be discussed at length further in this analysis.

There are many surrounding 'ili within Kula that are either adjacent or perpendicular to the said property.

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[1] ahupua'a: Land divisions: Much of the information of this compilation will also derive from the adjacent land divisions due to the lack of written and contextual information based on various written and noted sources.
[2] 'ili: Land section within a specific land division
[3] Maka'eha may be called Maka'ehu as those who are kama'āina or local to this area may once have called it so.
[4] heiau: A temple used for worship by traditional Hawaiians. Place of worship of various gods.

Nā 'Ili

There are many 'ili within the ahupua'a of Kula which stretch from the seashore to the peak of the mountain. Parts of Maka'eha reside on a ridge, a plateau, and in gulches. Surrounding this 'ili are others, such as Kalialinui and it's gulch, 'A'apueo, Pu'upane, Ōma'opio, Keahua, Kailua, and many other *'ili'ili*.[5]

'A'apueo: This 'ili has a unique topographical position. 'A'apueo is located on ridges, which made this area a safe place to live. A *kahuna*[6] once lived in 'A'apueo, and his sole responsibility was to protect a heiau that was built on Pu'upane hill in the Kula ahupua'a.

Pu'upane: The name literally means "hill of answers". Pu'upane resides within the district of Kula. This hill was decreed by a ruling chief of Maui to be sacred. No commoner ascended this hill, for it was a heiau for the high chiefs of Maui, from ancient times until Kihapi'ilani's arrival upon the hill of Pu'upane. A certain kahuna, as previously mentioned, lived at 'A'apueo to make sure that no commoner ascended Pu'upane, only those who were sanctified to do so.

Ōma'opio: This name literally means "whistling thrush". Ōma'opio has four registered heiau and numerous ahu[7]. The pronunciation, as well as the meaning, of this wahi[8] is uncertain in today's day and age.

The word *Kula* in Hawaiian translates to "plain". While this may barely describe some of the topographical features of this ahupua'a, much of its landscape is dry and arid. Therefore, farming was limited to plants that were tolerable to cold evenings and hot tempered days. Although the landscape of Kula has changed considerably over the past two to three hundred years, the climate has remained constant. The scene for most of the landscape was farming families.

It is often documented that the people of Kula were incompetent. This was derived from the fact that the people of Kula were not accustomed to the ways of the ocean. Families that lived near the ocean, and those who frequented the shores, mocked those of Kula who lacked experience in the ocean lifestyle. Therefore, those who lacked the experience needed to master the familiarities of the ocean were deemed incompetent.

[5] 'ili'ili: Smaller land sections within a specific land division and land section.
[6] kahuna: A priest or expert in any profession.
[7] ahu: Personal platforms of which commoners and royalty alike created to heed offerings to various gods and guardians.
[8] wahi: area, place

Many of the culturally significant sights, such as heiau and ahu are no longer existent, due primarily to the "paniolo era."[9] During this era, much of the land was cleared for the industrially driven use by cattle ranchers. Heiau and ahu were plundered without regard for its significance to the area. As mentioned earlier, the ahupua'a of Kula had many heiau and ahu located in 'ili such as Ōma'opio. During the late 1950's and 1960's, the conceptualized "suburbia" became the dream place to live, and thus began the influx of homes and population to Kula. This left little recovery of what had already been destroyed by the paniolo era. Fifty years ago, a Cultural Impact Statement was not an issue, nor was the significance of documenting Hawaiian antiquities prior to any specific development. Thus, there is a lack of information of such items.

Unknown Heiau

This leads to the issue of the unknown heiau in the TMK 2-3-11 region. Contained within the property is a rather large heiau, suspected to be, by reliable sources, a *luakini*[10] or *po'okanaka* heiau[10].

Winslow Walker, in his study "Archaeology of Maui," sites a heiau whose physical features are similar to what is left in today's day and age in the current TMK location. Site 224 as listed in Walker's personal recollections of the area, is quite possibly Mo'omuku Heiau. This report will opine that there is a strong chance that Mo'omuku Heiau and the heiau (in the TMK 2-3-11) which is in question, may in fact be one in the same.

Evidence to this possible conclusion is drawn from various sources. An interview I completed in 1996 with the late Kahu (Rev.) David Ka'alakea concluded that the heiau in question was a *luakini* (sacrificial heiau). The various pits located within the structure, *ki'i* (wooden images of various gods of the past) that were found, and other physical features of this area suggest as such.

Secondly, the definition of Mo'omuku means "cut-off section of land". It is difficult to envision this happening today, however if one were a *konohiki*[11] it would be an easy concept to interpret the view from this heiau as "cut-off sections of land". This particular site, from what is suspected to be Mo'omuku Heiau, had a prime view of Maui's North and South shores, as well as West Maui.

[9] Paniolo Era: The era of cowboy influx in the Kula region.
[10] luakini: These types of heiau were primarily used as the links towards various deities of traditional Hawai'i. Human sacrifices of Kings or Royal men whom were enemies or of the kauā clan (people of expulsion status) were often used as sacrificial specimens.
[11] konohiki: One who was responsible for land and resource management for various ahupua'a.

In the archaeological investigations[12] that were prepared by Archaeological Consultants of Hawai'i, Inc. and their consulting archaeologist Joseph Kennedy, it is suspected that parts of the heiau may have been cleared for production of some of the "sweetest" pineapples in all of Maui.

This report however, will not leap in beyond its peripheries to determine, and further assume or conclude, that this is in fact Mo'omuku heiau. It is beyond humanly possible to reconstruct the identity and purpose of this heiau without proper cultural knowledge of the area. It would not only be culturally wrong (*hewa*) to consummate a false identity and purpose of such a spiritual and religious site, it could also invoke unwanted *pilikia* (problems) with one's self. Therefore, this firm will not conclude or completely opine that this in fact is Mo'omuku heiau. (Refer to other sections of this report for more information specifically about the heiau)

Other Information:

Within a region of Maka'eha, known as Kaluapulani gulch, are found numerous petroglyphs of canoes. On a site visit in 1961, Dr. K. P. Emory et al. wrote:

> "The petroglyphs were in the [Kaluapulani] gulch just makai [sic] of the new (1964) lower Kula road on the north side of the gulch. There were a number of canoes with people in them, one had paddles. Another striking feature was the sails showing the wind flag at the top as well as the banners along the edge of the sails." (Emory et al., 1961)

In a significantly older text, written in the early 1880's, a Hawaiian language newspaper, Ka Nūpepa Kū'oko'a, printed "The Story of Kihapi'ilani," by Moses Manu. The text explicates the following: "On both sides of the Kalialianui Gulch, above the point where there is a natural crossing over the gulch, in line with the end of the road, many canoes with sails was depicted."

[12] This investigation was prepared by Joseph Kennedy of Archaeological Consultants of Hawai'i, Inc. for Mr. Bill McClary of 'Āinalani Associates in May of 1990.

Native Plant Growth:

The vegetation in the Kula and Maka'eha areas do not flourish as generously as other ahupua'a on Maui.

Every aspect of the traditional lifestyle was closely interconnected with the life forms of these islands. The saying, *"He Hawai'i Au"* –I am Hawai'i- reveals this basic truth: the people and their environment are one in the same. All of the needs of the population (which numbered nearly as many as those who inhabit Hawai'i today) were provided for abundantly from the life of the land and ocean, which passed on the stored energy of the sun in multitudes of useful and beautiful forms.

Due to its geographic location, as the most isolated land in the world, 5,000 miles from the nearest continent, the Hawaiian archipelago evolved incredibly diverse and unique ecosystems, with myriad species of flora and fauna found nowhere else on the planet.

A well-known tree is the sandalwood (Santalum freyecinetianum), known in Hawaiian as *'iliahi*. The wood was traditionally used to scent *kapa*[13] cloth. It was sometimes used to make *'ukeke*, a musical bow, the only traditional Hawaiian stringed instrument. The leaves and wood of the sandalwood trees were also used for medicinal purposes, often in combination with *'awa*[14] and other woods.

Other medicinal plants from this area include the *'ahina kuahiwi* (Gunnera petaloidea), also called the *ka'ape'ape* or *'ape'ape*, and the *mau'u lā'ili* (Sisyrinchium acre), a crawling grass (native iris) found on Kula's highest point, used to treat skin disorders.

The durable wood of the golden-flowered lacy *mamane* (Sophora chrysophylla) and the *kolomona* tree were utilized to make *o'o* (digging sticks), house poles, and *hōlua*[15] sleds.

Most of Kula's landscape is in a fairly dry and arid state, thus most plants would not do well in a place like this. However, Kula provided well-balanced dirt, as known today for producing the famous "Maui onion."

Due to dry conditions, *kalo* (taro) was not a suitable crop to plant. To supplement the need for wet land *kalo*, *'uala* (sweet potato) was raised as an

[13] kapa: bark cloth made from wauke (Broussonetia papyrifera) or māmaki bark; formerly clothes of any kind or bedclothes; quilt.
[14] 'awa: the kava (Piper methysticum), a shrub, native to the Pacific Islands, the root being the source of a narcotic drink of the same name used in ceremonies, and also used medicinally.
[15] hōlua: sled, especially the ancient sled used on grassy slopes.

alternative. Many sources point out Kihapi'ilani's potato patch in this specific 'ili (Maka'eha). Sweet potato was just as stable and healthy as kalo, yet required less water to fruit, whereas, the kalo best grew in fields of fresh running water.

Another plant that may have grown in this area, to supplement the need of kalo, was *'ulu* (artocarpus incisus) or breadfruit. According to "Native Planters in Old Hawai'i: Their life, lore and environment," written by E.S. Handy et al, explicates, "... early voyagers noted extensive planting of breadfruit along the southern and leeward coast..." Although this statement singles out the southern and leeward coasts, which are the dryer areas of the island, Kula still made a perfect place for 'ulu to flourish because of its arid plains.

Another blossoming plant that has resided in this area is *'a'ali'i* (Dodonaea viscosa) bush. This hardwood native shrub is indigenous to the islands. This plant also grows well in dryer climates. Ranging in heights of one to thirty feet, this shrub/tree is found growing at elevations up to 8,000 feet and in wind swept open country.

One essential plant used to construct thatched homes was the *pili* grass (Heteropogon contortus). This grass was also quite common in these areas because of the climate conditions. Pili favored growing in arid and dusty conditions. This grass was useful to the Hawaiians because, by bunching dried clumps of grass together, they could create a waterproofed house. (Refer to the map of Maui with the different zones for suitable planting of native plants attached to this report)

Plant Zone Map of Maui

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 2

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	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia mauiensis var. diffusa	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Styphelia tamelameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kului	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Charpentiera obovata		15'			
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

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.

Explanation of Plant Zone Map

PLACES TO BUY NATIVES ON:

Maui:

1. **Hoolawa Farms** — **575-5099**
   P O Box 731
   Haiku HI 96708
   The largest and best collection of natives in the state. They will deliver, but it's worth the drive to go and see!
   Will propagate upon request
2. **Kula True Value Nursery** — **878-2551**
   Many natives in stock
   Get most of their plants from Hoolawa Farms
   They take special requests
3. **Kihei Garden and Landscape** — **244-3804**
4. **Kihana Nursery, Kihei** — **879-1165**
5. **The Hawaiian Collection** — **878-1701**
   Specialize in Sandalwood propagation
   Will propagate special requests

Zone-specific Native and Polynesian plants for Maui County

Zone 2

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
V	Alyxia olivaeformis	maile	Vine		sea to 6,000'	Medium to Wet

Wildlife:

There is seldom-recorded information of the wildlife in the Kula/Maka'eha region. However, today the area is infested with foreign plants and wildlife such as feral pigs, deer, and fowl. This has left much of Kula's natural habitat destroyed.

In Maka'eha's own region, seldom do the native birds take flight. It is the common barn owl, native to North America, which primarily inhabits this region, along with the Golden-Ring Neck Pheasant. These two birds tend to be more aggressive in nature, which has caused depletion to the native birds and native plant species.

Maka'eha I Ka Mālia

(Maka'eha in the Peacefulness)

HEIAU

The *HEIAU* (pronounced "Hey-ow") is the most outstanding feature of the Kualono Project. The other outstanding feature is undeniably the view. From the heiau, all of central Maui can be seen. Reverend David Ka'alakea, a recognized minister, practitioner of Kahuna-Lā'au Lapa'au (medicinal healer), and spiritualist, was taken to the heiau to do a blessing. He related to several of us who were present that this heiau was a *luakini*[1], as it had all the attributes, such as the 3 pits which were where the sacrifices were offered to the gods. From the location of the heiau, two shorelines could be seen (South shore and North shore), and it linked the major areas, Ulupalakua, Kaho'olawe, Mā'alaea, and Paukūkalo (where the Hale Ki'i and Pihana Heiau are located). He felt that from the amount of petroglyphs in the gulch and other archaeological sites found, that this area was of major importance to the *kapo'e kahiko* (the people of old).

The confusion over the location of the ancient Hawaiian heiau is primarily due to the transition from the Hawaiian religion to Christianity in the early 1800's. Many of the heiau was ordered destroyed by the ruling King and Queen, who had been converted to Christianity. The *ki'i* (images) were hidden in caves near the heiau by dedicated followers of the Hawaiian religion, who thought that someday the "old religion" would be revived and the images that represented gods and goddesses would once again be placed on the heiau. This, however, did not happen.

Winslow Walker, in his study "Archaeology of Maui," sites a heiau whose physical features are similar to what remains in the current TMK location. Site 224, as listed in Walker's personal recollections of the area, is quite possibly Mo'omuku Heiau. This report will opine that there is a strong chance that Mo'omuku Heiau and the heiau in the TMK 2-3-11 (which is in question) may in fact be one in the same.

Evidence to this possible conclusion is drawn from various sources. An interview, done in 1996 by me with the late Kahu (Rev.) David Ka'alakea, concluded that the heiau in question was a *luakini*

[1] luakini: temple, church, cathedral, tabernacle, large heiau were ruling chiefs prayed and human sacrifices were offered; to perform temple work (Hawaiian-English Dictionary Mary Kawena Puku'i/Samuel H. Elbert) Page 213:"Luana"

(sacrificial heiau). The various pits located within the structure, *ki'i* (wooden images) of various gods of the past, and other physical features of this area suggest as such.

Secondly, the definition of Mo'omuku means "cut-off section of land". It is difficult to envision this happening today, however if one were a konohiki[2] it would be an easy concept to interpret the view from this heiau as "cut-off sections of land." This particular view, from what is suspected to be Mo'omuku heiau, had a prime view for Maui's North and South shores as well as West Maui.

In the archaeological investigations[3] prepared by Archaeological Consultants of Hawai'i, Inc. and their consulting archaeologist Joseph Kennedy, it is suspected that parts of the heiau may have been cleared for production of some of the "sweetest" pineapples in all of Maui.

In her book, Inez Ashdown mentions that, in regards to heiau, there is: *"another just above where Bullock's is now on the Puka-lani road"*. The entire area was used for upland farming by the natives, and particularly for Kiha-a-Pi'ilani (King of Maui), who lived near Pi'iholo. He planted his sweet potatoes on the red hill called Pu'u o Kali, where many petroglyphs and human footprints in the lava can still be found. Kiha had the reputation of being so powerful that he could do the work of eighty strong men. He and his wife, Ku-maka, being of aristocratic lineage and gods, did not know how to make tapa or farm until they were driven from Hāna by his brother Lono-a-Pi'ilani (Ashdown 1970:58).

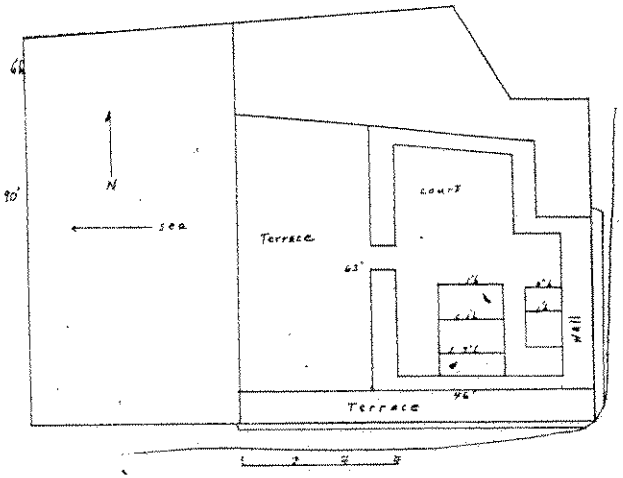
Although I could not find other direct information on the heiau, other documents will be attached to this report about points of interest that surround the project area.

Based on reviews of readily available background literature, basic familiarity with the general project area, and reliable informants like Rev. David Ka'alakea and others, as well as its location, its view from the South shore to the North shore, and the remnants of 4 pits, I strongly believe that the heiau would be classified as either a *luakini* or *po'okanaka*, both being a sacrificial heiau. In Winslow Walker's findings, the measurements of the heiau in question were the same dimensions as the Mo'omuku Heiau. The only reason this heiau does not have a name is because there were no informants that could truthfully say what the name is. In Hawaiian custom, names are very important, and one cannot be "taken out of the air" and bestowed on the heiau. Everything had a

[2] konohiki: One who was responsible for land and resource management for various ahupua'a.
[3] This investigation was prepared by Joseph Kennedy of Archaeological Consultants of Hawai'i, Inc. for Mr. Bill McClary of 'Āinalani Associates in May of 1990.

name for a purpose, and even in this circumstance, the cultural protocol has to be followed. To unknowingly name the heiau is a cultural insult.

As the "old-timers" passed on, it became even more difficult to ascertain the knowledge of our past culture. This is due to the fact that it was customary for the *kūpuna* (elders) not to share important information, because people might use the information for wrong doing. This is the reason so much of our past culture has been destroyed. So, when we do find culturally important objects like this heiau, it behooves us to preserve it the best we can. We can only surmise from the evidence that we have, that its name is most probably the Mo'omuku[4] Heiau.



HEIAU MOOMUKU

fig 67

[4] "Mo'o" means land, "muku" means to cut, and because the location and view that it commends, the name would be appropriate.

The developer, Hanohano L.L.C, has agreed to a 100' diameter buffer zone which will be placed around the heiau. Large boulders will delineate this buffer zone. A 30' by 4' high stone wall will be constructed around the inner buffer closest to the heiau. No plants or grasses will be grown in this buffer zone. Within the outer buffer zone of 100', zone-specific native and Polynesian plants will be grown. (Refer to Plant Zone Map adapted from the Maui County Planting Plan, Zone 2). Copy attached to this report.

IMUA I KA NAUAO E PAULI LA MAKOU INOA
(Seeking the knowledge to push us forward)

CKM CULTURAL RESOURCES

Specializing in Cultural Impact Statements
(using State of Hawaii O.E.Q.C. methods),
Blessings, Weddings, Lectures
and Ho'oponopono

INTERVIEW SUMMARY AND CONSENT

JOB NAME: Kualoa Project

PERSON INTERVIEWED: William F. Cambra

DATE OF INTERVIEW: 7/10/03 – 1010 Kuka Hiwa, Pukalani.

INTERVIEWER: CKM Cultural Resources: C.K. Maxwell Sr.

PURPOSE OF INTERVIEW: Cultural Impact Assessment

I hereby give permission to CKM Cultural Resources to use the information from this interview in preparing a cultural impact assessment report for the subject project. I understand that appropriate credit will be provided in the cultural assessment report. I further understand that I will be able to review the summary of the interview report prior to publication.

By: Wm. E. Cambra
Print Name

Signature: Wm. E. Cambra

Date: 7/10/03

Kahu Charles Kauluwela Maxwell, Sr.
157 Alea Place - Pukalani, Maui, HI 96768
Phone: (808) 572-8038 - Fax: (808) 572-0602 - Cell: 870-3345
Email: kalc@moolelo.com - Website: www.moolelo.com

William E. Cambra's Consent Form

CKM CULTURAL RESOURCES

Specializing in Cultural Impact Statements
(using State of Hawaii O.E.Q.C. methods),
Blessings, Weddings, Lectures
and Ho'oponopono

INOINA I KA NA'AUAO E PAPA'U IA MAKOU IHOLA
(Seeking the knowledge to push us forward)

INTERVIEW SUMMARY AND CONSENT

JOB NAME: Kualono Project

PERSON INTERVIEWED: Paul C. Elkins

DATE OF INTERVIEW: 7/11/03 – 11 Kupe'e Place Pukalani

INTERVIEWER: CKM Cultural Resources: C.K. Maxwell Sr.

PURPOSE OF INTERVIEW: Cultural Impact Assessment

I hereby give permission to CKM Cultural Resources to use the information from this interview in preparing a cultural impact assessment report for the subject project. I understand that appropriate credit will be provided in the cultural assessment report. I further understand that I will be able to review the summary of the interview report prior to publication.

By: Paul C. Elkins
Print Name

Signature: Paul C. Elkins

Date: 7/11/03

Kahu Charles Kauluwehi Maxwell, Sr.
157 Alea Place · Pukalani, Maui, HI 96768
Phone: (808) 572-8038 · Fax: (808) 572-0602 · Cell: 870-3345
Email: kale@moolelo.com · Website: www.moolelo.com

Paul C. Elkins' Consent Form

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INOINA I KA NA'AUAO E PAPA'U IA MAKOU IHOLA
(Seeking the knowledge to push us forward)

INTERVIEW SUMMARY AND CONSENT

JOB NAME: Kualono Project

PERSON INTERVIEWED: Louis G. Cambra Jr.

DATE OF INTERVIEW: 7/12/03 – 288 Makaiwa Place, Pukalani

INTERVIEWER: CKM Cultural Resources: C.K. Maxwell Sr.

PURPOSE OF INTERVIEW: Cultural Impact Assessment

I hereby give permission to CKM Cultural Resources to use the information from this interview in preparing a cultural impact assessment report for the subject project. I understand that appropriate credit will be provided in the cultural assessment report. I further understand that I will be able to review the summary of the interview report prior to publication.

By: Louis G. Cambra Jr.
Print Name

Signature: Louis G. Cambra Jr.

Date: 7/12/03

Kahu Charles Kauluwehi Maxwell, Sr.
157 Alea Place · Pukalani, Maui, HI 96768
Phone: (808) 572-8038 · Fax: (808) 572-0602 · Cell: 870-3345
Email: kale@moolelo.com · Website: www.moolelo.com

Louis G. Cambra, Jr.'s Consent Form

INFORMANTS INTERVIEWS

STATEMENT OF:

Mr. Oliver Young
Retired Police Officer –Maui Police Department – Moloka'i District
P.O. Box 233, Kaunakakai, Moloka'i 96748

Interviewed on 7/10/03 at 11:00 a.m., done via telephone from his home in Kaunakakai, Moloka'i. He stated that he was born and raised in Pulehu, Kula, Maui. He remembers this area well, because they used to walk to Tanizaki Store (now Pukalani Superette) from Kula and would pass this area. He remembers that "stone pile", but did not know it was a heiau. Some Portuguese people owned the property, and he thinks it might have belonged to the Phillips family.

He remembers that the gulches in the area contained a lot of "Hawaiian stuffs", but did not know what they were, as they were taught not to bother those things. He did not recall cultural or spiritual ceremonies happening in the area. His only concern was that access to the area and the heiau be left open and not blocked. He was very happy to hear that a buffer zone will be created around the heiau and native plants will be planted in the area.

STATEMENT OF:

William Cambra, 41 yrs. Old
Hair Dresser
1010 Kula Highway, Pukalani, Maui

Interviewed on 7/10/03, at 6:45 p.m., at his home. He was born on Maui, and is a 3rd Generation Portuguese in Hawaii. Before moving to this property he was living in lower Pukalani, near Kilakila Street. His family later moved on to this property where they built a home in 1987, but owned the land for a long time prior to that. The property they own is 2 ¼ acres. As a young person he had occasion to walk all over this area, and remembers the project site and the pile of stones which they knew as a "Hawaiian place". He stated that the gulches fronting this project area

are full of petroglyphs and other Hawaiian things. He does not recall any cultural or spiritual things happening in the project area.

STATEMENT OF:

Paul C. Elkins, 71 yrs
Retired Business Man
11 Kupe'e Place, Pukalani, Maui, Hawai'i 96768

Interviewed at his home at 7:15pm. He related that he was born and raised in the mainland. He and his wife purchased their home in 1963 and opened up Bullocks of Hawai'i, a restaurant and curio shop about 100 yards from this project.

He became deeply involved in politics and was very involved in Maui's civic affairs. He knew a lot of information about the Pukalani area. His neighbor, the late Fred Kalani, told him that his family was buried in the gulches, and the project area had a lot of Hawaiian "things" but was not specific. He understood that the heiau was a place the old Hawaiians used to worship at. Fred Kalani used to frequent his store (which sold liquor) and would tell him all these stories.

After being shown the map of the project, he said that if the heiau is preserved properly, it could be an asset to this project and would be the focal point of this subdivision.

He went on to say that he was aware of John Tavares' finding of the Ki'i (images) in the first gulch (Kaluapulani) in 1963. Also, he had found numerous artifacts right in his own property when they built his home and was told by Mr. Kalani that they used to make canoes in this area, and that is why there are so many petroglyphs depicting canoes and sails on the walls of the gulch.

He recalls that the late Inez Ashdown told him about the heiau that is located on this project area, although she did not know its name.

STATEMENT OF:

Louis G. Cambra Jr.
Retired – Firemen
288 Makaena Place, Pukalani, Maui 96768

Interviewed at this home on 10/12/03 at 10:15am. He was born in Pu'unēnē. He has lived on this property about 9 years, and has owned this property about 12 years. He related that the project abuts his pasture on the Makawao side of this property. The heiau is about 40 yards on the Kula side of his home. He has not seen any cultural activities in the area, with the exception of the author and archaeologist coming around the heiau. He remembers that he had testified many times in regards to the prior owners who were planning to build a subdivision, because he wanted to make sure that the lots would be ½ acre lots and that there would be a 25 foot buffer(no build)zone, because several of the residents in the area raise animals and are in farm operations. He is not in objection to the subdivision as long as it abides by the stated agreements and if the heiau is preserved.

STATEMENT OF:

Kahu Charles Kauluwehi Maxwell Sr.,
Author of this report "Maka'eha I Ka Mālia"
157 Alea Place, Pukalani, Maui, HI. 96768
07/10/03 12:45p.m.

I was born in Napili, Maui, on May 14, 1937, and was raised in Pulehu, Kula, Maui from 4 years old. I have lived in Pukalani, at the present address, for the last 39 years.

Having been raised in the Kula area, the slopes of Haleakalā was our playground. We used to ride horses, donkeys, and walk wherever we wanted to go. Much of my years growing up was spent in the gulches from Upper Kula to Makawao. I distinctly remember walking through this property when it was farm land, and later when it was turned into a pineapple field. When I moved to Pukalani, I hunted for pheasant in the area and can remember the "stone" pile. We were always taught as children to respect the *pohaku* (stone), because our ancestors used to build shrines and make *heiau* (temples) out of it. The gulches fronting this property contained many petroglyphs. When I moved to Pukalani in the mid-60's, I became really involved with my culture by investigating the physical evidence that was left by our ancestors, in the forms of

caves, petroglyphs, stone implements, "factories" where they would make their implements, and Native Hawaiian plants and their medicinal uses in the practice of Lā'au Lapa'au. From a young age, my mother and father exposed me to all forms of Hawaiian healing and cultural practices, but now I was able to recognize the physical association with what I had found in these areas, from within Haleakalā Crater, to Kahikinui, and the entire upcountry area.

The name Pukalani is recent in origin. It was probably taken from the hill that is in Makule-Kailua (below Pukalani), which is called Pu'ukalani (the Hill of Heaven). The project site is in the Maka'eha ahupua'a (land division) which borders 'A'apueo, Makawao ahupua'a and the Kula ahupua'a.

In the early 1990's, there was much concern with the development of this site, and it was a very contentious topic for the Pukalani Community Association. Much pressure was put on the owners at that time, 'Āina Lani Development, to do an archeological survey of the heiau. Joe Kennedy of Archeological Consultants of Hawai'i did the survey of the heiau. His report is attached to this report.

In September of 1996, the Malama Group, who had bought the property from 'Āina Lani Development, retained me to do research on the heiau to find its historical and cultural significance, and possibly its name. In the course of my investigation, I had occasion to speak to the residents living around the project area. I spoke to Mr. Fred Kalani, who owns about 7 acres makai and adjacent to this project. He related that his kūpuna had told him that the "pile of stones" was an ancient heiau and that there were burials in the area, but he did not know where they were located. Because of his cultural upbringing, he tried to shy away from areas of cultural significance.

Another informant I spoke to in August of 1996 was John Tavares. He lives in Pukalani, on the Old Haleakalā Highway, below this project area. He related during the interview at that time that he was very familiar with the project area. Mr. Tavares related also that the entire area surrounding this project contains numerous archaeological sites and historical information.

(In 1963, Mr. Tavares found the only two wooden images that were ever found on Maui. It was found somewhere (exact location kept a secret) in a cave either in the Kaluapulani Gulch, several hundred yards in the Ulupalakua direction from this project, or in Kaliialianui Gulch, next to 'A'apueo). Both images are housed at the Bishop Museum on a perpetual loan and are typical of an image that would be kept in a *luakini*

or *po'okanaka* heiau. A heiau of this caliber would have been used for sacrifices. Only after Mr. Tavares passes on, will the Bishop Museum know of the exact location where the images were found.

On August 22, 1996, Reverend David Ka'alakea, a recognized minister, practitioner of Kahuna-Lā'au Lapa'au (medicinal healer) and spiritualist, was taken to the heiau to do a blessing. He related to several of us present (including the archeologist Joe Kennedy) that this heiau was a *luakini*, as it had all the attributes. The 3 pits on the heiau would have been where the sacrifices were offered to the gods. From the location of the heiau, the two shores could be seen (South shore and North shore) and it linked the major areas, Ulupalakua, Kaho'olawe, Mā'alaea, and Paukūkalo (where the Hale Ki'i and Pihana Heiau are located) together. He felt that from the amount of petroglyphs in the gulch, and other archaeological sites found, that this area was of major importance to the kapo'e kahiko (the people of old).

Another informant, Leslie Ann Bruce, who is an archaeologist and lives on Baldwin Ave. in Paia, was interviewed on August 30th, 1996. She related that she conducted cultural and historic research in and around the Kualono Project. She said that several years ago, while doing work with the late Dr. Emory of the Bishop Museum, he had commented that it was very possible that this entire area was used in ancient times for the Makahiki Festival. This festival was the most important event of the year for the ancient Hawaiians. He based this theory on the presence of the heiau and other archaeological sites in this area. (The Makahiki festival was usually held from the middle of October and lasted for four months. It was a time when "taxes" were paid, the image of the god Lono was carried from one end of the island to the other, all wars were stopped, games ,sports, and religious festivities took place, and friends and family re-unions were reestablished).

CULTURAL EXPERTISE: Present Chair of the Maui/Lāna'i Island Burial Council, Maui representative of the Hawai'i Advisory to the United States Civil Rights Commission (past chair), Ordained Hawaiian Minister, Hawaiian Cultural Specialist of the Maui Ocean Center, Executive Director of Hui Ai Pōhaku Inc., Board Member of Hui Malama I Na Kūpuna Of Hawai'i Nei, Native Hawaiian Member of the State Task Force, host of "Talk Story With Uncle Charlie" on KNUI AM900 Radio, and retired Police Officer (injured in the line of duty) County Of Maui Police Department.

Conclusion

Much of the history of Maka'eha, which includes this project area, lacks in quantitative measures. Thus, it is extremely difficult to extract the details of a lifestyle unfamiliar to those of today. The natural habitat is inundated with foreign forest shrubbery and various other plants brought in to "beautify" certain landscapes, such as the cactus (pānini) which thrives in this region today.

The two gulches that sit on both sides of the ridge largely protect Maka'eha. This fact has historically made Maka'eha's region one of great importance. The heiau expounded on earlier, and the numerous amounts of petroglyphs found, allows this report to conclude that this area and adjacent 'ili were of great importance to *ka po'e kahiko* (people of old).

Much of Kula's natural and indigenous landscape barely exists. The thinking then should be to reverse the impact on the land by planting shrubs native to the area, desecrate the land as little as possible, and try to preserve and protect remnants of the past. More cautious approaches to certain areas are solutions to the vitality of our Hawai'i.

Interpretation of Projects Name

KUALONO
(Ridge)

The reason for giving this project the name "Kualono" is because by standing above the heiau, one experiences the sensation of standing on a high ridge, with a panoramic view looking in all directions, from South Maui to the North shore area. It is also why this location was chosen for a heiau.

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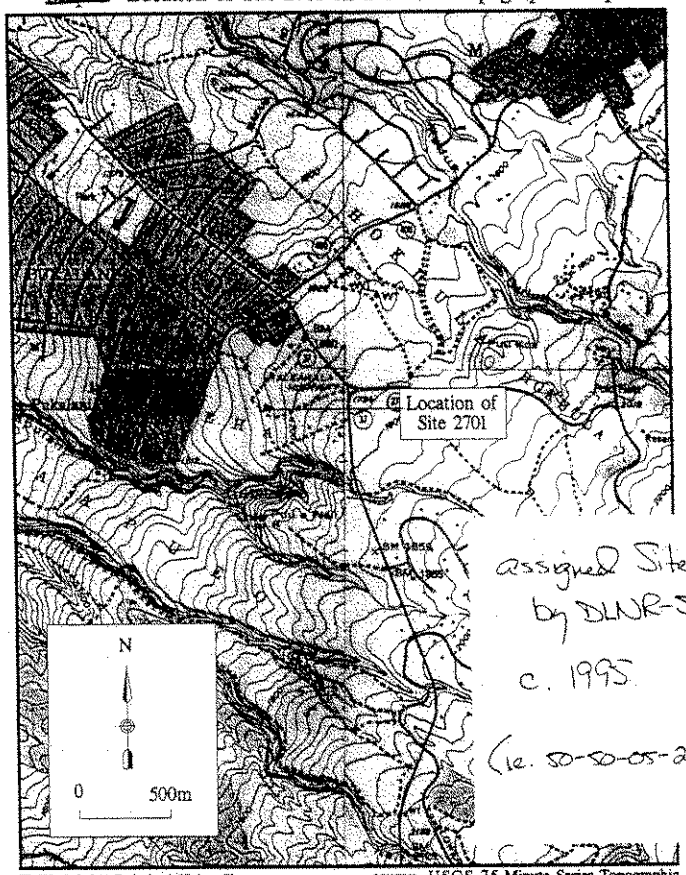
ARCHAEOLOGICAL INVESTIGATIONS
AT
A SUSPECTED HEIAU SITE
LOCATED NEAR
PUKALANI, DISTRICT OF KULA, MAUI
TMK:2-3-11

Prepared for: Mr. Bill McClary
Ainalani Associates
1251 S. King St. Suite D
Honolulu, Hawaii 96815

Prepared by: Joseph Kennedy
Archaeological Consultants
of Hawaii, Inc.
59-624 Pupukea Road
Haleiwa, Hawaii 96712

Produced at the request of SHPD: 2/17/95

[redacted] Location of Site 2701 on a U.S.G.S. Topographic Map



TMK: 2-2-3:11 Pukalani Heiau Site
Site 50-50-05-2701

source: U.S.G.S. 7.5 Minute Series Topographic
Puu O Kali Quadrangle (por.), 1983
Paia Quadrangle (por.), 1983
Kilohana Quadrangle (por.), 1983
Haiku Quadrangle (por.), 1983

assigned Site #2701
by DLNR-SHPD
c. 1995
(ie. 50-50-05-2701)

ARCHAEOLOGICAL CONSULTANTS
of
HAWAII

59-624 Pupukea Rd.
Haleiwa, Hawaii 96712
(808) 638-7442

JOSEPH KENNEDY
Archaeologist

Mr. Bill McClary
Ainalani Associates
1251 S. King St. Suite D
Honolulu, Hawaii

May 23, 1990

Dear Mr. McClary:

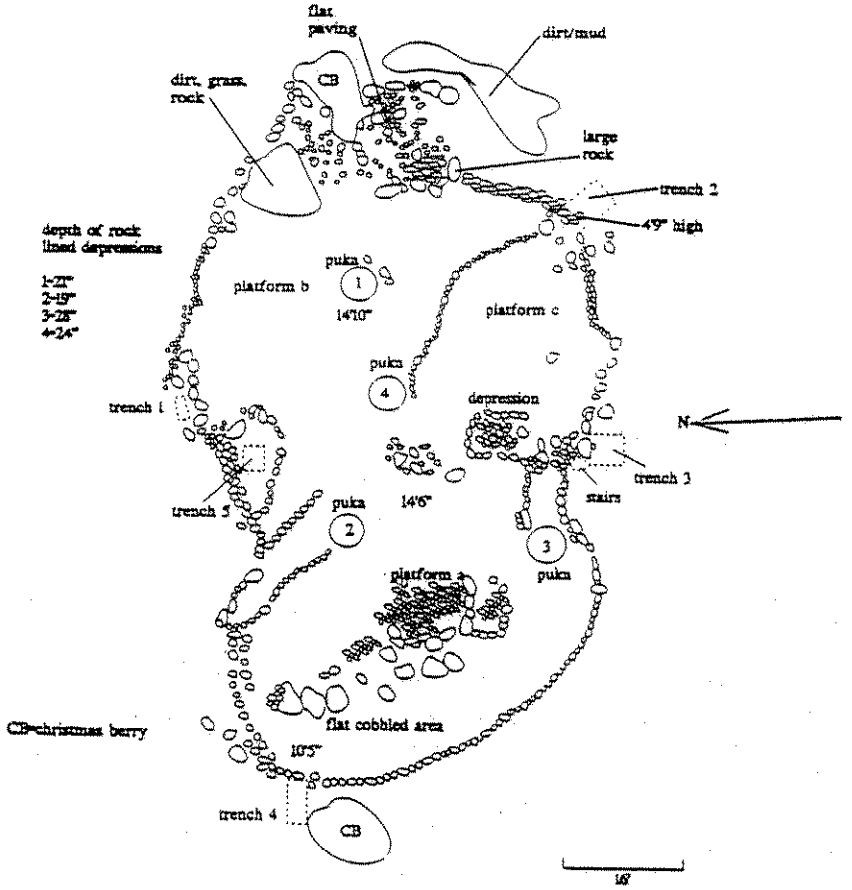
Archaeological testing at the site of this suspected heiau was conducted over a period of ten working days. The first two and a half days were devoted to hand clearing the structure of all vegetation, decaying organic material and other refuse such as small pieces of plastic used in pineapple production. Cherry tomato vines covered the top of the heiau with morning glory vines covering the sides. Twigs and branches were also removed. A canopy of haole ilima trees and morning glory surrounded the southern, eastern and the corner portion of the western side of the structure. This along with a type of California grass was cleared with machetes. Christmas berry and castor bean were also in the immediate area.

The heiau stands at the edge of an organic pineapple field that at the time of testing was in it's fifth season of production. It is said that this field produces some of the sweetest pineapples on the island. One of the workers, a 16 year old "local" youth attributed the sweetness of the pineapples to the heiau, declaring that the pineapples had been blessed by the heiau.

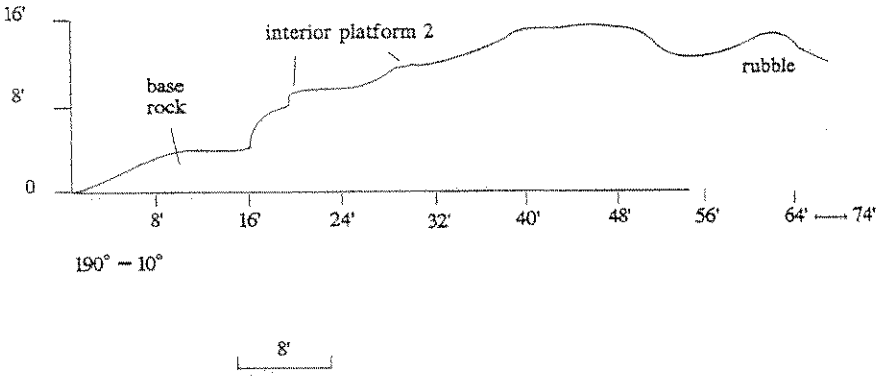
METHODOLOGY

Excavation procedures utilized natural stratigraphic layers incorporating ten centimeter levels within the layers. The majority of units were excavated with hand trowels and hand brooms although a pick axe and a flat end shovel were used to filter removed soil for artifacts and other cultural material.

The heiau's internal structural integrity is fairly well intact although the south and west side's exterior portions have experienced a large degree of slumping. There was exposed bedrock immediately south of the structure. This lead us to suspect that it served as the heiau's foundation. It's base was comprised of medium size sub-angular boulders.



AINA LANI DEVELOPMENT
Overview-Kula Heiau



AINA LANI DEVELOPMENT
KULA, MAUI

Test Unit One

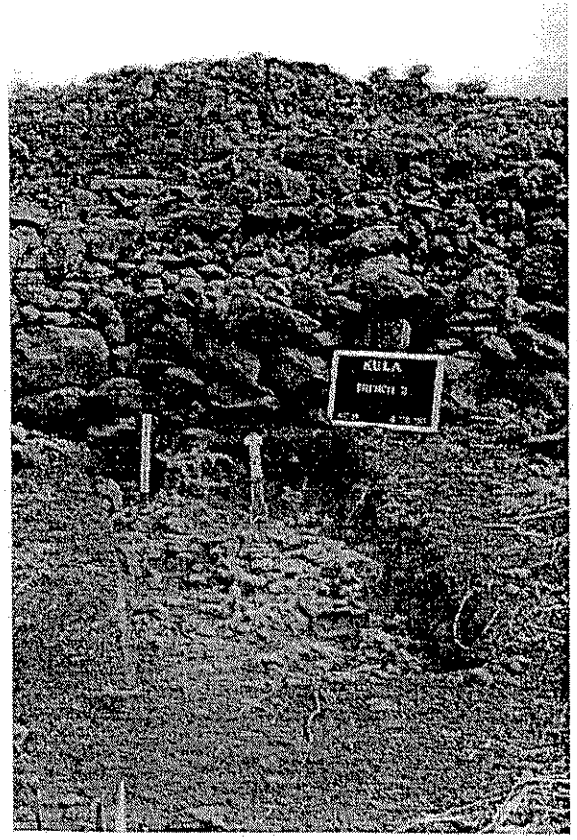
The first test unit was placed near the center of the northern side of the heiau extending out perpendicular one meter. It was necessary to locate a unit here to determine if this area represented the true, constructed edge of the heiau or if this area represents the pile of rocks that were dumped here when the field was cleared for pineapple production, as reported by a local informant. Unlike other sections of the heiau, this area did not exhibit signs of visible stacking however the edge did form circular boundary to the structure. The placement of the unit adjacent to the structure would reveal any sub-surface construction and the appearance of a foundation stone would support the theory that this area was indeed the true side of the heiau that had seen severe destruction of it's structural integrity.

After a depth of thirty centimeters below the surface was reached it was determined that this area was not the true, constructed northern side of the heiau. The southern wall of the unit did not show any sign of sub-surface construction nor were any foundation stones uncovered. In fact, no evidence of purposeful architectural design was found. The only cultural material collected was a very small amount of charcoal and pieces of plastic used for pineapple production from layer two, level one (2-13cm. below the surface). The occurrence of charcoal can be attributed to the slash and burn method of clearing a field of unwanted brush. Excavation of test unit one was terminated upon reaching a maximum depth of thirty centimeters below the surface at the southern end of the unit (layer 2, level 3).

Test Unit Two

The next test unit (Trench 2) was placed at the corner of the eastern and southern walls extending out two meters. The unit was located here for two reasons. The first was that stacking (three courses high) of large cobbles and small boulders were still evident and by placing a unit adjacent to this stacking would reveal any sub-surface construction as well as uncover possible foundation stones. It also should be noted that bedrock lies approximately two meters to the west of the unit.

After reaching a depth of twenty-two centimeters below the surface (layer two, level two) it was determined that no sub-surface stacking existed, for there was an absence of stacked rocks in the northern wall of the unit, the wall adjacent to the stacked portion of the heiau.



Trench 2

AINA LANI DEVELOPMENT

KULA, MAUI

Also at this depth, the majority of the unit was comprised of bedrock seemingly functioning as the foundation for the heiau. A small piece of this bedrock was exposed in the northern end of the unit prior to excavation, however it was not until layer two, level two was reached that the bedrock revealed itself to be the heiau's foundation.

Test unit two yielded cultural material in layer two, levels one and two. In level one, a charcoal sample was collected as well as small fragments of kukui nut shell, two small pieces of volcanic glass, one basalt flake (no polish) and one possible basalt flake. In level two another charcoal sample, greater in quantity, was collected along with additional fragments of kukui nut shell.

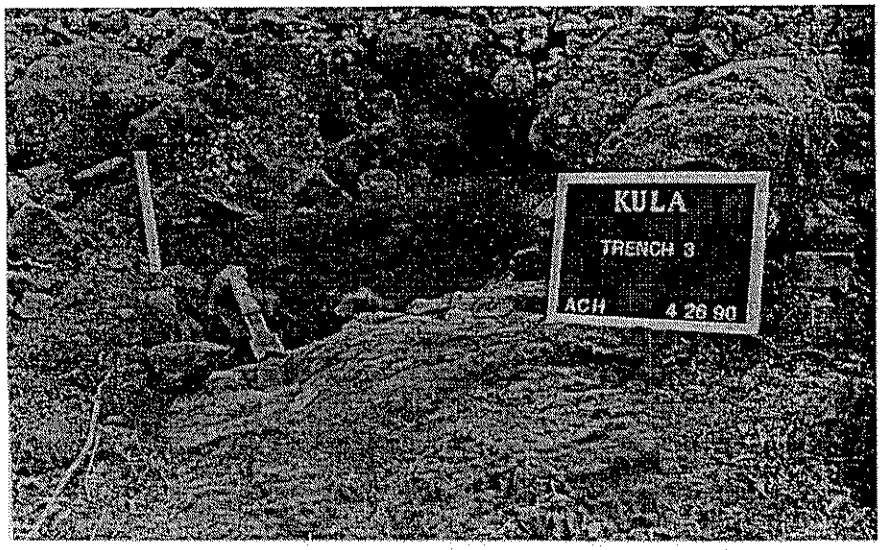
Upon ascertaining the above information, excavation of test unit two was terminated at twenty-two centimeters below the surface at the interface of layers two and three. Layer three was void of cultural material.

Test Unit Three

Test unit three was located directly south of what may have been the constructed entrance to the heiau. This area also represents the southern side of the heiau. Again, our purpose here was to locate any sub-surface construction and reaffirm our belief that the heiau's foundation consisted of the natural outcrop of bedrock seen on the surface and test unit two as well as recover any cultural remains and artifacts.

As a result of two large boulders and the heiau itself, this area seems to have been somewhat protected and thus, seen little soil build-up on the surface of the unit as well as limited erosion. These conditions were excellent for retention of surface cultural material of which there were many; kukui shell fragments, one small piece of volcanic glass, charcoal and osteological material from a rodent (mandible) and phalanges from an unidentified animal. It was originally thought that these phalanges may have been human, however the morphological ridge on the anterior section of the phalanges discounts any possibility of human material. Another possibility that these bones were from an extinct Hawaiian goose could not be confirmed.

After removal of the surface layer, excavation continued providing additional cultural material from layers one, two and three. Layer one produced charcoal and two small pieces of volcanic glass.



Trench 3

AINA LANI DEVELOPMENT

KULA, MAUI

It's depth reached four centimeters below the surface.

Layer two, level one produced additional charcoal of which a sample was sent for dating and it's age estimated at 110+/-60 B.P. Kukui shell and four small pieces of volcanic glass were also recovered. Layer two reached a depth of twelve centimeters below the surface in the northeast corner. Foundation bedrock comprised the southern portion of the unit. It should be noted that a small part of this bedrock was visible on the surface and became larger in size with depth.

Layer three, level one witnessed an even grater portion of the unit devoted to the foundation bedrock, supporting the foundation bedrock theory. Other than a very small portion of the unit in the northwest corner, the entire unit was comprised of the foundation bedrock. The north wall of the unit did not show evidence of stacking of other support systems, however a fair amount of cobble size rocks were removed from the unit directly on top of the foundation bedrock that sloped downwards. It was presumed that these cobbles were placed here in order to fill in the space between the bedrock and the heiau.

Cultural material recovered from this layer and level consisted of another charcoal sample, greater in quantity and also sent for dating. It's estimated age was 200 +/- 60 B.P. Kukui shell as well as a volcanic glass flake were also recovered. Layer three reached a depth of twenty-three centimeters below the surface in the northeast corner of the unit. Excavation of test unit three was terminated at this layer and level upon the exposing of the foundation bedrock throughout the majority of the unit.

Test Unit Four

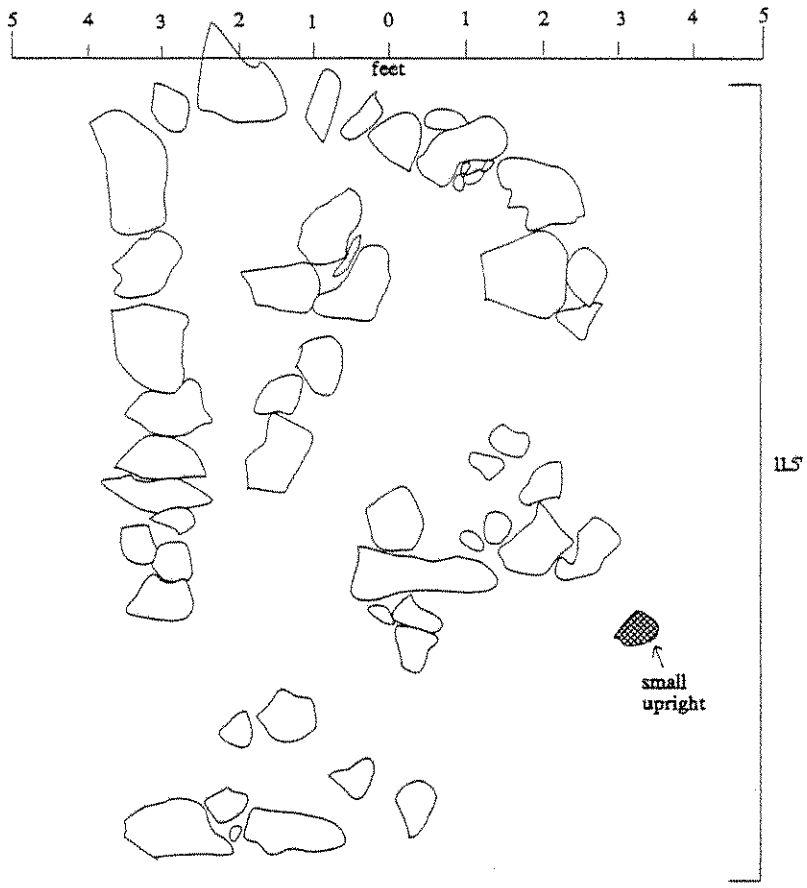
Test unit four was placed at the northwestern side of the heiau in order to acquire another sub-surface view of the heiau from a different side of the structure, as well as locate foundation bedrock and retrieve cultural material and artifacts. The eastern wall of the unit is adjacent to two boulders that may have functioned in a supporting capacity for the heiau. The unit extends out from these boulders 165cm. to the west. East of these boulders visible stacking is apparent, however this side of the heiau has seen a fair amount of structural damage.

As a result of time limitations, test unit four was abandoned at layer two, level one twenty-four centimeters below the surface. The cultural material collected reflects those recovered from prior units.

Southwest Corner Facing East

AINA LANI DEVELOPMENT
KULA, MAUI

ARCHAEOLOGICAL CONSULTANTS OF HAWAII, INC.



AINA LANI DEVELOPMENT
Interior Platform C – Kula Heiau

The surface layer produced a kukui shell fragment, layer one, level one was void of cultural material and layer two, level one produced an additional kukui fragment and a small charcoal sample.

Foundation bedrock was not exposed due to the limited excavation of this unit. The eastern wall of the unit (the wall adjacent to the structure) did not exhibit signs of any sub-surface construction.

Test Unit Five

Test unit five was located inside the three by one meter rock/soil depression at the northern end of the heiau, three meters from the edge. If this area was indeed an internal feature of the structure, it was suspected that this depression may have functioned as a receptacle for human osteological material. Measuring one meter by eighty centimeters, test unit five was placed near the center of the depression. It was thought that the depression had been somewhat destroyed resulting in an incongruous soil stratigraphy.

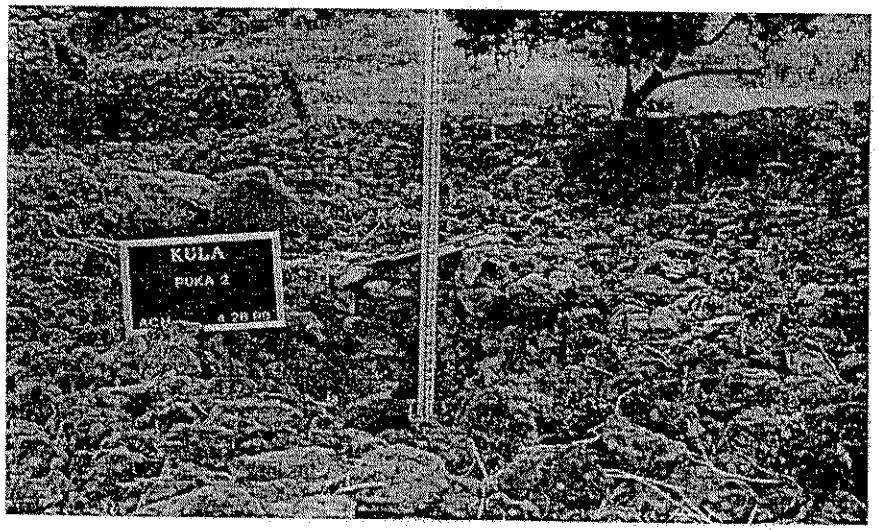
As expected, soil stratigraphy was not clearly defined. Much of the unit was filled with small to large angular and sub-angular cobbles and boulders. In fact, the unit contained more rocks than soil with the walls not withstanding excavation procedures and thus easily collapsed.

At twenty centimeters below the surface in the northwest portion of the north wall, a reddish lens, measuring ten centimeters thick, was revealed with a gray ashy lens, five centimeters thick, directly below. Three or four small, blackened cobbles were also removed from this area at thirty centimeters below the surface. Charcoal was also recovered from the red lens as well as from the surface and the preceding twenty centimeters. The existence of blackened rocks and charcoal coupled with a red and gray lens points to the area once being used for a fire.

The base of excavation reached sixty-five centimeters below the surface with the unit terminating upon retrieval of the following data; walls easily collapse signifying an absence of intended construction, the small fire area and most important the appearance of barbed wire coming up through the base of excavation. As a result of these findings, it was determined that the depression was not an interior feature of the heiau but rather was formed through a deposit of rocks and soil at the edge of the heiau.

MIDDEN ANALYSIS BY LAYER; KULA HEIAU

SITE	EU	LEVEL	Bone	Volcanic Glass	Seed	Kukui	Basalt Flake	Soil Samp.	Charcoal	unID	Comments
Kula Heiau	TU1	LA2S						122			
		LA2LE1 7-13							2.5		
		unlabeled							0.5		
Kula Heiau	TU2	LA2LE1A 5-8					1.5				
		LA2LE1B							3.5		
		LA2LE1C 3-13							13.5		
		LA2LE1D 3-10				2					
		LA2LE1E			TR.						1 sm reddish-brown
		LA2LE1F 7-10		0.5							
		LA2S						40.5			
		LA3								TR.	possible bone frag.
		LA3LE1				TR.					
		LA3S						73			
Kula Heiau	TU3	surface A	TR.								Rattus?
		surface B							2		
		surface C				TR.					
		LA1S						80.5			
		LA1A							1.5		
		LA1B		TR.							
		LA1LE1								TR.	possible bone frag.
		LA2LE1A			TR.						1 sm reddish-brown
		LA2LE1B				3					
		LA2LE1C		TR.							
		LA2LE1D		TR.							
		LA2S						84			
		LA3LE1A 12-24		0.5							
		LA3LE1B				0.5					
		LA3S						58			
		LA7(in bg TU4)				0.5					
Kula Heiau	TU4	surface				TR.					
		LA1LE1									TR. piece plastic
		LA1LE1S						48.5			
		LA2S						96			
		LA2LE1							TR.		
		LA2LE2A				TR.					
		LA2LE2B			TR.						1 sm reddish-brown
		LA2LE2C							1		
Kula Heiau	TU5	surface							5.5		
		LA1 0-10							5		
		LA2 10-20							6.5		
		LA3 20-30							5		
		unlabeled 65							7		
		unlabeled 0-20							9.5		some only part.burnt
		unlabeled	TR.								Rattus?

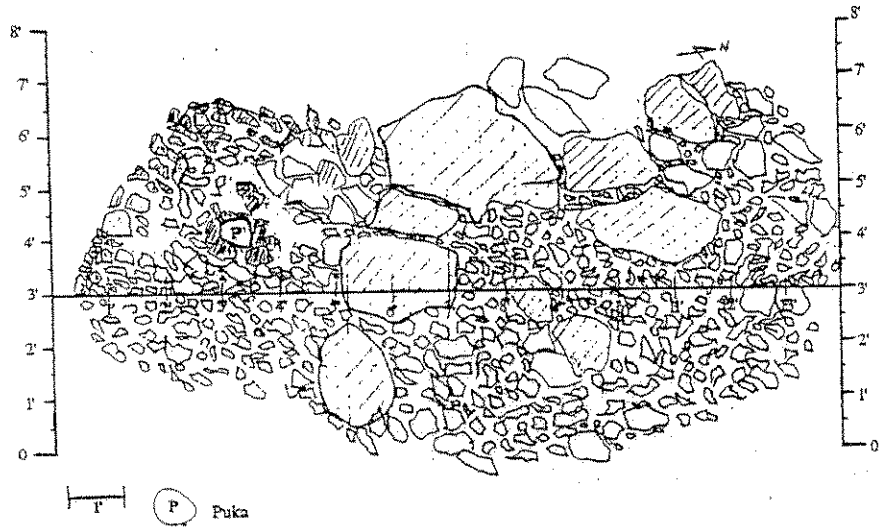


Puka 2

AINA LANI DEVELOPMENT
KULA, MAUI

Puka 3

AINA LANI DEVELOPMENT
KULA, MAUI



AINA LANI DEVELOPMENT
KULA, MAUI

Interior Platform B – Kula Heiau

Presumably, the fire was made after the material was deposited and does not represent activities associated with a functioning heiau.

Soil Analysis

Layer One: 0-2cm. in depth (except t.u.3), filled with roots, rootlets and an abundance of small angular and sub-angular pebbles. Soil consistency is loose and it's texture dry. Color is light brown (7.5YR 4/6).

Layer Two: 12cm. in depth, filled with roots and rootlets and an abundance of sub-angular and angular pebbles and cobbles. Soil consistency is loose and it's texture very dry. Color is a lighter brown than layer one.

Layer three: 10cm. in depth, filled with an abundance of sub-angular and angular cobbles and pebbles, roots and rootlets. The soil is very loose and fine and somewhat moister than previous layers. Color is a lighter brown than layer two (7.5YR 5/4).

CONCLUSIONS

It should be pointed out that informant testimony is not consistent with this conclusion. Members of the Pires, Phillips and Boteilho family were contacted regarding the function of this structure as they were the former land owners. We were told that the structure was a clearing mound that took shape in 1916 by the hand of their grandfather.

No previous archaeological work has taken place on the property indicating the presence (or absence) of a heiau, and it is remarkable that Walker (who concentrated on heiau in his 1931 manuscript) noted other religious sites in the general area but makes no mention of this one.

Nevertheless, on the strength of the evidence presented above in the body of this report, it is our opinion that the structure examined once served as a precontact religious structure or heiau.

In addition to the information already presented, it must be pointed out that clearing mounds are never constructed (i.e. distinct, level joined platforms, multiple stacked rows of rocks with flat surface exposed, internal features [in this case four, uniform circular stone line depressions], entrances, etc.).

On the other hand, all of the above listed features are regular components of heiau construction and all are present at the site in question. Also, as can be seen from the midden display, kukui, basalt flakes and volcanic glass were all present at this site. These are not usual components of clearing mounds.

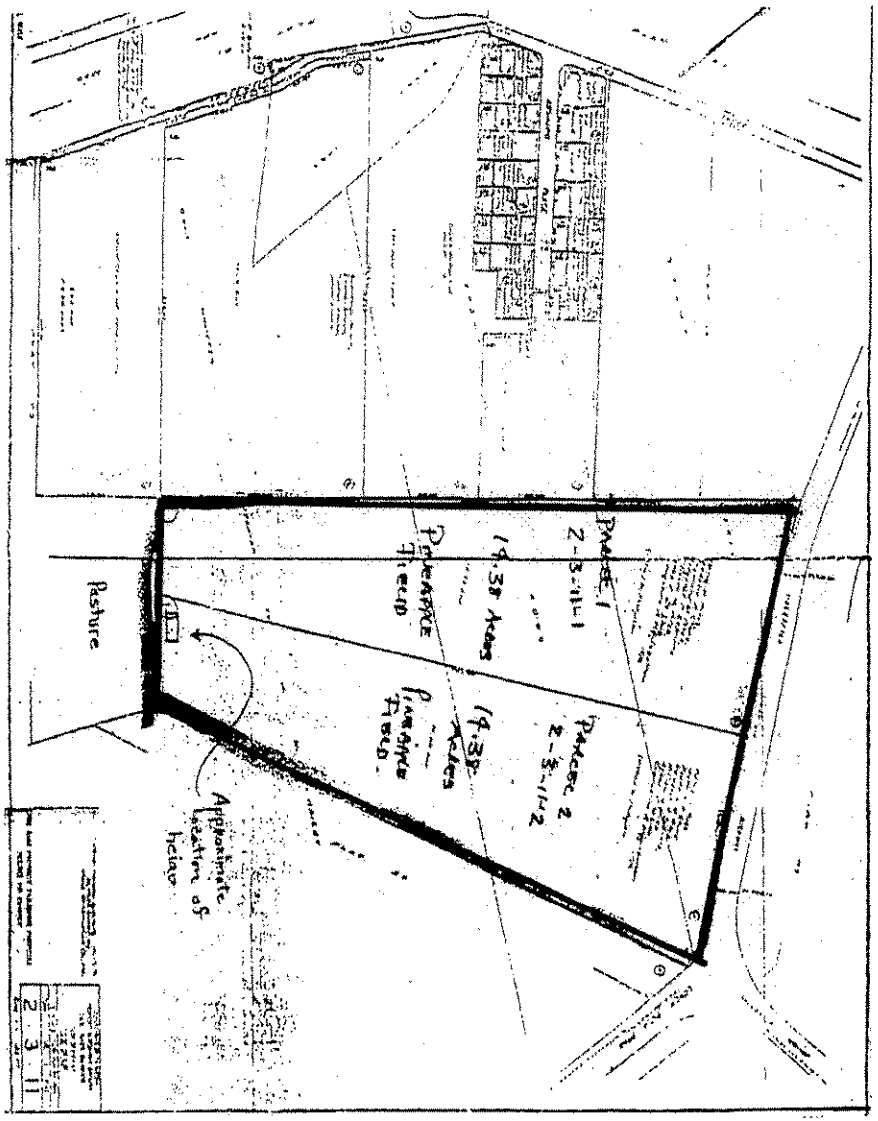
There is evidence that some clearing type rubble has been pushed up against the structure but not enough to obscure the outline and internal form of a traditional heiau.

It is our recommendation that this structure be preserved under "Criterion E" of the National Register of Historic Places Significance Rating, as a site having cultural significance.

If there are any questions regarding this report, please feel free to contact me.

Aloha,

Joseph Kennedy
Consulting Archaeologist



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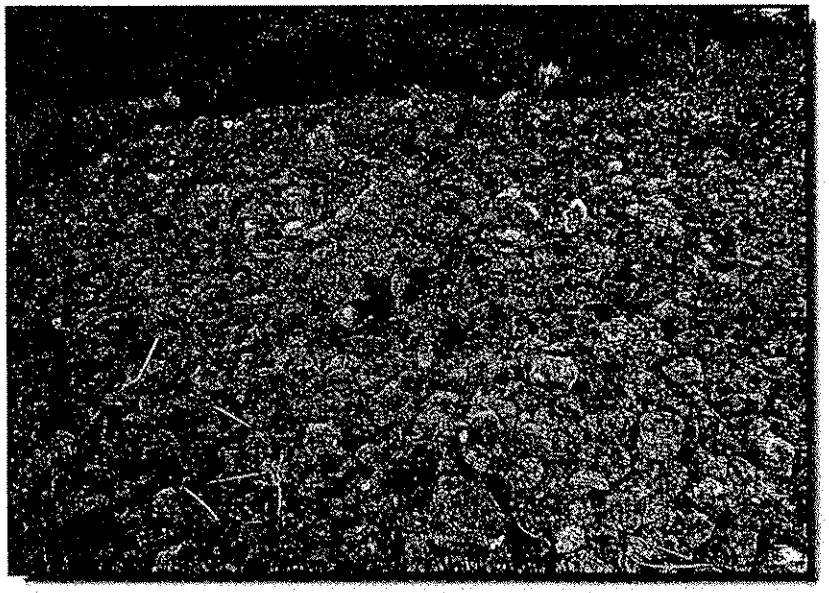
13 Temple image. This remarkable example of the hooded crest structure was found in 1963 in a cave on Maui where it had probably been hidden in 1820, after the abolition of the kapu system. The head and crest are stained black. The three-inch-diameter post on which the figure stands is corrugated for its entire length (39 in) with cordlike rings. Height of figure: 36 in. Bernice P. Bishop Museum. Cat. no. T28.

THIS KI'I (IMAGE) WAS FOUND IN 1963, EITHER IN KALUAPULANI GULCH, ADJACENT TO THIS PROJECT OR IN KALIALINUI GULCH, ¾ MILE OMA'OPIO DIRECTION FROM KUA LONO SUBDIVSION. (from "Hawaiian Sculpture" by J.H. Cox & W.H. Davenport, University Press 1974)

Maui Ki'i – Photo taken 1970, Bishop Museum

Pit on lower portion of heiau

View of stone pile on heiau



Showing pit on heiau

Showing largest pit in the middle of the heiau

Ancient and Modern Districts of Maui

View towards Mauna Kahalawai (West Maui Mountains)

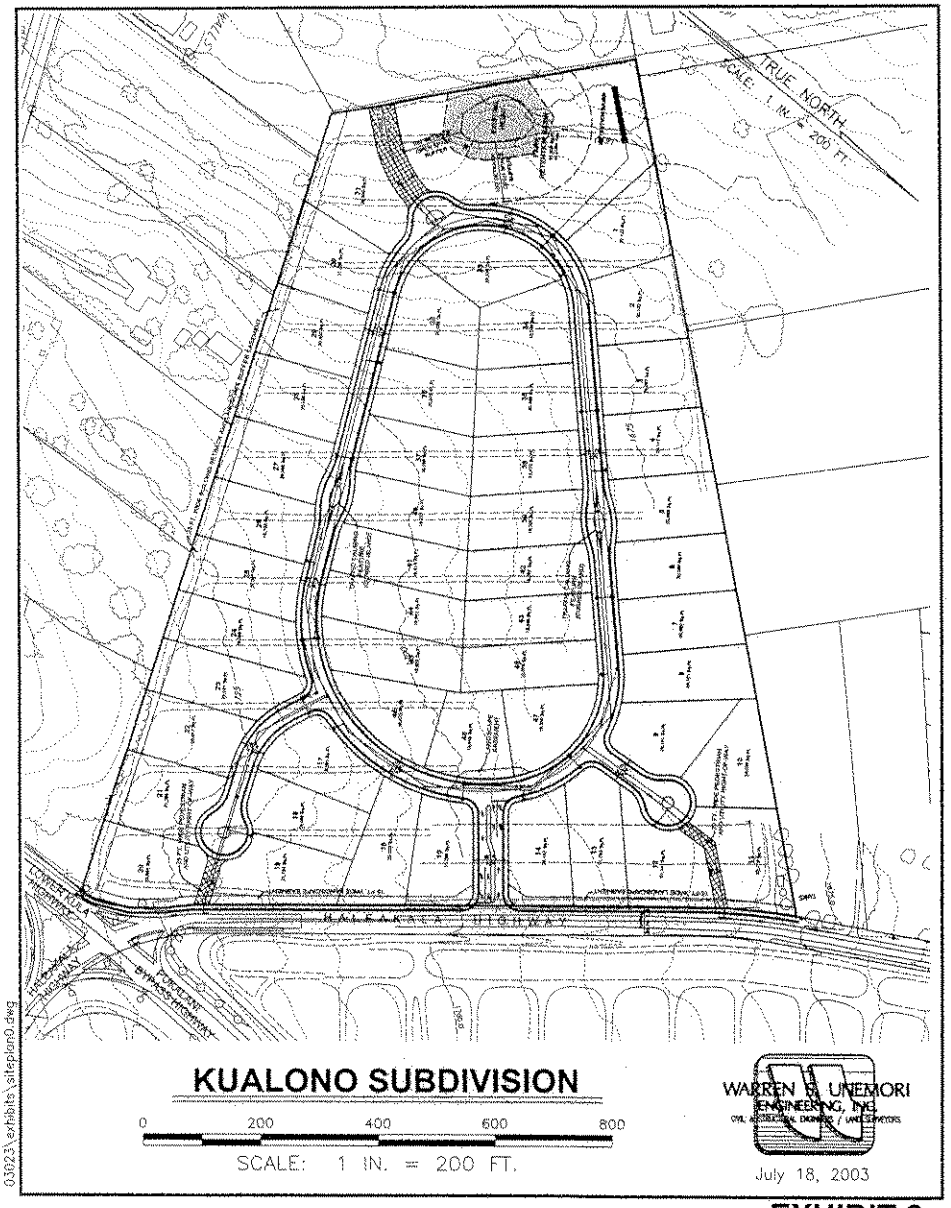

TRUE NORTH
SCALE: 1 IN. = 200 FT.
KUALONO SUBDIVISION
0
200
400
600
800
SCALE: 1 IN. = 200 FT.
WARREN S. UNEMORI ENGINEERING, INC.
July 18, 2003

EXHIBIT 2

Vuich Environmental
Consultants, Inc.

Environmental Site Assessment:
Phase I Investigation

Subject Site:

KUALONO SUBDIVISION (PROPOSED)
Corner of Haleakala Highway and Kula Road
Kula, Hawaii 96790
T.M.K. (2) 2-3-11:01 and 02

Prepared for:

HANOHANO LLC
2005 Main Street
Wailuku, Hawaii 96793
Attn: Mr. Don Fujimoto

Conducted and Compiled by:
Vuich Environmental Consultants, Inc.
VEC Project Number #0310-681
December 23, 2003

1498 Lower Main Street, Suite C • Wailuku, Hawaii 96793 • 808.249.2777 Phone • 808.249.2778 Fax

Vuich Environmental
Consultants, Inc.

Environmental Site Assessment:
Phase I Investigation

Property: KUALONO SUBDIVISION
Corner Haleakala Highway and Kula Road
Kula, Hawaii 96790
T.M.K. (2) 2-3-11:01 and 02

Prepared for: HANOHANO LLC
2005 Main Street
Wailuku, Hawaii 96793
Attn: Mr. Don Fujimoto

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been prepared by the investigator under direct supervision and provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state and local statutes, regulations and ordinances.

Robert Davis, Site Investigator — Date: 12/18/03

- B. S. Environmental and Hazardous Materials Management

Jeffrey E. Kermode, Project Manager — Date: 12/18/03

- B.A. (Geography), B.Tech. (Environmental Engineering)
- Lead-Based Paint Inspector (EPA Accredited Course)
  EPA Certification No. HI-03-0920045008
- Asbestos Building Inspector (AHERA Accredited Course)
  State of Hawaii Certification No. HIASB-0351

John S. Vuich, M.S., Project Supervisor — Date: 12/18/03

- Registered Environmental Assessor
  Registration No. 1433 (State of California)

Table of Contents

Vuich Environmental – End of Section

Disclosure

This document contains the results of services performed on this Project by **Vuich Environmental Consultants, Inc. (VEC)** pursuant to Agreement. The results represent the application of a variety of scientific and analytical disciplines that have been rendered using the standard of care, skill, and diligence normally provided by professionals in the performance of similar services under similar circumstances.

VEC assessments are intended to reduce, but not eliminate, uncertainty regarding recognized environmental conditions in connection with the Subject Site, as conducted within reasonable limits of time and cost. A general consensus of EPA's guidance on landowner liability is that *no environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property.*

The use of this document and the results reported are limited to the services performed and areas examined as described in this document and no inferences are intended with respect to anything not described herein.

VEC is not responsible for conditions or consequences arising from relevant data, facts, and information that were concealed, missing, withheld, not fully disclosed, or not reasonably available at the time these services were performed. **VEC** is not responsible for any indirect, incidental, or consequential damages of any nature arising from any cause.

VEC has no beneficial economic interest in the Project other than as an independent professional organization performing the agreed services. **VEC**'s warranties are as described above and there are no other warranties of any kind, expressed or implied, regarding the services.

Executive Summary

Introduction

This Phase I Environmental Site Assessment (ESA) has been prepared for Mr. Don Fujimoto, of Hanohano LLC., and was conducted pursuant to Vuich Environmental Consultants, Inc.'s (VEC's) written proposal and contract accepted by Mr. Fujimoto on November 6, 2003. This investigation and report format follows the guidelines of the American Society of Testing and Materials (ASTM) Publication E1527-00.

Site Description

The subject site is located at the intersection of the old Haleakala Highway and Lower Kula Road near the town of Pukalani, Maui, Hawaii. The property consists of two (2) parcels of undeveloped land, irregular in shape, measuring approximately 28.69 acres in total area. The site is further described on the Tax Maps of the State of Hawaii as Division 2, Zone 2, Section 3, Plat 11, Parcels 001 & 002 (See Tax Map, Appendix B). Property access is from Haleakala Highway.

Pukalani is a small mountainside town located on the western slopes of the Haleakala Crater (East Maui). (See Figure 1, Appendix A). The Pacific Ocean is located approximately 7.5 miles to the north.

A very limited unpaved (dirt) road network circles the subject site and exits are located in the northern corner and near the southeastern corner of the subject site. The remainder of the property consists predominately of vegetated land (mature trees, grasses, rock piles, and small shrubs). (See Figure 2, Appendix A). Historically, the land was used for agricultural purposes (pineapple).

Surrounding land use consists of residential properties and undeveloped land.

Records Review

The purpose of a records review is to obtain and review records that will help identify ***recognized environmental conditions*** in connection with the subject property. The services of Environmental Data Resources, Inc. were utilized to compile the database listings.

Our records review did not discover any current investigation of the subject site under any programs conducted by a federal, state, or local environmental agency.

Site Reconnaissance

A site investigation focuses on obtaining information indicating the likelihood of identifying physical ***recognized environmental conditions*** in connection with the property and assessing the subject property in relation to surrounding land uses and natural surface features. It includes a physical inspection of the real property and any on-site facilities.

On November 18, 2003, VEC personnel, Mr. Robert A. Davis, conducted an overall site inspection of the subject site. Accessible areas of the property were visually and physically inspected.

The following are significant observations of field conditions: (See Site Plan, Figure 2)

- Three (3) 55-gallon drums (empty);
- Significant amounts of landscaping debris covered by soil stockpiles were noted in the northeastern area and along the western boundary of the subject property;
- Limited dumping of wood pallets, metals, and plastics were noted throughout the landscaping debris;
- One (1) discarded special waste item (i.e. stove) was noted;
- Eighteen (18) excavation trenches (archeological survey) were noted.
- Historic irrigation infrastructure (dismantled).

Conclusions

Recognized environmental conditions, as defined by ASTM Standard E1527-00, are the presence or likely presence of any hazardous substance or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property. ***Recognized environmental conditions*** are described with regard to (1) the nature and extent of the environmental condition, (2) potential or actual environmental threat, (3) potential for transport (migration) of any environmental conditions, and (4) consideration for further investigation. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

VEC has performed this Phase I Environmental Site Assessment in conformance with the scope and limitations of the ASTM Practice E 1527-00 for the subject property located at the intersection of Haleakala Highway and Kula Highway near the town of Pukalani, Maui (TMK Number (2) 2-3-011:001 & 002), defined as the subject property. Any exceptions to or deletions from this practice are described in Section 1.4, Limitations and Exceptions, of this report. **This assessment has revealed no evidence of *recognized environmental conditions* in connection with the property, except for the following:**

- ***Database Listings*** *(See Section 4.0 & EDR Report, Appendix B).*

  The subject site is not listed.

  There is one (1) nearby listed site, as indicated by the EDR Report within the appropriate search distances from the subject property.

  It is our opinion that the nearby listed site does not have reasonable potential to adversely impact the environmental condition of the subject property.

- ***Current and Historic Use or Storage of Hazardous and Regulated Substances*** *(See Section 5.2.1., 5.3.2 & 5.3.3).*

  There is no evidence of any historic misuse or significant spills of hazardous or regulated substances on the subject property.

  Three (3) empty55-gallon drums were identified on the subject property. No surface soil staining or odors were related to these drums.

  The subject property was involved in intense pineapple cultivation for several decades up until the early 1990's. While the use of pesticides on subject property does not necessarily result in an adverse impact to the environmental condition of the subject site, it is possible (yet unlikely) for residual amounts of these substances to accumulate to concentrations that present a potential threat to human health or the environment. Soil and groundwater sampling and laboratory testing would provide additional information to evaluate potential environmental effects from these historic agricultural activities. There is, however, no regulatory requirement to conduct this sampling.

*The concerns listed below may not be considered **recognized environmental conditions** by ASTM definition; however, they may be considered regulated under other environmental laws and ordinances and may present a potential liability to the property owner.*

- ***Solid Waste Management:*** *(See Section 5.5.4)*

  A limited amount of historical dumping (landscaping debris, miscellaneous debris and special waste) was evident on the subject property. Some regulated items were noted. Management of these wastes needs to be performed in a manner that complies with all local, state, and federal regulations as applicable to the waste type. Confirmation of unidentifiable materials may require sampling and laboratory analysis.

Due to significant dumping of landscaping debris and heavily vegetated areas, the entire subject site and underlying soils were not visibly inspected. It is important to note that if additional clearing of the property commences and large amounts of construction debris or unidentifiable substances (containers) are further discovered, proper waste identification, testing and applicable waste handling/disposal procedures are followed.

VEC is unable to determine the contents of berms without conducting exploratory excavations.

- ***Surface Waters and Area Aquifer Protection*** *(See Section 5.5.5)*

  If future land use includes developing the land for residential or commercial use, the developer and property owner should be aware of the potential for contaminants to run off-site and into nearby water courses (including wetland areas). Products of concern relating to any future development project or land-clearing activity would be earthen material (silt), paints, oils, antifreezes and other fluids from automobile or on-site machinery, or leaks from on-site stocked items.

  Future land clearing of greater than one (1) acre will likely require both a County of Maui grading/grubbing permit and a National Pollution Discharge Elimination System (NPDES) General Permit (State of Hawaii, Department of Health).

The conclusions stated above should not be construed to mean that any regulatory agency would have the same opinion as this author, nor is any implication proposed therefrom. The results of this environmental assessment are intended for general reference purposes only and are not intended as legal advice. The advice of legal counsel should be sought in regard to individual facts, circumstances and interpretation of environmental liability.

Environmental Site Assessment

Phase 1 Investigation

1.0 INTRODUCTION

A Phase I Environmental Site Assessment (ESA) is conducted to determine if a site may be contaminated with hazardous or toxic substances or wastes resulting from current or past site activities, unauthorized dumping or disposal, or migration of contaminants from adjacent or nearby properties. Its goal is to identify ***recognized environmental conditions*** on a property that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products. These release conditions apply to structures on the property as well as the soil, groundwater, or surface water of the property. The American Society of Testing and Materials (ASTM) Standard 1527-00, Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process, is used to "...define good commercial and customary practices for conducting an environmental site assessment of a parcel of commercial real estate".

1.1 Purpose

The study objectives are to characterize the environmental setting of the subject property, to identify any obvious activity of environmental concern that may have occurred at or near the site, and to evaluate potential migration pathways for any identified contaminants. It may also address any activities that affect future considerations for potential environmental impairment to the property.

Another function of this Phase I ESA is to conduct an *appropriate environmental inquiry* in response to the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, its amendments, and similar state and local regulations. An ESA "appropriate inquiry" may provide the buyer, receiver, or lender making a loan secured by the subject real property with a basis to qualify for the *innocent landowner defense* should any legal action be initiated for environmental impairment to the property.

1.2 Detailed Scope of Services

This Phase I Environmental Site Assessment (ESA) has been prepared for Mr. Don Fujimoto, Vice President of Hanohano LCC., and was conducted pursuant to Vuich Environmental Consultants, Inc.'s (VEC's) written proposal and contract accepted by Mr. Fujimoto on November 6, 2003.

There were no other additional services requested of VEC by the Client.

1.3 Significant Assumptions

The assessment of ***recognized environmental conditions*** relies on: 1) sources of actual knowledge, 2) thorough appropriate inquiry, 3) reviewing reasonably ascertainable documents and records, and 4) conducting a visual and olfactory reconnaissance. In conducting this ESA, VEC has relied on the truthfulness of its inquiry sources and the validity of reviewed records. If obvious indications or VEC actual knowledge contradicted the reported/reviewed information sources, it has been so stated in the appropriate sections of this report.

1.4 Limitations and Exceptions

The investigation performed for this report includes the components of an *appropriate inquiry* regarding the potential for contamination to exist or have occurred at this site. This investigation is also the basis of an *appropriate inquiry* into the presence or likely presence, release or threatened release, of hazardous substances and petroleum products at this real property. This Phase I Environmental Site Assessment was prepared according to guidelines presented in the American Society of Testing and Materials Document entitled *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM E-1527-00).

Since no ESA can eliminate uncertainty regarding the potential for ***recognized environmental conditions*** in connection with a property, the limiting intent of this investigation is to reduce the uncertainty to an appropriate level. Minimal requirements for the Phase I ESA include a review of historical records, a review of files and databases compiled by regulatory agencies, interviews with current owners and/or occupants of the property, and a field reconnaissance of the subject site and adjacent areas.

This ESA also takes into consideration the evaluation of other substances and products that are or may be interpreted as excluded under CERCLA. Commonly, these substances are of concern in commercial real estate transactions under current custom and usage and may include, but are not limited to, Radon, Lead-in-Drinking Water and Special Environmental Resources. Where appropriate, VEC has considered environmental concerns of other federal, state, and local regulations.

Some data base resources developed for Maui County are in their infancy or are not cross-referenced in a manner as to be readily discernible. The Maui County Fire Department maintains historical file material that is not on a database.

Databases and records utilized for this investigation were limited to those that are reasonably ascertainable; that is, they had to be publicly available, obtainable from its source within reasonable time and cost constraints, and practically reviewable with regard to volume, sorting, and organization. Additionally, the services of *Environmental Data Resources, Inc.* (EDR) were utilized to compile the environmental database listings. (See Appendix B).

1.5 Special Terms and Conditions

As a standard practice, a confidential client privilege was initiated by VEC for the work performed and contents of this report. VEC shall ensure that its officers, employees, agents, and independent contractors do not disclose this report or any information contained therein to any person without the proper knowledge and written consent from the Client (or as otherwise required by law). VEC shall ensure that each of its officers, employees, agents, and independent contractors understand and obey these requirements.

The information and opinions provided herein are intended as background data and planning guidance to interested parties. This should not be construed to mean that any regulatory agency would have the same opinion as VEC, nor is any implication proposed.

VEC has performed this study in a competent and professional manner. Since there may be hidden or unknown conditions that may be missed during this inspection, VEC cannot warrant the actual site conditions described in this report.

Vuich Environmental End of Section

2.0 SITE AND REGIONAL DESCRIPTION

Refer to Figure 1, Regional Setting Map, in Appendix A, for a depiction of the general site setting of the subject site in relation to topographic features. Also depicted are the projected groundwater flows, regional surface water flows, and locations of other significant physical features or structures.

2.1 Location and Legal Description

The subject site is located at the intersection (northeastern corner) of the old Haleakala Highway and Lower Kula Road near the town of Pukalani Maui, Hawaii. The site is further described on the Tax Maps of the State of Hawaii as Division 2, Zone 2, Section 3, Plat 11, Parcels 001 & 002 (See Tax Map, Appendix B). Property access is from Haleakala Highway.

2.2 Site and Vicinity General Characteristics

The property consists of two (2) parcels of undeveloped former agricultural land, irregular in shape, measuring approximately 28.69 acres in total area.

The northern adjacent property consists of a pineapple field. Five (5) residential structures and one (1) vacant lot make up the eastern adjoining properties. The southern adjoining properties are undeveloped land. Three (3) residential structures and two (2) undeveloped lots make up the adjoining property to the west. See Figure 2, Appendix A.

Pukalani is a small mountainside town located on the western slopes of the Haleakala Crater (East Maui). (See Figure 1, Appendix A). The Pacific Ocean is located approximately 7.5 miles to the north.

2.3 Description of Structures, Roads, Other Improvements

A very limited unpaved (dirt) road network encircles the subject site and exits are located in the northern corner and near the southeastern corner of the subject site. The remainder of the property consists of predominately vegetated land (mature tree, grasses, rock pile, and small shrubs). (See Figure 2, Appendix A). No building structures were located on-site at the time of VEC's site visit.

2.4 Current Use of the Property

The site is mostly undeveloped fallow land with a limited road (dirt) network. VEC observed that there were approximately eighteen (18) excavation trenches located on the subject property. VEC was informed that these trenches were dug to evaluate the subsurface soils for any archeological significance. The excavator was Archaeological Services.

2.5 Current Uses of the Adjoining Properties

The current uses of the adjoining properties as observed by the investigator during the site reconnaissance are as follows (see also Figure 2, Site Plan, in Appendix A):

▪ *Northern Adjoining Property:*	Pineapple fields. This property is separated from the subject property by Haleakala Highway.
▪ *Eastern Adjoining Property:*	Undeveloped land and residential structures.
▪ *Southern Adjoining Property:*	Two (2) undeveloped lots.
▪ *Western Adjoining Property:*	Undeveloped land and residential structures.

Vuich Environmental End of Section

3.0 USER PROVIDED INFORMATION

As a standard of practice, the following information was requested from the Client during the preliminary phases of this investigation:

- Title records and knowledge of environmental liens;
- Personal, specialized knowledge or experience in regard to ***recognized environmental conditions*** concerning the property; and
- If applicable, actual knowledge of a significant, low purchase price for the property, and explanation for the lower price.

The purpose of this information is to help identify the possibility of ***recognized environmental conditions*** in connection with the property. These tasks do not require the technical expertise of an environmental professional and are generally not performed by environmental professionals performing the Phase I ESA. VEC submits a Preliminary Environmental Investigation questionnaire to the Client for this information. The completed questionnaire is attached in Appendix B.

According to information provided by the Client in the Preliminary Environmental Investigation, the Client is not aware of any environmental liens, proceedings, or investigations against the subject property as of the date of this ESA.

Vuich Environmental End of Section

4.0 RECORDS REVIEW

The purpose of a record review is to obtain and review records that will help identify ***recognized environmental conditions*** in connection with the subject property. The service of Environmental Data Resources, Inc. (EDR) was utilized to compile the database listings.

4.1 Standard Environmental Record Sources

The subject property and properties within the minimum search distances were reviewed from the following record sources (see below). Risk sites, if any, that may be located on or adjacent to the subject property, or are within close proximity to the subject site are described. Refer to Appendix B, EDR Radius Map Report, for a complete listing and description of all sites located within the designated search distances, details, and government agency database release dates.

The EDR Report bases the location of the listed risk sites on longitude/latitude information provided by the respective government agency. VEC confirms the locations of risk sites within close proximity to the subject site during the site visit. When the VEC site visit contradicts the EDR Report, it has been so stated.

THE SUBJECT SITE IS NOT LISTED ON ANY OF THE FOLLOWING FEDERAL OR STATE DATABASE LISTINGS OF THE EDR REPORT.

Federal Database Listings

▼ **National Priorities List (NPL or Superfund) and Proposed NPL, EPA.** The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program.

- *The EDR database report indicates no listings within the one-mile search radius of the subject site.*

▼ **Comprehensive Environmental Response, Compensation and Liability Information System List (CERCLIS), EPA.** The CERCLIS list contains data on potentially hazardous waste sites that have been reported to EPA by states, municipalities, private companies and private persons, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites that are either proposed to or on the NPL and sites, which are in the screening and assessment phase for possible inclusion on the NPL.

- *The EDR Report indicates no listing within the 1/2-mile search radius of the subject site.*

▼ **CERCLIS – No Further Remedial Action Planned (NFRAP), EPA.** NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

The EDR Report indicates no listing within the ¼-mile search radius of the subject site.

▼ **Corrective Action Report (CORRACTS), EPA.** The CORRACTS report lists hazardous waste handlers with RCRA corrective action activity.

- *The EDR Report indicates no listings within the one-mile search radius of the subject site.*

▼ **Resource Conservation and Recovery Information System (RCRIS), EPA/NTIS.** RCRIS includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

- *The EDR Report indicates no listings of RCRIS treatment, storage and disposal (TSD) site within the ½-mile search radius of the subject site.*

- *The EDR Report indicates no listing for the subject property and no listing for a RCRIS large quantity generators within the ¼-mile search radius of the subject site. Large quantity generators are entities that generate at least 1,000 kg/month of non-acutely hazardous waste or 1.0 kg/month of acutely hazardous waste (Lg. Quan. Gen. - LQG).*
- *The EDR Report indicates no listing for the subject property and no listing for a RCRIS small quantity generator (Sm. Quan. Gen. - SQG) within 1/4-mile of the subject site. RCRIS small quantity generators are entities that generate less than 1,000 kg/month of non-acutely hazardous waste.*

▼ **Emergency Response Notification System (ERNS), EPA/NTIS.** Records and stores information on reported releases of oil and hazardous substances.

- *The subject site is not listed.*

State of Hawaii Database Listings

▼ **Sites List (SHWS), DOH.** A list of facilities, sites, or areas in which the Office of Hazard Evaluation and Emergency Response (HEER) has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

- *The subject site is not listed.*
- *The EDR Report indicates no listings within the 1-mile search radius of the subject site.*

▼ **Permitted Landfills in the State of Hawaii (SWF/LF), DOH.** An inventory of solid waste disposal facilities or landfills in the State of Hawaii. These may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

- *The subject site is not listed.*
- *The EDR Report indicates no listings within the ½-mile search radius of the subject site.*

► **Leaking Underground Storage Tank (LUST) database, DOH.** An inventory of reported leaking underground storage tank incidents.

- *The subject site is not listed.*
- *The EDR Report indicates one (1) listings within a 1/2-mile radius of the subject site.*

One (1) LUST site is located at the Makawao Fire Station, 134 Makawao Avenue. The State of Hawaii DOH has listed this site as "cleanup completed" as of October 20, 1997. This status indicates remediation has been initiated and completed to the satisfaction of the DOH. Given its down gradient location relative to the subject property and current status, it is VEC's opinion, this site poses no significant threat to the subject property.

▼ **Underground Storage Tank (UST) database, DOH.** USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with DOH.

- *The subject site is not listed.*
- *The EDR Report indicates no listings within ¼-mile of the subject property.*

4.2 Additional Environmental Record Sources

The subject property and properties within the minimum search distances were reviewed from the following record sources. Refer to Appendix B, EDR Radius Map Report, for a complete listing and description of all sites located within the designated search distances, details, and database release dates.

Federal Database Listings

- **Superfund (CERCLA) Consent Decrees (CONSENT), EPA Regional Offices.** Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites.
  - *The subject site is not listed.*
  - *The EDR Report indicates no listings within the one-mile search radius of the subject site.*
- **Records of Decisions (ROD), EPA.** ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.
  - *The subject site is not listed.*
  - *The EDR Report indicates no listings within the one-mile search radius of the subject site.*
- **National Priority List Deletions (De-listed NPL), EPA.** A list of sites that have been deleted from the NPL where no further response is appropriate.
  - *The subject site is not listed.*
  - *The EDR Report indicates no listings within the one-mile search radius of the subject site.*
- **Facility Index System/Facility Identification Initiative Program Summary Report (FINDS), EPA.** Contains both facility information and 'pointers' to other sources that contain more detail.
  - *The subject site is not listed.*
- **Hazardous Materials Information Reporting System (HMIRS) DOT.** A list of hazardous material spill incidents reported to DOT.
  - *The subject site is not listed.*
- **Material Licensing Tracking System (MLTS), Nuclear Regulatory Commission (NRC).** A list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements.
  - *The subject site is not listed.*
- **Mines Master Index File (MINES), Department of Labor, Mine Safety and Health Administration.** Contains both facility information and 'pointers' to other sources that contain more detail.
  - *The subject site is not listed.*
  - *The EDR Report indicates no listings within the ¼-mile search radius of the subject site.*
- **Federal Superfund Liens (NPL Liens), EPA.** A list of properties whereby the EPA has filed liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability.
  - *The subject site is not listed.*
- **PCB Activity Database System (PADS).** Identifies generators, transporters, commercial storers and/or brokers and disposers of PCBs who are required to notify EPA of such activities.
  - *The subject site is not listed.*
- **RCRA Administrative Action Tracking System (RAATS), EPA.** A historical archived database containing records on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by EPA. The database was discontinued on September 30, 1995.
  - *The subject site is not listed.*

- **Toxic Chemical Release Inventory System (TRIS), EPA.** A list of facilities which release toxic chemicals to the air, water, and land in reportable quantities under SARA Title III, Section 313.
  - *The subject site is not listed.*
- **Toxic Substances Control Act (TSCA), EPA.** Identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list.
  - *The subject site is not listed.*
- **Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA)/TSCA Tracking System (FTTS INSP and FTTS), EPA – Office of Prevention, Pesticides and Toxic Substances.** FTTS tracks administrative cases, pesticide enforcement actions, and compliance activities related to FIFRA, TSCA, and Emergency Planning and Community Right-to-Know Act (EPCRA).
  - *The subject site is not listed.*

State of Hawaii Database Listings

- **Release Notifications (SPILLS), DOH.** Releases of hazardous substances to the environment reported to the HEER Office. The following databases are included in the HEER Spill List:

  Release Notification Report: a compilation of releases reported to HEER.

  Hawaii Emergency Planning and Community Right-to-Know Act (HEPCRA): a list of facilities that have submitted Tier II and Form Rs as a reporting requirement.
  - *The subject site is not listed.*
- **Registered Wells and Dry Wells, DLNR.** (See Section 5.5.6). There are no registered wells listed for the subject property. *(10/99 DLNR data).*
- **Air Quality Permit, DOH.** Current activities conducted on-site do not require an air quality permit.
- **Storm Water Discharge (NPDES) Permit, DOH.** Current activities conducted on-site do not require a NPDES permit.

County and Other Database Listings

Other local records of environmental interest that were reviewed or considered for review by VEC included:

- **Fire Department, County of Maui.** The Maui County Fire Department (MCFD) maintains file material that is not on a database. MCFD was contacted for an inquiry on the subject property. See Appendix B for MCFD response.
- **Former Manufactured Gas (Coal Gas) Sites.** EDR provides exclusive information regarding the existence and location of Coal Gas sites.
  - The EDR Report indicates no listings within the one-mile search radius.
- **Grading/Grubbing Permit, County of Maui.** The current activities being conducted on-site do not require a grading/grubbing permit.
- **Hazardous Waste Disposal Documents.** VEC did not review any hazardous waste disposal documents.
- **Maui Electric Company.** Maintains records on county power transformers regarding PCB-containing equipment and equipment maintenance. VEC did not observe any transformers on the subject property.
- **Other Environmental Reports.** Environmental site assessment reports that were previously completed by VEC in close proximity to the subject site were reviewed.

- **Planning & Zoning, County of Maui.** According to the Maui County Department of Planning, the subject site's zoning is "State Agricultural District" and **is not** within the boundaries of the Special Management Area (SMA).
- **Property Tax Office, County of Maui.** The Maui County Property Tax Office maintains records of past ownership, maps, sketches and other information as it pertains to the subject property. (See also Section 7.1). The property owners are listed as Curtis and Pauline Harada and EKR, Inc.
- **Wastewater Discharge Permit, County of Maui.** VEC did not identify any wastewater discharge permits registered to the subject property.

4.3 Physical Setting Source(s)

The following sources were reviewed for physical setting information (refer to Section 7.0 for a complete listing):

- Atlas of Hawaii;
- Civil Defense Tsunami Evacuation Map;
- Geologic and Topographic Map (Hawaii Atlas & Gazetteer);
- Groundwater Map and Water Quality Plan for State of Hawaii;
- U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, HI;
- U.S. Geological Survey, 7.5 Minute Topographic Map, Kilohana Quadrangle, and Nahiku Quadrangle, 1983.

These data sources were used to provide information regarding physical characteristics of the subject site and surrounding area. This information is typically used in analysis of potential geological trends, which might impact environmental conditions of the subject site. Note that this investigation is not intended to identify geologic hazards associated with the subject property.

4.4 Historical Use Information Regarding the Property and Adjoining Properties

The following historical data sources were reviewed for this report (refer to Section 7.0 for a complete listing):

- Aerial Photographs;
- Department of Planning and Zoning, County of Maui;
- Maui County Fire Department (Fire Prevention Bureau / Hazardous Materials Division);
- Maui County Real Property Tax Records;
- Personal Interviews;
- Sanborn Maps (no coverage);
- State of Hawaii, Department of Health, Environmental Management Division;
- Environmental Date Resources (EDR).

Historic Aerial Photographs

A series of aerial photographs, which covered the subject property and surrounding area, were examined. See Figure 2, Site Plan, for clarification of specific locations.

Table 10 Historical Aerial Photograph Analysis

Date	Aerial Photo Analysis	
2/27/50	SS: N,E, S W: RG:	Pineapple agriculture. Rock (papa) pile visible; Pineapple agriculture; Undeveloped land; Mainly agricultural, limited residential development to the northwest.
3/16/62	SS: N, E, S: W: RG:	No observable changes noted. Haleakala Highway visible to the northeast as a paved roadway; No observable changes noted; Agricultural use; Continued residential development to the northwest.
1/30/77	SS: N, E, S: W: RG:	No observable changes noted; No observable changes noted; One (1) residential structure; Increasing residential development to the west.
9/28/96	SS: N: E: S: W: RG:	Land appears to be fallow; No observable changes noted; Four (4) residential structures (present day); Undeveloped land; Two (2) residential structures (present day); Residential development continues. Kula Highway established to the east. Kula High School visible to the east.

Notes:
SS: Subject Site
N: Northern Adjoining Property
E: Eastern Adjacent Property
S: Southern Adjacent Property
W: Western Adjoining Property
RG: Regional Area

VEC did not observe any features on aerial photographs examined that would suggest the presence of significant vegetation stress, soil staining, or bulk storage of chemicals such as drums or tanks.

Vuich environmental — End of Section

5.0 SITE RECONNAISSANCE

Information regarding the storm water flow, property layout, physical characteristics, and adjoining property conditions are presented in Figure 2, Site Plan, and site photographs. (See Appendix A).

5.1 Methodology and Limiting Conditions

A site investigation focuses on obtaining information indicating the likelihood of identifying ***recognized environmental conditions*** in connection with the property and assessing the subject property in relation to surrounding land uses and natural surface features. It includes a physical inspection of the real property and any on-site building structures.

On November 18, 2003, VEC personnel, Mr. Robert A. Davis, conducted an overall site inspection of the subject site. The method used to observe the subject property included: (1) walking the entire perimeter of the subject property, (2) thoroughly inspecting all areas of observed dumping (debris piles) and (3) traversing several sections of the undeveloped vegetated land. The property boundaries were not clearly defined, and the VEC investigator made estimates based on the property TMK map and from limited survey markers.

Certain physical obstructions limited the investigator from total property observations of native surface soils. Approximately 10% of the subject site's total surface soils were not observable due to debris and rock pile dumping.

Any environmental conditions reported here are not intended to include minimal conditions that 1) generally do not present a material risk of harm to public health or the environment and 2) generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

5.2 General Site Setting

5.2.1 Current and Past Use(s) of the Property

Current Uses

According to the Maui County Tax Office the current owners are listed as Curtis and Pauline Harada and EKR Inc.

The property consists of fallow agricultural land that remains undeveloped. A very limited unpaved (dirt) road network encircles the subject site. The remainder of the property consists of predominately vegetated land (mature trees, grasses, small shrubs, and a rock pile). (See Figure 2, Appendix A).

Information presented here represents those items visually or physically observed or identified in the interviews or records review.

Past Uses

County Tax records up until approximately the 1990s and aerial photographs indicate that historically the subject property was used for pineapple agriculture. There is no record indicating any other development took place on the subject site other than the limited unpaved (dirt) road network.

The knowledge of past uses of the property was primarily made from aerial photographs and interviews. Topographic maps and the Hawaii Atlas provided limited regional information.

5.2.2 Current and Past Uses(s) of the Adjoining Properties and Surrounding Area

VEC has researched current uses of adjoining properties and at its discretion, past uses of the adjoining properties and the surrounding areas. Information presented here represents those items visually or physically observed or identified in the interviews or records review. The information is described herein as items that may indicate ***recognized environmental conditions*** with adjoining properties and those conditions that may indicate a high probability of migration of hazardous substances or petroleum products to the subject property.

Adjoining Property	Period	Land/Property Uses	Concerns	Comments
North of Subject Site	Past	Pineapple agriculture	Historical pesticide application leading to possible soil and groundwater contamination.	Pineapple agriculture has been active on this site for several decades. During this time, there may have been the use of agricultural pest control chemicals and fertilizers, which had long been recognized by the U.S. Environmental Protection Agency (EPA) for contributing to the potential contamination of surface soils and groundwater systems. Although chemicals used for pineapple cultivation could have been regularly used in significant quantities, they degrade with time in soil. Most agricultural chemical concerns typically arise when bulk (full strength) products leak or are spilled onto soils. However, it is possible that chemicals in long-term use remain at, or above, regulated levels.
	Present	Pineapple agriculture	See note above.	See note above.
East of subject site	Past	Pineapple agriculture	See note above.	See note above.
	Present	Residential and Undeveloped land.	None.	None.
South of subject site	Past	Pineapple agriculture	See note above.	See note above.
	Present	Undeveloped vegetated land.	None.	None.
West of subject site	Past	Pineapple agriculture	See note above.	See note above.
	Present	Residential and Undeveloped land.	Dumping.	Dumping was noted near the northwest corner of the subject property (See photo #12). No products of concern that could impact the subject property were noted.

The development of past uses of the adjoining properties was primarily made from interviews, VEC site reconnaissance, and aerial photographs. Topographic maps and the Hawaii Atlas provided limited regional information.

5.2.3 Topography

The regional area lies on the western slopes of the Haleakala Volcano (East Maui). Its physiographic type feature is described as Kula Slightly Dissected Upland.

Locally, the average elevation is approximately 1700 feet above mean sea level and is characterized by slight topographic relief (4% slope) towards the northwest. On-site relief directs storm water towards the

northwestern portion of the property. (See Figure 2). Storm water flow along Haleakala Highway is in a northwesterly direction. Storm water flow along Lower Kula Road is in a northerly direction.

The nearest prominent natural feature is Pacific Ocean, located approximately 7.5 miles to the north.

5.2.4 Geology and Soils

According to the U.S. Department of Agriculture, the following soil series underlies the subject site:

- Haliimaile silty clay loam, 3 to 7 percent slopes (HgB). This soil is on smooth uplands. The surface layer is dark reddish-brown about 15 inches thick containing few to many pebble-size rock fragments. Runoff is slow and the erosion hazard is slight. Permeability is moderately rapid.

Other common, surface geologic phenomena investigated in an environmental site assessment are faults, landslides, rock falls, and volcanic eruptions. After examination of the relevant data, it has been determined by VEC that these geologic phenomena are not a factor to the subject site.

In 1992, the USGS reevaluated the seismic hazards for the State of Hawaii, and Maui County was classified as Zone 2B. This indicates that in any given year within a 50-year period (average building life span) there is a 10% chance that a .20g (force of gravity) horizontal ground acceleration may take place during the peak wave of an earthquake. Engineering design codes for this area should have considered this acceleration prior to construction. Buildings not in compliance with the Uniform Building Code (UBC) seismic provisions may be subject to some level of damage from earthquakes that exceed the .20g acceleration.

However, it should be noted that this is not an investigation for geological hazards.

5.2.5 Hydrology

The subject site area has an annual average rainfall of approximately 30 inches. The average temperature range from the annual high to the annual low is 82 degrees and 55 degrees Fahrenheit, respectively. The pre-development vegetation zone within this temperature and rainfall range is characterized as open guava forest with shrubs. Characteristic plants consist of guava, lantana, koa haole, spanish clover, and bermuda grass.

On-site drainage is in a westerly direction (See Figure 2, Site Plan).

The pertinent Federal Insurance Rate Map (FEMA FIRM MAP #15003 0260 B dated map on June 1, 1981) depicts the subject property as minimal flooding (Zone C).

The Civil Defense Tsunami Evacuation Maps indicate the subject property **is not** within the Tsunami reach-zone. The Pacific Ocean is located approximately 7.5 miles north of the subject site. One (1) storm water retention basin was noted up gradient from the southeastern corner of the subject property.

5.2.6 Hydrogeology

As with all islands of the United States, Maui is regulated by the Coastal Zone Management Act of the Clean Water Act. These two designations require protective comprehensive plans for groundwater management and limit the extent of certain types of development and land use. One important management criterion is the disposal of wastewater. The Water Resources Research Center has designated the groundwater management area as the *Makawao Aquifer System* within the *Central Aquifer Sector*. The groundwater underlying the subject site is defined as follows:

Table 4.0. Aquifer Classification of the subject site.

Aquifer	Aquifer Type, Hydrology & Geology	Status of Groundwater				
		Development Status	Utility	Salinity (mg/l Cl)	Uniqueness	Vulnerability to Contamination
Upper	Unconfined, high level aquifer occurring on an impermeable layer (Perched).	Currently Used	Drinking	Fresh	Replaceable	High
Lower	Unconfined basal aquifer occurring in horizontally extensive lavas (Flank)	Potential Use	Drinking	Fresh	Irreplaceable	Moderate

The following are descriptions of the aquifer classification codes, according to Water Quality Plan of 1992:

Aquifer Type Hydrogeology (basal, high level, unconfined, confined, or confined/unconfined: basal – freshwater in contact with seawater; *high level* – freshwater not in contact with seawater; *unconfined* – water table is the upper surface of the saturated aquifer; *confined* – aquifer is bounded by impermeable or poorly permeable formations; and *confined or unconfined* – the actual condition is uncertain.

Aquifer Type Geology: flank, dike, flank/dike, perched, dike/perched, and sedimentary.

Development Stage – currently used, potential use, no potential use: Aquifers are differentiated according to those already being used (currently used), those with potential utility (potential use), and those having no potential for development.

Utility – drinking, ecologically important, neither: Identifies aquifers by use.

Salinity – fresh, low, moderate, high and seawater: The gradation of groundwater from fresh to seawater is a feature of all basal aquifers in Hawaii. The upper limit of the standard for drinking water is 250 mg/l Chlorine (Cl^-) (fresh) and true seawater has a chloride content of 18,980 mg/l.

Uniqueness – irreplaceable and replaceable: The classes irreplaceable and replaceable are direct EPA derivatives. Virtually all-potable water in the state of Hawaii should be considered irreplaceable over the long term.

Vulnerability to Contamination – high, moderate, low, none: Because of the geographical limits of resources, interconnection among groundwater sources and the relatively rapid time of groundwater travel, aquifers can be described as being either vulnerable or not vulnerable to contamination.

The estimated depth to the basal groundwater is approximately 1600 feet below the surface. Upper level groundwater may be situated beneath the subject property. The flow direction is expected to be in a westerly direction.

The subject site is located mauka (mountainside) of the Underground Injection Control (UIC) line by approximately seven (7) miles. The UIC line is the designated boundary that divides protected inland areas situated over drinking water sources from seaward areas located over non-potable water sources. Sites mauka of the UIC line are considered drinking water sources and permit limitations are imposed by Maui County, Clean Water Branch (CWB).

5.2.7 Potable Water Supply and Sewage Disposal System

There were no structures located on the subject site at the time of the site visit. Any future structures would likely be connected to the County of Maui Wastewater and Water systems.

5.3 Interior and Exterior Observations

5.3.1 Hazardous/Regulated Substances and Petroleum Products in Connection with Identified Uses.

There are no hazardous substances or regulated materials currently used on-site, as part of a production process, or otherwise directly related to on-site operations, as visually or physically observed during the site visit or identified from interviews or records review.

5.3.2 Hazardous/Regulated Substances and Petroleum Products/Containers (not in connection with identified current uses).

VEC did not identify any hazardous/regulated substances and/or petroleum products that are not in connection with identified current uses as visually and physically observed on the property at the time of the site visit.

The subject property and adjacent properties have been involved in historical pineapple agriculture activities for several decades. During this time, there was use of agricultural pest control chemicals, which have long been recognized by the U.S. Environmental Protection Agency (EPA) for contamination to surface soils, groundwater and surface water systems. Although chemicals used for pineapple agriculture could have been used in significant quantities, they degrade with time in soil and it is unlikely (yet possible) that chemicals historically applied could remain at or above regulated levels.

Additionally, the typical chemical application is in a diluted form over a field area. Agriculture chemical concerns typically arise when bulk (full strength) products leak or are spilled on soils. Historic migration of pesticides onto the subject property is possible.

There is no evidence of any historic misuse, improper bulk storage, or significant spills of hazardous or regulated substances on the subject property.

5.3.3 Unidentified Substance Containers

VEC did not observe any unidentified substances suspected of being possible hazardous/regulated substances or petroleum products as visually and physically observed on the property at the time of the site visit. VEC did observe three (3) 55-gallon drums (empty) located on-site. No soil staining or odors were associated with these drums.

5.3.4 Storage Tanks

No indications regarding the historic or current presence of USTs on the subject site was obtained through our review of regulatory databases, interviews or through VEC's site reconnaissance.

5.3.5 Odors

VEC identified no suspect odors on the subject property.

5.3.6 Pools of Liquid

The investigator did not observe any pools or sumps of liquids likely to be hazardous substances or petroleum products to the extent visually and/or physically observed on the subject property at the time of the site visit or from interviews or records review.

5.3.7 Indications of PCBs

Pole or pad-mounted transformers numbered 7777 or above are considered non-PCB containing by the Maui Electric Company. There were no electrical transformers were observed on the subject property.

Background Information:

Polychlorinated biphenyls (PCBs) are groups of manufactured organic chemicals that contain 209 individual chlorinated chemicals (known as congeners) and were introduced in 1929. PCBs have been used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. Products containing PCBs are old fluorescent lighting fixtures, electrical appliances containing PCB capacitors, old microscope oil, and hydraulic fluids.

The manufacture of PCBs stopped in the United States in 1977 because of evidence that they build up in the environment and cause harmful effects. The distribution in commerce of PCB containing items was banned in 1979 (40 CFR 761.20). The EPA aggressively enforces regulations concerning PCB manufacturing, use, distribution, release and disposal under the Toxic Substance Control Act (TSCA). This federal agency extensively regulates the use, servicing, and disposal of PCBs in electrical equipment by enforcing marking, notification, inspection, and record keeping requirements.

5.4 Interior Observations

5.4.1 Heating and Cooling Systems of On-site Building Structures

There were no structures located on the subject site at the time of the site visit. This section does not apply.

5.4.2 Stains and Corrosion

There were no structures located on the subject site at the time of the site visit. This section does not apply.

5.4.3 Indoor Wastewater Drains, Sumps and Grease Interceptors

There were no structures located on the subject site at the time of the site visit. This section does not apply.

5.5 Exterior Observations

5.5.1 Pits, Ponds, and Lagoons

There were no areas identified as man-made or natural depressions that are, or would have been, likely to hold waste liquids or sludge from industrial operations or other activities.

5.5.2 Stained Soil or Pavement

No significant areas of surface or soil staining were observed at the time of VEC's site inspection.

5.5.3 Stressed Vegetation

There were no areas of stressed vegetation identified on the subject property at the time of the site visit that are, or would have been, likely caused from something other than insufficient water (or flooding).

5.5.4 Solid Waste

Several debris mounds were identified throughout the subject property. (See Figure 2). The height of the debris mounds ranged from approximately 3 to 8 feet in height and up to 20 feet in length. VEC is unable to determine the mounds' content without conducting excavation.

The following solid wastes were noted during the site reconnaissance:

- Landscape debris (i.e. tree limbs, palm fronds, grasses, shrubs, etc.);
- Soil debris;
- Miscellaneous items (i.e. empty 55-gallon drums, metals, wooden pallets, and plastic materials);
- One (1) special waste item (i.e. white good).

Some wastes may be considered "Special Wastes" according to the Hawaii Administrative Rules (HAR) on Solid Waste, Title 11, Chapter 58.1. Special wastes are those wastes that do not fit in the mixed municipal solid waste (MMSW) category, either by general nature or because of special handling requirements. Special waste categories include: asbestos, sludge, medical waste, used oil, batteries, agricultural wastes, tires, derelict vehicles and white goods (i.e., appliances). Locally, the County of Maui, Department of Public Works, Solid Waste Division administers the disposal of these materials. These wastes need to be disposed of in a permitted solid waste landfill such as the Maui County Central Landfill. Special wastes' management needs to be performed in a manner that complies with all local, state, and federal regulations as applicable to the specific waste type.

The exact source of the soil debris is unknown, however, is likely from grading activities on the subject property. The contents of the debris berms could not be determined. Trenching and excavation of soils and materials will be necessary to determine the exact extent and content of dumped materials.

Historical on-site disposal practices are unknown. Historical aerial photographs did not indicate dumping activity on the subject property.

5.5.5 Wastewater or Storm Water – Discharge Drains, Dry Wells, Drainage Ways, and Retention Basins

VEC did not identify any outdoor storm water, wastewater sumps, dry wells, discharge- drains or retention basins on the subject property.

Future developers should be aware of the potential for contaminants to enter nearby drainage ways or storm water discharge drains. Products of concern relating to any future development project would be earthen material (silt), oils, antifreezes and other fluids from automobile or on-site machinery, or leaks from on-site stocked items.

Any future grubbing or grading activity that may take place on the subject site (especially if > 1 acre of soil disturbance), both a Maui County Grading Permit and a Department of Health, Clean Water Branch, NPDES (National Pollutant Discharge Elimination System) permit will likely be required.

5.5.6 Wells

From VEC's observations and database search, there are no production, domestic, abandoned, irrigation or monitor wells located on the subject site.

Wells located near the subject property are mainly used for irrigation or unknown purposes.

5.5.7 Septic and Cesspool Systems

There were no structures located on the subject site at the time of the site visit.

5.6 Non-Scope Considerations

The concerns listed below are not normally considered relevant under CERCLA, however, they may be considered regulated under other environmental laws and ordinances and may present a potential liability to the property owner.

5.6.1 Asbestos-Containing Materials (ACM)

Current OSHA regulations for occupational exposure to asbestos hazards require commercial building owners to presume all thermal system insulation, sprayed or textured surfacing materials and asphaltic and vinyl flooring installed in buildings constructed before 1981 to be ACM. The subject property did not have any on-site building structures.

VEC personnel did not observe any structures or materials that may be ACM during the site visit.

Background Information:

Asbestos was widely used in building materials and in fire retardant applications up through the 1980s. Asbestos use in the United States did not start to decline until the EPA banned the spray-applied materials during 1973-1978. Further restrictions on U.S. manufactured asbestos products continued into the 1990s. The EPA ban rule and phase-out of all asbestos-containing materials (ACMs) was to be implemented in stages from 1990 to 1997, but the Rule was overturned in federal court.

Asbestos is a known health hazard causing progressive lung scaring and cancer. Asbestos related conditions usually develop within 15 to 40 years after exposure. Exposed smokers have an increased risk factor of 50 to 90 times that of the non-smoking population.

State and federal rules have established standards for the use and control of ACM. These standards apply to worker protection, notification procedures, renovation/demolition activities, and construction debris (waste) management.

Under the EPA's Asbestos Hazard Emergency Response Act (AHERA), 40CFR763, asbestos-containing material (ACM) is defined as any substance whose asbestos content exceeds one percent (1%) of the total volume as determined by Polarized Light Microscopy (PLM) analysis. Building inspector training, sampling procedures and laboratory analysis are also addressed under this rule. Some aspects of this rule have been extended to public and commercial buildings. The Hawaii Administrative Rules 11-502 have essentially adopted EPA's AHERA standard.

Current OSHA regulations for occupational exposure to asbestos hazards require commercial building owners to *presume* all thermal system insulation, sprayed or textured surfacing materials and asphaltic and vinyl flooring installed in buildings constructed before 1981 to contain ACM. The Federal Occupational Safety and Health Act (OSHA) Construction Standard for Asbestos requires that building owners communicate any potential or actual asbestos hazards (29CFR1926.1101(k)). Owner/Operators must inform in-house employees and any outside contractor (workers) who apply or bid for work in or adjacent to areas known or *presumed* to contain asbestos. Included asbestos materials are Thermal system insulation (TSI), sprayed or troweled-on surfacing materials, and asphalt or vinyl flooring material installed prior to 1981. Hawaii Occupational Safety and Health (HIOSH) under HAR 12-141.1 has adopted the federal standard.

Under EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) 40CFR Part 61, are requirements for renovation and demolition work involving ACM.

5.6.2 Lead-Based Paint

VEC did not identify any materials on the subject property that are known or suspected to contain lead-based paint.

Background Information:

Lead is a metal element in pure form but is found in other chemical compounds used within manufactured and formulated products. Among these are pipe solder, paint and other coatings and water pipes - items commonly found in older buildings and homes.

Lead becomes toxic to the human body even in low levels by chronic over exposure. The exposure may occur by breathing dust, eating dust (on food, tobacco, fingers, or eating paint chips (children)). Lead poisoning affects the brain and central nervous system; especially susceptible are young children. Lead is also known to impact kidney and liver functions.

The EPA/HUD defines lead-based paint as paint or other coatings containing lead equal to or in excess of 0.5% lead by weight or 1.0 mg/cm^2. The prevalence of lead-based paint in housing built before 1940 is especially high according to research conducted by the U.S. Department of Housing and Urban Development (HUD). After 1940, its use diminished until 1972 when U.S. manufactured housing paint

became regulated at 0.5 percent lead by weight and "banned" in 1978; this means that paint could not be manufactured and sold for housing use if it contained lead above the U.S. Consumer Products Safety Commission's (CC) 0.06 percent by weight. The "ban" provided a basis for using the cut-off date of 1978 when disclosing the possibility of lead-containing paint in sales and rentals of housing units.

Any detected lead-level in paint below HUD and the CPSC's criteria remains an environmental concern under the U.S. Occupational Safety and Health Administration's (OSHA) Lead Standard for Construction Workers, 29CFR1926.62 and the HIOSH equivalent, HAR 12-148.1. Communication of lead-levels in paint is required for worker safety, when conducting renovation or demolition, and for construction debris (waste) management.

5.6.3 Arsenic-Containing Substances

VEC did not identify any materials on the subject property that are known or suspected to contain arsenic.

Background Information

Arsenic, like several other heavy metals, tends to accumulate in the body. Ingestion of a small dose may seemingly exert no adverse effect at all, while ingestion of multiple small doses could cause death. In lesser amounts, arsenic-containing compounds cause other health problems, like mottling of the skin, skin lesions, nervous disorder, and severe, irreversible liver damage. Arsenic is a human carcinogen, causing skin tumors when ingested and lung tumors when inhaled.

Arsenic-containing compounds were once used as components of some inorganic pesticides. In the 1940s, these pesticides were used to control insects and rodents.

To protect against exposure to high arsenic concentrations, OSHA requires workers to use air-purifying respirators and to wear protective clothing in areas where airborne arsenic compounds are known to exist.

The Resource Conservation and Recovery Act (RCRA), Subtitle C lists arsenic and arsenic-containing compounds as a hazardous waste. Therefore, construction/demolition debris (waste) management should be conducted in accordance with all Federal, State, and Local regulations. This typically requires waste segregation into construction material and dust/debris waste. Sampling using the Toxicity Leach Characteristic Procedure (TCLP) for arsenic is required for hazardous waste determination.

5.6.4 Radon

VEC did not identify any man-made products on the subject property that are known or suspected to emit radioactive decay elements.

Background Information:
Radon is a colorless and odorless radioactive gas that can produce health effects such as cellular injury. Radon gas can occur in the natural environment as concentrations from certain rocks and geologic conditions have a high radon-emanation potential.

These surface rock types are not known to occur in Hawaii. It is possible that increased concentrations of Radon could occur in regions where geologic fault and volcanic rift zones may release gases from deeper earth sources. However, the State of Hawaii, Department of Health (DOH) has not addressed concerns for any significant levels of gas to occur anywhere in Hawaii. This was based on the 1992 and 1996 DOH investigations conducted in elementary schools throughout the State.

5.6.5 Lead in Drinking Water

There were no structures located on the subject site at the time of the site visit. The domestic water for any future structures would likely be connected to the County of Maui water system.

5.6.6 Ecological Resources, Endangered Species, Cultural and Historic Resources, and Wetlands

There are no known wetlands, critical habitats, or threatened and endangered species designated for the subject site.

VEC is unaware of any cultural or historic resources associated with the property other than the historic heiau located on the southern portion of the property. (See Figure 2 and Photo #8, Appendix A). An archeological inventory survey conducted by Archeological Services indicated no other significant findings.

5.6.7 Indoor Air Quality

There were no structures located on the subject site at the time of the site visit. This section does not apply.

Background Information:

Indoor air quality (IAQ) problems primarily result from indoor pollution sources that release gases or airborne particles. The term "Sick Building Syndrome" (SBS) is used to describe situations in which building occupants experience acute or chronic health and discomfort effects that appear to be linked to time spent in a building and may be localized in a particular room or zone or may be widespread throughout the building. Frequently, problems result when a building is operated or maintained in a manner that is inconsistent with its original design or prescribed operating procedures or as a result of poor building design or occupant activities.

Sources of indoor air contaminants can originate from within the building or be drawn in from the outdoors. The following causes may contribute to IAQ problems:

1. *Inadequate ventilation* – As a result of the oil embargo in 1973, national energy conservation measures called for a reduction in the amount of outdoor air provided for ventilation. In many cases the reduced outdoor air ventilation rates were found to be inadequate to maintain the health and comfort of building occupants. Potential air pollutant sources in ventilation or heating, ventilating, or air-conditioning (HVAC) systems include, but are not limited to: dust or dirt in ductwork; microbiological growth (i.e. mold, mildew, or bacteria); improper use of biocides, sealants, and cleaning compounds; and refrigerant leakage. Inadequate ventilation may increase the concentrations of these indoor air contaminants.
2. *Biological contaminants* – Bacteria, molds, pollen and viruses are types of biological contaminants. These contaminants may breed in stagnant water that has accumulated in ducts, humidifiers and drain pans, or where water has collected on ceiling tiles, carpeting, or insulation. Surfaces exposed to high humidity with limited air movement may also be subject to microbiological contamination.
3. *Chemical contaminants from indoor sources* – Potential air pollutant sources of indoor chemical contaminants include, but are not limited to: adhesives, carpeting, upholstery, manufactured wood products, pesticides, combustion products (i.e. carbon monoxide, carbon dioxide, and nitrogen oxides), and cleaning agents emitting volatile organic compounds (VOCs). Tobacco smoke contributes high levels of VOCs, other toxic compounds, and respirable particulate matter. Research has shown that some VOCs can cause chronic and acute health effects at high concentrations, and some are known carcinogens.
4. *Chemical contaminants from outdoor sources* – The outdoor air that enters a building can be a source of indoor air pollution. Potential air pollutant sources of outdoor chemical contaminants include, but are not limited to: motor vehicle exhausts; plumbing vents; combustion products (i.e. carbon monoxide, carbon dioxide, and nitrogen oxides); and building exhausts (i.e. bathrooms and kitchens). These contaminants can enter the building through poorly located air intake vents, windows, and other openings.

Indicators of SBS or IAQ related health problems include, but are not limited to, headache, eye, nose, or throat irritation, dry cough, dry or itchy skin, dizziness or nausea, fatigue, and sensitivity to odors.

5.6.8 High Voltage Transmission Lines

VEC did not identify any high voltage transmission lines on the subject site.

End of Section

6.0 FINDINGS, OPINIONS, AND CONCLUSIONS

6.1 Recognized Environmental Conditions

Recognized environmental conditions, as defined by ASTM Standard E1527-00, are the presence or likely presence of any hazardous substance or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property. ***Recognized environmental conditions*** are described with regard to (1) the nature and extent of the environmental condition, (2) potential or actual environmental threat, (3) potential for transport (migration) of any environmental conditions, and (4) consideration for further investigation. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

VEC has performed this Phase I Environmental Site Assessment in conformance with the scope and limitations of the ASTM Practice E 1527-00 for the subject property located at the intersection of Haleakala Highway and Kula Highway near the town of Pukalani, Maui (TMK Number (2) 2-3-011:001 & 002), the property. Any exceptions to or deletions from, this practice are described in Section 1.4, Limitations and Exceptions, of this report.

This assessment has revealed no evidence of *recognized environmental conditions* in connection with the property, except for the following:

6.1.1 Database Listings (See Section 4.0 & EDR Report, Appendix B)

Findings/Concerns:

The subject site is not listed. The listed nearby sites were reviewed for environmental concerns relative to the subject site.

Opinions and Conclusions:

It is unlikely the nearby listed site has had a significant environmental impact on the subject property, nor is there any expected impact therefrom.

6.1.2 Current and Historic Use or Storage of Hazardous and Regulated Substances (See Sections 5.2.2, 5.3.2, & 5.3.3)

Findings/Concerns:

There is no evidence of any historic or current significant misuse of hazardous or regulated substances on the subject property.

Historically, pineapple agriculture had been occurring on the subject property for several decades up until approximately the early 1990s. These operations have been most likely associated with the application of pesticides and fertilizers.

Opinions and Conclusions:

While the use of pesticides and herbicides on the subject property does not necessarily result in adverse impacts to the environmental condition of the subject site, it is possible (yet unlikely) for residual amounts of these substances to accumulate to concentrations that present a potential threat to human health or the environment. Soil and groundwater sampling and laboratory testing would provide additional information to evaluate potential environmental effects from these agricultural activities. A limited soil sampling survey may be performed to determine the residual levels of chemicals of potential concern. A standard, pro-active procedure would be to conduct such a survey prior to future development at this site.

6.2 Other Environmental Concerns

The concerns listed below may not be considered ***recognized environmental conditions*** by ASTM definition. However, they may be considered regulated under other environmental laws and ordinances and may present a potential liability to the property owner.

6.2.1 Solid Waste Management (See Section 5.5.4)

Findings/Concerns:

A limited amount of dumping (landscaping, special waste, and soil debris) is evident on the subject property. Due to some densely vegetated areas and debris stockpiles located on the subject property, the entire subject site was not visibly inspected.

Opinions and Conclusions:

Any waste disposal should be in a permitted solid waste landfill or recycled in a manner that complies with all local, state, and federal regulations as applicable to the specific waste type with special attention given to regulated items.

It is important to note that if additional clearing of the property commences and significant amounts of construction debris or unidentifiable substances (containers) are discovered, proper waste identification, testing and applicable waste handling/disposal procedures are followed in accordance with federal, state, and local regulations.

6.2.2 Surface Waters and Area Aquifer Protection (See Section 5.5.5)

Findings/Concerns:

Construction activities may be planned for the subject site. For any future grubbing and grading and construction activities planned for the site, the property owner should be aware of the potential for contaminants to run off-site and into on-site watercourses (wetland areas) or adjacent storm water drains. Products of concern relating to any future development activity would be earthen material (silt), oils, antifreezes and other fluids from automobile or on-site machinery, or leaks from on-site stocked items.

Opinions and Conclusions:

Construction managers and developers of any future on-site development activities should consider implementing aggressive, proactive environmental policies during the development-planning phase.

Future land clearing projects will likely require a County of Maui grading/grubbing permit and if the size of a project creates greater than one (1) acre of soil disturbance, the developer will also require a National Pollution Discharge Elimination System (NPDES) General Permit (State of Hawaii, Department of Health, Clean Water Branch).

Vuich environmental End of Section

The conclusions stated above should not be construed to mean that any regulatory agency would have the same opinion as this author, nor is any implication proposed therefrom.

The results of this environmental assessment are intended for general reference purposes only and are not intended as legal advice. The advice of legal counsel should be sought in regard to individual facts, circumstances and interpretation of environmental liability.

7.0 REFERENCES

7.1 Published References

1. American Standard of Testing and Materials, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, E1527-00, 2000.
2. "Atlas of Hawaii", 2nd Edition, Department of Geography, University of Hawaii at Hilo, 1983, University of Hawaii Press.
3. "Atlas of Hawaii", 3rd Edition, Department of Geography, University of Hawaii at Hilo, 1998, University of Hawaii Press.
4. County of Maui, Real Property Tax Division, Historical Records for TMK Number (2) 2-3-11:01 and 02.
5. Hawaii Administrative Rules, Title 11, Department of Health, Chapter 58.1, Solid Waste Management Control.
6. State of Hawaii, Department of Health, Solid and Hazardous Waste Branch, Underground Storage Tank Section, List of Leaking Underground Storage Tank Release Sites, August 2003.
7. State of Hawaii, Department of Health, Solid and Hazardous Waste Branch, Underground Storage Tank Section, List of Underground Storage Tank Facilities, August 2003.
8. State of Hawaii, Department of Health, Voluntary Response Program (VRP), List of Voluntary Response Program Sites, July 2003.
9. State of Hawaii, Department of Health, Office of Hazard Evaluation and Emergency Response, List of HEPCRA Facilities, October 2001.
10. State of Hawaii, Department of Health, Office of Hazard Evaluation and Emergency Response, List of Release Notifications, September 2000.
11. State of Hawaii, Department of Health, Office of Hazard Evaluation and Emergency Response, List of Sites List, July 2001.
12. State of Hawaii, Department of Land and Natural Resources, Registered Wells and Dry Wells, 1999.
13. State of Hawaii, Department of Land and Natural Resources, "State of Hawaii Water Quality Plan and Groundwater Map", June 1990, Revised December 1991.
14. U.S. Department of Agriculture, Soil Conservation Service, "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii", 1972.
15. U.S. Environmental Protection Agency, Office of Air and Radiation et al., Indoor Air Facts No. 4 (revised) Sick Building Syndrome, April 1991.
16. U.S. Environmental Protection Agency, Building Air Quality: A Guide for Building Owners and Facility Managers, 1991.

7.2 Map and Other References

1. Environmental Data Resources, Inc., "The EDR Field Check Report", December 5, 2003.
2. Federal Emergency Management Agency, "Flood Insurance Rate Map", Number #15003 0260 B dated map of June 1, 1981.
3. R.M. Towill Corporation, Aerial Photographs, Honolulu, Hawaii.
4. Air Survey Hawaii, Aerial Photographs, Honolulu, Hawaii.
5. Sanborn Maps (no coverage)
6. U.S. Geological Survey, 7.5 Minute Topographic Map, Kilohana Quadrangle, and Nahiku Quadrangle, Hawaii 1983.

7.3 Record of Personal Communications

Table 3.0 - List of personal interviews conducted by VEC

Date	Interviewee	Title & Organization	Address	Phone Number
11/18/03	Mr. Don Fujimoto	Client, Hanohano LLC.	2005 Main Street, Wailuku, HI 96793	(808) 270-0526
12/15/03	Ms. Lisa Hasosuiki	Archeological Services Hawaii	16 South Market St. Suite J. Wailuku, HI 96793	(808) 244-2012
11/20/03	Mr. Val Martin	Maui County Fire Department, Fire Prevention Bureau	21 Kinipopo Street Wailuku, HI 96793	(808) 270-7567
12/10/03	Ms. Rebecca Kuhaulua (Lee)	Grounds Superintendent, Kula High School	121 Kula Highway Hula, HI 96790	(808) 573-8710
12/10/03	Ms. Alma Takahashi	County of Maui, Wastewater Reclamation Division	200 South High St. Wailuku, HI 96793	(808) 270-7420
12/10/03	Mr. Ruiz	Solid and Hazardous Waste Branch	919 Ala Moana Blvd. Honolulu, Hawaii 96814	(808) 586-4226

Appendix A:

Maps, Plans, and Photographs

FIGURE 1: REGIONAL SETTING MAP

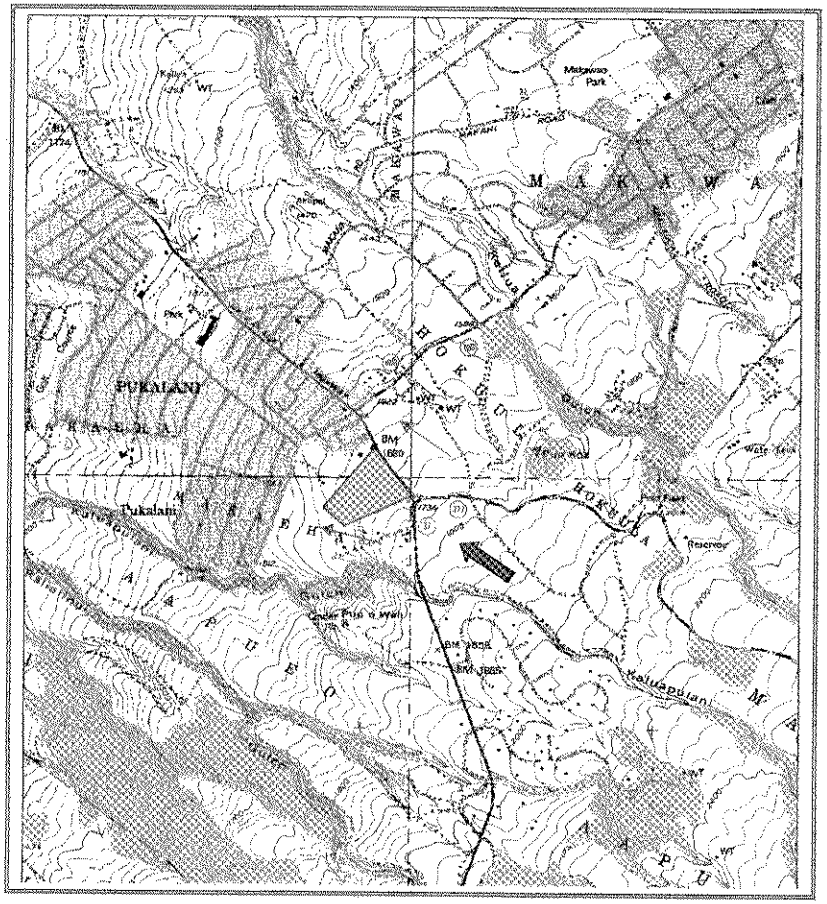
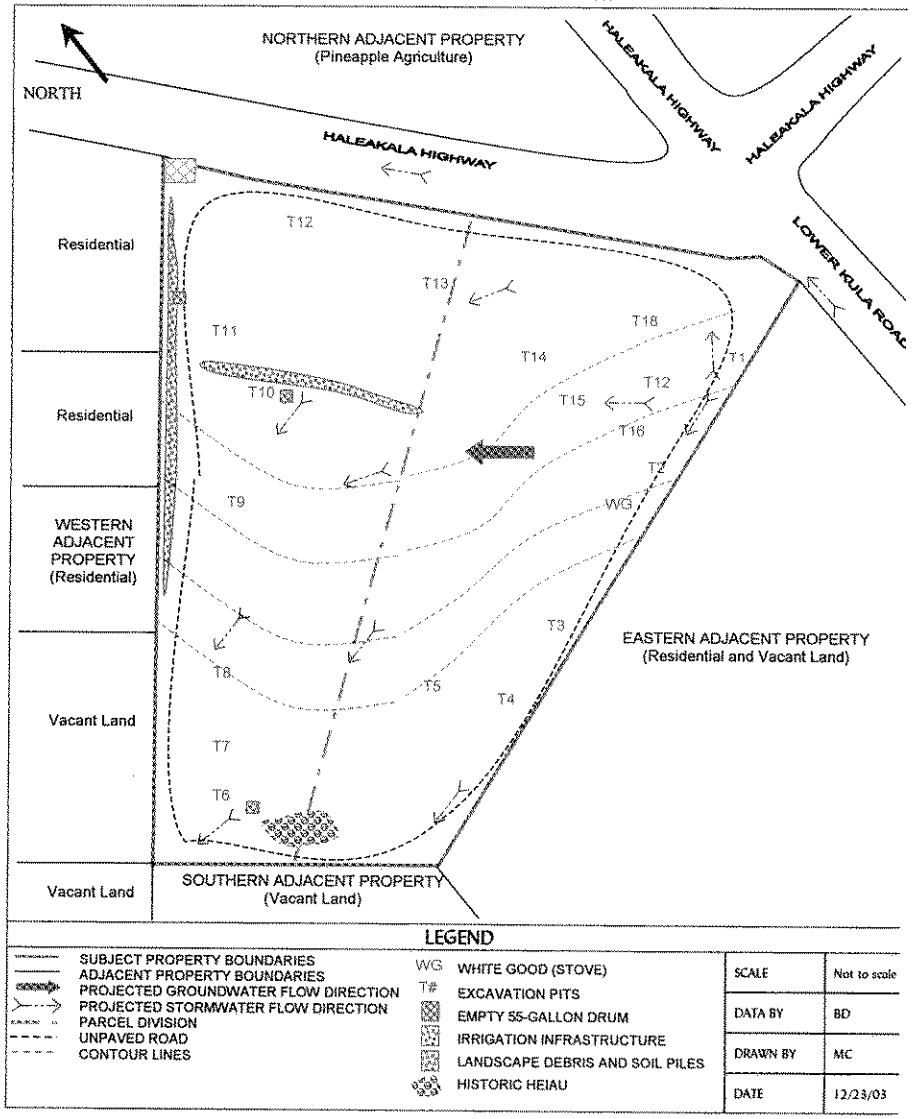


FIGURE 2: SITE PLAN



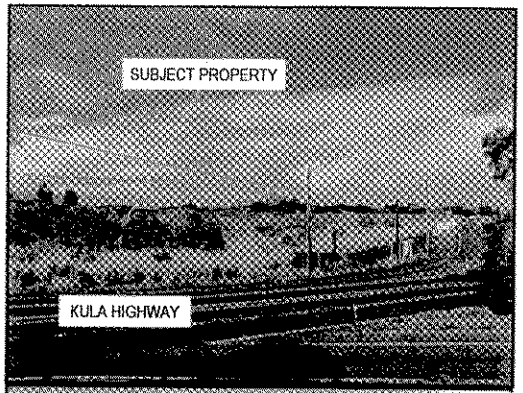


PHOTO 1

Northwesterly view of the subject property's northern boundary (Haleakala Highway) across Kula Road.

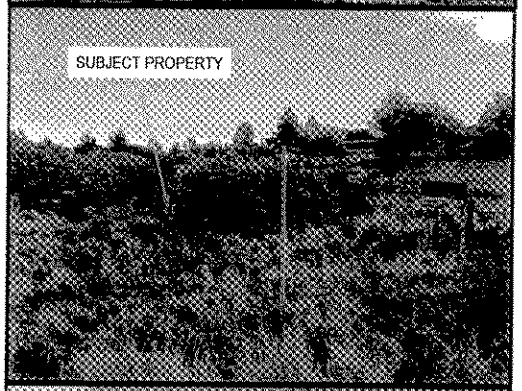


PHOTO 2

Northeasterly view along the subject property's eastern boundary.

PHOTO 3

Easterly view along the subject property's southern boundary.

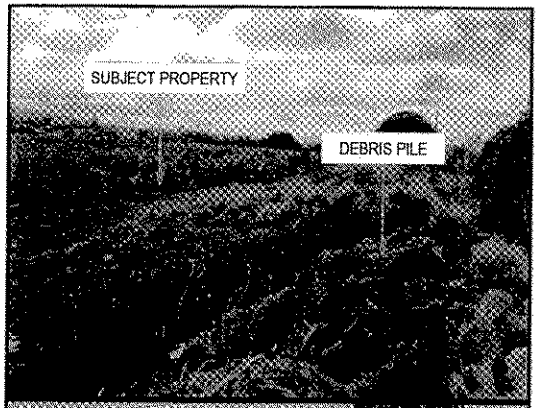


PHOTO 4

Southwesterly view along the subject property's western boundary.

PHOTO 5

Former irrigation infrastructure (dismantled). No evidence of staining or release was noted on the surface soils in the area.

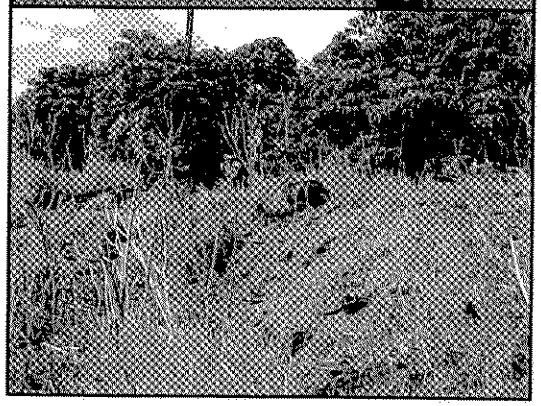


PHOTO 6

Landscape and soil debris pile located on the western property boundary. Note drum in the center of the plots. No staining was noted related to this drum.

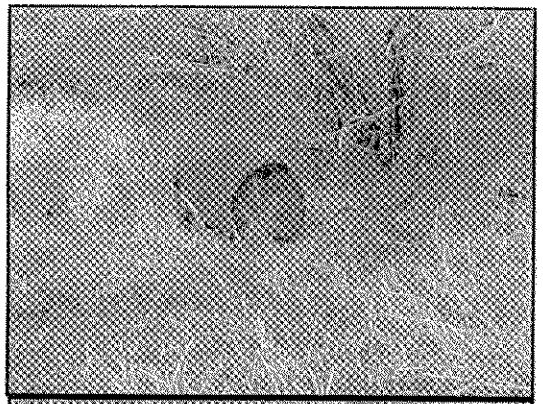


PHOTO 7

Fifty-five (55) gallon-drum located near the rockpile in southern portion of the property. No soil staining or odor was related to this drum.

PHOTO 8

Historic "Heiau" located in the southern portion of the property.

PHOTO 9

One (1) of several archeological excavation trenches located throughout the subject property.

PHOTO 10

Cooking range (special waste) located on the eastern property boundary.

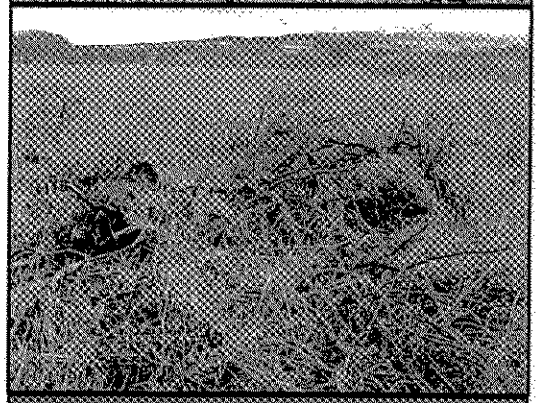


PHOTO 11

Landscaping debris located in the northern portion of the subject property.

PHOTO 12

Miscellaneous debris piles located on adjacent western property. View is south westerly from the southwestern corner of subject property.

Appendix B:

Regulatory Records Documentation
Site Specific Documentation

Vuich Environmental

Preliminary Environmental Investigation

According to ASTM Standard 1527-00, the user's (or client's) responsibility in this investigation is to help identify the possibility of recognized environmental conditions in connection with the property. Please assist us by responding to the following request for data and information you may have, or of which you may have some specialized knowledge. This questionnaire will be included in the Appendices of the final report as an indication of user assistance.

Please Supply As Many of the Following Documents As Possible

A. [✓] **Tax Map Key Number/Tax Code Number** (2) 2-3-11 : 01 & 02

B. [✓] **Title Information** *(Current, and any previous ownership.)*

C. [ ] **Property Legal Description** *(If Title Information is not available)*

D. [✓] **Tax Map and/or Site Development Drawing/Plat**

E. [ ] **Special Property Information** *(Well-development data, endangered species listings, historical registration or environmental deed restrictions.)* See proposed subd. layout & Hiau Loan

F. [ ] **Real Estate Appraisal Report**

G. [ ] **Special Management Area Permit Report (SMA)**

Please Provide the Following Information to The Best Of Your Ability

1. **Environmental Site Assessments (ESA):** Are you aware of any previous assessments: *Cleanup Closure Reports, Permit Characterization Reports, etc.* conducted on the subject site or *within the immediate area?* If yes, please supply details.
   No

2. **Local-State-Federal Inspections:** Are you aware of any environmental inspections *conducted by any regulatory agency*, i.e., Hawaii Dept. of Health (Environmental Health Services), OSHA, U.S. Army Corps of Engineers, Department of Land & Natural Resources, Fish & Wildlife Services, HUD, EPA, or County Wastewater or Solid Waste Division of the Public Works/Waste Management Department etc.? If yes, please supply details.
   No

3a. **Structures/Buildings:** Are there any as-built or other construction drawings available for review? *Contact Name and Telephone Number:*
   No

3b. **Site improvements?** *(Renovation Date & Extent)*
   None

4. **Purchase Price:** Is the property's purchase price within a normal market range or *significantly lower? If lower, please supply details.*

Rev 04/03
Environmental Investigation Starter Pack (HI).dot

1496 Lower Main Street, Suite C, Wailuku, Hawaii 96793 ▼ (808) 249-2777 Phone ▼ (808) 249-2778 Fax

5. **Name of Current Owner:**

6. **Name of former Owner:**

7. **Proceedings Against the Property:** Are you aware of any administrative or legal proceedings against the property for environmental concerns i.e., Compliance Orders, Notices of Violation? If yes, please supply details.
No

8. **Property Liens:** Are there any recorded liens or consent decrees on the property that is environmentally related, i.e., property clean-up, waste removal, asbestos abatement, wastewater issues, etc.? If yes please supply details.
No

9. Specialized **Historic Information:** Are you aware of any previous owner, neighbor, business affiliate or other individual who might have knowledge of any special or unusual historic use of, and/or previous operations conducted on the subject property? *Contact Name and Telephone Number:*
Heiau

10. **Manufacturing or Processing:** If there are manufacturing or processing activities conducted on-site, is there an operation flow chart, diagram or procedures manual available for review? *Contact Name and Telephone Number*
None

11. **This Report is Prepared For:** (*Please Print*)
Attention: Don Fujimoto
Organization: Hanohano LLC
Address: 2005 Main St. Wailuku, HI 96793
Phone no.: 270-0526 Fax no.: 242-2777

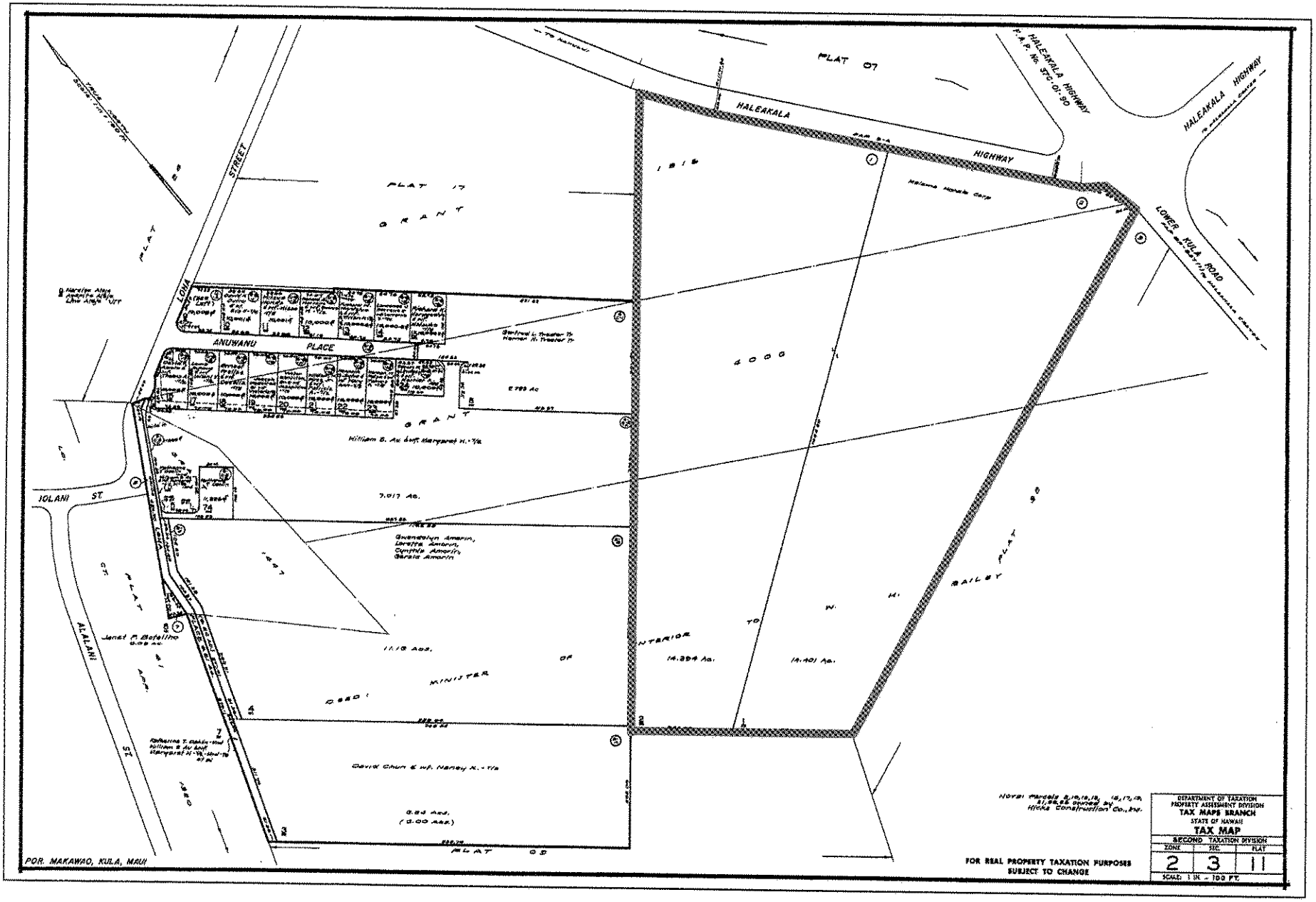
12. **Please List Other Organizations (Lenders) Who Will Require a Listing as "Also Prepared For:" on the report cover and signature page.**
(a) Attention: None
Organization:
Address:
(b) Attention: None
Organization:
Address:

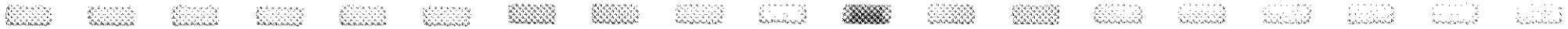
We will submit 2 signed reports for each project. If additional copies are required, an additional fee will be charged for processing.

Who Prepared This Starter Package Information?

Name: (Please Print) Don Fujimoto	Title: V.P.
Company/Organization: Hanohano LLC	
Address: 2005 Main St. Wailuku HI	
Tel. No.: 244-1500 270-0526 (direct)	Fax No.: 242-2777
Signature:	Date: 10/14/03

1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 ▼ (808) 249-2777 Phone ▼ (808) 249-2778 Fax


HALEAKALA HIGHWAY
F.A.P. No. STP-01-90
HALEAKALA HIGHWAY
LOWER KULA ROAD
LOHA STREET
ANUWANU PLACE
IOLANI ST
ALALANI ST
PLAT 07
PLAT 17
GRANT
4000
7.017 Ac.
17.19 Acs.
14.394 Ac.
14.401 Ac.
0.84 Acs.
(3.00 Acs.)
POR. MAKAWAO, KULA, MAUI
FOR REAL PROPERTY TAXATION PURPOSES
SUBJECT TO CHANGE
DEPARTMENT OF TAXATION
PROPERTY ASSESSMENT DIVISION
TAX MAPS BRANCH
STATE OF HAWAII
TAX MAP
SECOND TAXATION DIVISION
ZONE 2
SEC. 3
PLAT 11
SCALE 1 IN. = 100 FT.



LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EMD/CWB

October 29, 2003

Ms. Massy Cashen
Vuich Environmental Consultants
1498 Lower Main Street, Suite C
Wailuku, Hawai'i 96793

Dear Ms. Cashen:

SUBJECT: UNDERGROUND INJECTION CONTROL (UIC)
REPLY TO YOUR REQUEST FOR PUBLIC RECORD FOR
1. TMK: (2) 2-3-11:01 and 02
Vacant Lot-Corner Haleakala Highway and Lower Kula
2. TMK: (2) 3-4-12:45,47,48,83 and 86
Vacant Lot-Wailuku

There are no UIC permits associated with the subject properties.

If an injection well is found at any property, please contact us so that we can determine if the injection well regulations are applicable.

If you have any questions about this subject, please call Chauncey Hew at (808) 586-4258 (Honolulu) or call direct toll free from Maui at 984-2400, ext. 64258.

Sincerely,

WILLIAM W. WONG, P.E., CHIEF
Safe Drinking Water Branch
Environmental Management Division

CH:cb

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EMD / CWB

11009ESM.0

November 6, 2003

Ms. Massy Cashen
Vuich Environmental Consultants, Inc.
1498 Lower Main Street, Suite C
Wailuku, Hawaii 96793

Dear Ms. Cashen:

Subject: Request for Public Records

The Department of Health, Clean Water Branch ("DOH-CWB") received your two (2) requests for public records dated October 20, 2003. Our staff searched the DOH-CWB database and found no records of past or pending environmental permits, licenses, citations, or other information pertaining to the following site(s):

(1) Address: Vacant Lot - Wailuku
TMKs: (2)3-4-12:45, 47, 48, 83, and 86

(2) Address: Vacant Lot - Corner Haleakala Highway and Lower Kula
TMKs: (2)2-3-11:01 and 02

Should you have any questions, please contact Mr. Michael Tsuji, Supervisor of the Enforcement Section, for enforcement concerns and Mr. Alec Wong, Supervisor of the Engineering Section, for permitting concerns, Clean Water Branch, at (808) 586-4309.

Sincerely,

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

County of Maui
Department of Fire & Public Safety
200 Dairy Road
Kahului, HI 96732
Phone: (808) 270-7572
Fax: (808) 270-7918

HAZARDOUS MATERIALS BUREAU
JAMES L. KINO, CAPTAIN

August 22, 2003

Vulch Environmental Consultants
1498 Lower Main Street, Suite C
Walluku, HI. 96793

Dear, Ms. Cashen

I am unable to do a search on our database from the Tax map Key's you provided; TMK (2) 3-4-12:45, 47, 48, 83, and 86 in Wailuku; (2) 2-3-11:01 and 02 in Lower Kula. I will need a street address to be able to provide you with the information you are seeking.

Sincerely,

James L. Kino
Captain, Hazardous Materials Division
Phone 270-7572

Vuich Environmental
Consultants, Inc.

October 20, 2003

State of Hawaii Department of Health
Environmental Management Division
919 Ala Moana Boulevard, Room 309
Honolulu, HI 96814
Phone: (808) 586-4200
Fax: (808) 586-5800
Attn: Clean Air Branch

Subject: REQUEST FOR PUBLIC RECORDS

Dear Sir/Madam:

We are requesting a search for any past or pending environmental permits, licenses, citations, or other information pertaining to the site(s) described below.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Tax Map Key is enclosed.

Truly yours,

Massy Cashen

Vuich Environmental
Consultants, Inc.

October 20, 2003

State of Hawaii Department of Health
Environmental Management Division
919 Ala Moana Boulevard, Room 301
Honolulu, HI 96814
Phone: (808) 586-4309
Attn: Clean Water Branch

Subject: REQUEST FOR PUBLIC RECORDS

Dear Sir/Madam:

We are requesting a search for any past or pending environmental permits, licenses, citations, or other information pertaining to the site(s) described below.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Tax Map Key is enclosed.

Truly yours,

Massy Cashen

Maui (Corporate) Office: 1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 ● (808) 249-2777 Phone / (808) 249-2778 Fax
Oahu Office: 650 Kakoi Street, Unit 3, Honolulu, Hawaii 96819 ● (808) 836-1611 Phone / (808) 836-6299 Fax
Inter-Island: (800) 572-1165 ● www.vuichenvironmental.com

Vuich Environmental
Consultants, Inc.

October 20, 2003

State of Hawaii Department of Health
Environmental Management Division
919 Ala Moana Boulevard, Room 206
Honolulu, HI 96814
Phone: (808) 586-4249
Attn: Office of Hazard Evaluation
& Emergency Response (HEER)

Subject: REQUEST FOR PUBLIC RECORDS

Dear Sir/Madam:

We are requesting a search for any past or pending environmental permits, licenses, citations, or other information pertaining to the site(s) described below.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Tax Map Key is enclosed.

Truly yours,

Massy Cashen

Maui (Corporate) Office: 1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 ● (808) 249-2777 Phone / (808) 249-2778 Fax
Oahu Office: 650 Kakoi Street, Unit 3, Honolulu, Hawaii 96819 ● (808) 836-1611 Phone / (808) 836-6299 Fax
Inter-Island: (800) 572-1165 ● www.vuichenvironmental.com

Vuich Environmental
Consultants, Inc.

October 20, 2003

State of Hawaii Department of Health
Environmental Management Division
919 Ala Moana Boulevard, Room 308
Honolulu, HI 96814
Phone: (808) 586-4258
Fax: (808) 586-4370
Attn: Safe Drinking Water Branch

Subject: REQUEST FOR PUBLIC RECORDS

Dear Sir/Madam:

We are requesting a search for any past or pending environmental permits, licenses, citations, or other information pertaining to the site(s) described below.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Tax Map Key is enclosed.

Truly yours,

Massy Cashen

Maui (Corporate) Office: 1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 ● (808) 249-2777 Phone / (808) 249-2778 Fax
Oahu Office: 650 Kakoi Street, Unit 3, Honolulu, Hawaii 96819 ● (808) 836-1611 Phone / (808) 836-6299 Fax
Inter-Island: (800) 572-1165 ● www.vuichenvironmental.com

Vuich Environmental
Consultants, Inc.

October 20, 2003

State of Hawaii Department of Health
Environmental Management Division
919 Ala Moana Boulevard, Room 212
Honolulu, HI 96814
Phone: (808) 586-4226
Attn: Solid & Hazardous Waste Branch

Subject: REQUEST FOR PUBLIC RECORDS

Dear Sir/Madam:

We are requesting a search for any past or pending environmental permits, licenses, citations, or other information pertaining to the site(s) described below.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Tax Map Key is enclosed.

Truly yours,

Massy Cashen

Maui (Corporate) Office: 1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 ● (808) 249-2777 Phone / (808) 249-2778 Fax
Oahu Office: 650 Kakoi Street, Unit 3, Honolulu, Hawaii 96819 ● (808) 836-1611 Phone / (808) 836-6299 Fax
Inter-Island: (800) 572-1165 ● www.vuichenvironmental.com

Vuich Environmental
Consultants, Inc.

October 20, 2003

Mr. Roland Tejano, Engineer
Maui District Health Office
Department of Health
54 High Street, Wailuku
Maui, Hawaii 96793
Phone: 984-8232 / Fax: 984-8222

Attn: Wastewater Branch

Subject: REQUEST FOR PUBLIC RECORDS

Dear Mr. Tejano:

We are requesting a search for any past or pending environmental permits, licenses, citations, or other information pertaining to the site(s) described below.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Tax Map Key is enclosed.

Truly yours,

Massy Cashen

Maui (Corporate) Office: 1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 • (808) 249-2777 Phone / (808) 249-2778 Fax
Oahu Office: 650 Kakoi Street, Unit 3, Honolulu, Hawaii 96819 • (808) 836-1611 Phone / (808) 836-6299 Fax
Inter-Island: (800) 572-1165 • www.vuichenvironmental.com

Vuich Environmental
Consultants, Inc.

October 20, 2003

Maui County Fire Department
Hazardous Materials Division
200 Dairy Road
Kahului, Hawaii 96732
Attn: Capt. James Kino
Via Fax No: 270-7919

RE: Request for Public Records for Vuich Environmental Consultants (VEC)

Dear Capt. Kino:

VEC is requesting any past or present information of environmental concern pertaining to the subject site and adjacent sites from the Maui County Fire Department's database. This could include information on environmental releases (spills), permits, citations, inspections, etc.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Thank you for your assistance.

Sincerely yours,

Massy Cashen

Attachment: TMK map

Maui (Corporate) Office: 1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 • (808) 249-2777 Phone / (808) 249-2778 Fax
Oahu Office: 650 Kakoi Street, Unit 3, Honolulu, Hawaii 96819 • (808) 836-1611 Phone / (808) 836-6299 Fax
Inter-Island: (800) 572-1165 • www.vuichenvironmental.com

Vuich Environmental
Consultants, Inc.

October 20, 2003

Maui County Fire Department
Fire Prevention Bureau
21 Kinipopo Street
Wailuku, Hawaii 96793
Attn: Capt. Neal Bal
Via Fax No: 270-7889

RE: Request for Public Records for Vuich Environmental Consultants (VEC)

Dear Capt. Bal:

VEC is requesting any past or present information of environmental concern pertaining to the subject site and adjacent sites from the Maui County Fire Department's database. This could include information on environmental releases (spills), permits, citations, inspections, etc.

SITE INFORMATION:

Project Number:	**0310-681**
Tax Map Key No.:	**(2) 2-3-11:01 and 02**
Address:	**Vacant Lot - Corner Haleakala Highway and Lower Kula**
Current Owner:	**Curtis Y. and Pauline K. Harada - Parcel 1** **EKR, Inc. - Parcel 2**
Former Owner:	**Malama Mohala Corporation**
Current Occupant:	**None**
Type of Business:	**Vacant**

Thank you for your assistance.

Sincerely yours,

Massy Cashen

Maui (Corporate) Office: 1498 Lower Main Street, Suite C, Wailuku, Hawaii 96793 • (808) 249-2777 Phone / (808) 249-2778 Fax
Oahu Office: 650 Kakoi Street, Unit 3, Honolulu, Hawaii 96819 • (808) 836-1611 Phone / (808) 836-6299 Fax
Inter-Island: (800) 572-1165 • www.vuichenvironmental.com

The EDR Radius Map™ Report

Kualono Subdivision
Vacant Lot
Makawao, HI 96768

Inquiry Number: 01093774.1r

December 05, 2003

EDR® Environmental Data Resources, Inc.

***The* Source For Environmental Risk Management Data**

3530 Post Road
Southport, Connecticut 06890

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

VACANT LOT
MAKAWAO, HI 96768

COORDINATES

Latitude (North):	20.829200 - 20° 49' 45.1"
Longitude (West):	156.332100 - 156° 19' 55.6"
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	777865.7
UTM Y (Meters):	2305408.5
Elevation:	1706 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	20156-G3 PAIA, HI
Source:	USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
CORRACTS	Corrective Action Report
RCRIS-TSD	Resource Conservation and Recovery Information System
RCRIS-LQG	Resource Conservation and Recovery Information System
RCRIS-SQG	Resource Conservation and Recovery Information System
ERNS	Emergency Response Notification System

STATE ASTM STANDARD

SHWS	Sites List

SWF/LF..... Permitted Landfills in the State of Hawaii
UST..... Underground Storage Tank Database
VCP..... Voluntary Response Program Sites

FEDERAL ASTM SUPPLEMENTAL

CONSENT..... Superfund (CERCLA) Consent Decrees
ROD..... Records Of Decision
Delisted NPL..... National Priority List Deletions
FINDS..... Facility Index System/Facility Identification Initiative Program Summary Report
HMIRS..... Hazardous Materials Information Reporting System
MLTS..... Material Licensing Tracking System
MINES..... Mines Master Index File
NPL Liens..... Federal Superfund Liens
PADS..... PCB Activity Database System
US BROWNFIELDS..... A Listing of Brownfields Sites
DOD..... Department of Defense Sites
RAATS..... RCRA Administrative Action Tracking System
TRIS..... Toxic Chemical Release Inventory System
TSCA..... Toxic Substances Control Act
SSTS..... Section 7 Tracking Systems
FTTS INSP..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

SPILLS..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Ges) Sites

BROWNFIELDS DATABASES

US BROWNFIELDS..... A Listing of Brownfields Sites
BROWNFIELDS..... Brownfields Sites
VCP..... Voluntary Response Program Sites

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STATE ASTM STANDARD

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.

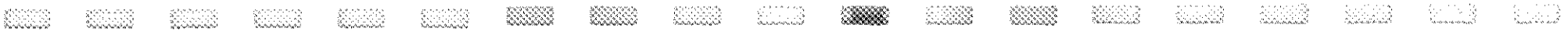
A review of the LUST list, as provided by EDR, and dated 08/01/2003 has revealed that there is 1 LUST site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
MAKAWAO FIRE STATION	***134 MAKAWAO AVE***	*1/4 - 1/2 N*	*1*	*6*

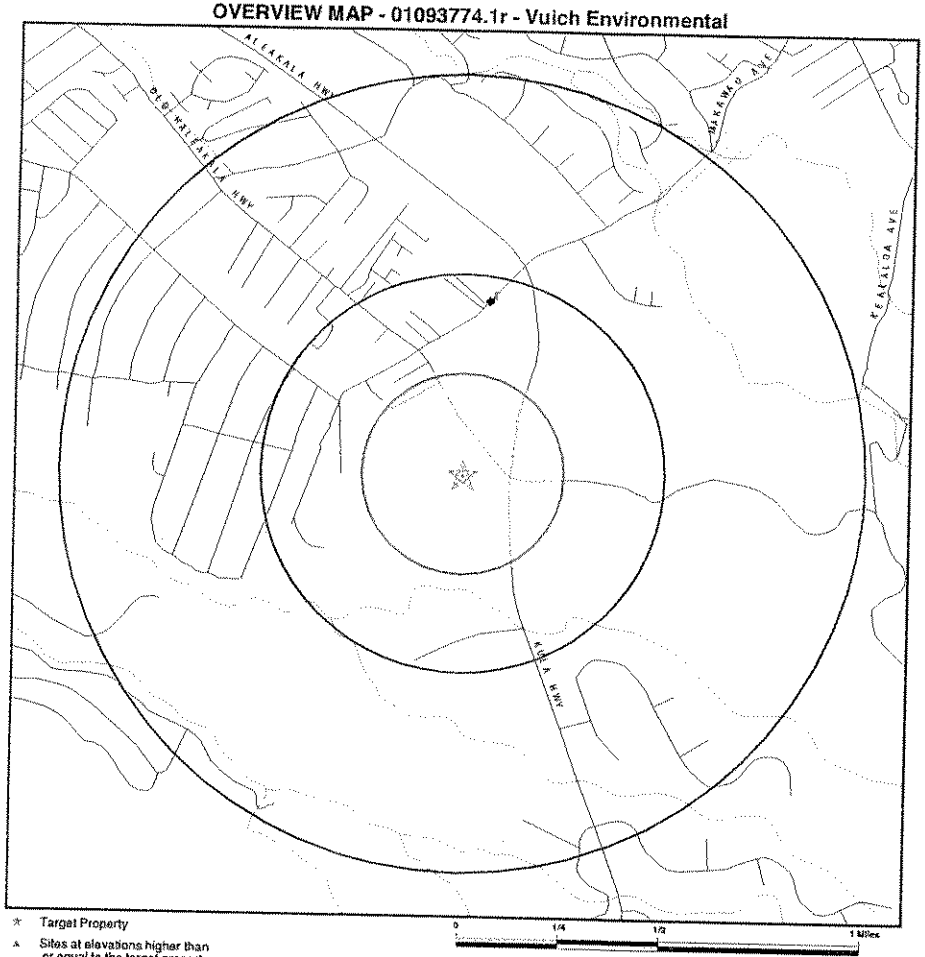
EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
KALAUPAPA LANDFILL	SHWS, SWF/LF
BEN FRANKLIN STORES PROPERTY	SHWS
LANAI LANDFILL (LF-0056-98)	SHWS, SWF/LF
HAWAIIAN COMMERCIAL & SUGAR CO.,	SWF/LF
KAKAMAULA LANDFILL	SWF/LF
KALUAKOI LANDFILL	SWF/LF
MAUNALOA LANDFILL	SWF/LF
MOLOKAI LANDFILL (NAIWA LF LF-0030-	SWF/LF, SPILLS
CENTRAL MAUI LF, PHASE I&II LF-0034	SWF/LF
MAALEA C&D LF	SWF/LF
CENTRAL MAUI LF PHASE IV	SWF/LF
MAUI PINEAPPLE CO.	UST



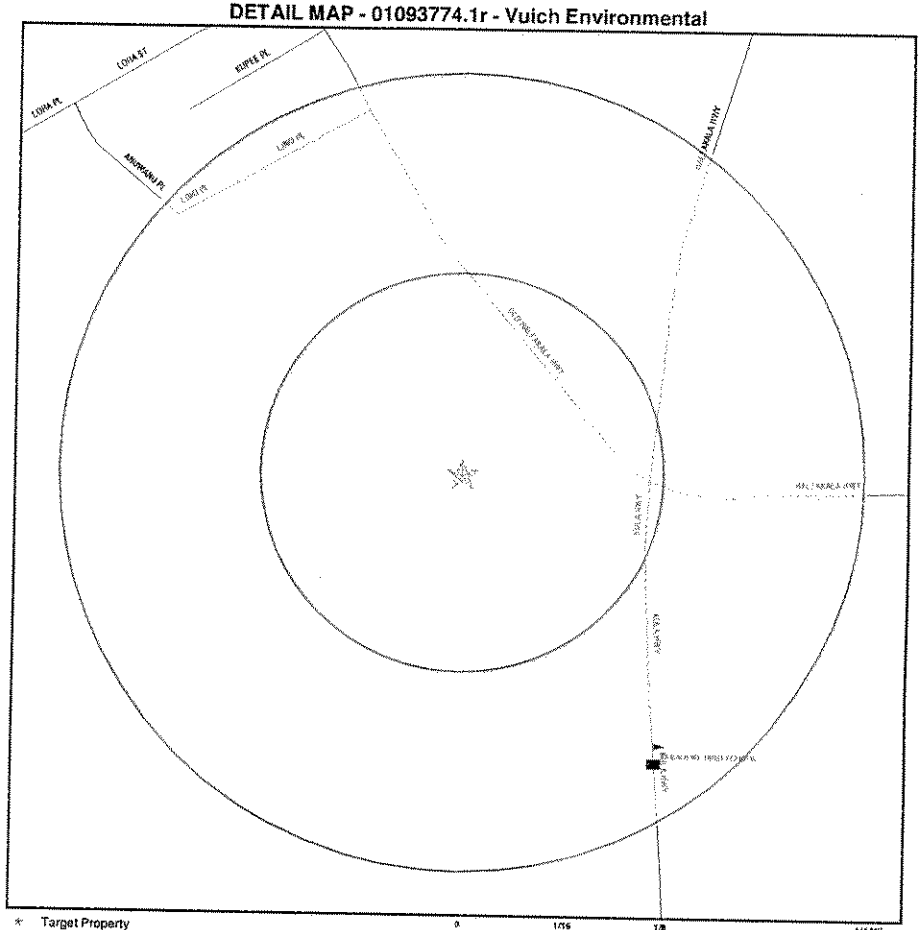
OVERVIEW MAP - 01093774.1r - Vuich Environmental



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Coal Gasification Sites
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone

TARGET PROPERTY:	Kualono Subdivision	CUSTOMER:	Vuich Environmental
ADDRESS:	Vacant Lot	CONTACT:	Massy Cashen
CITY/STATE/ZIP:	Makawao HI 96768	INQUIRY #:	01093774.1r
LAT/LONG:	20.8292 / 156.3321	DATE:	December 05, 2003 6:01 pm

DETAIL MAP - 01093774.1r - Vuich Environmental



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Coal Gasification Sites
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone

TARGET PROPERTY:	Kualono Subdivision	CUSTOMER:	Vuich Environmental
ADDRESS:	Vacant Lot	CONTACT:	Massy Cashen
CITY/STATE/ZIP:	Makawao HI 96768	INQUIRY #:	01093774.1r
LAT/LONG:	20.8292 / 156.3321	DATE:	December 05, 2003 6:01 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.250	0	0	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRIS-TSD		0.500	0	0	0	NR	NR	0
RCRIS Lg. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRIS Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
STATE ASTM STANDARD								
SHWS		1.000	0	0	0	0	NR	0
State Landfill		0.500	0	0	0	NR	NR	0
LUST		0.500	0	0	1	NR	NR	1
UST		0.250	0	0	NR	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
FEDERAL ASTM SUPPLEMENTAL								
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
NPL Liens		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
STATE OR LOCAL ASTM SUPPLEMENTAL								
SPILLS		TP	NR	NR	NR	NR	NR	0
EDR PROPRIETARY HISTORICAL DATABASES								
Coal Gas		1.000	0	0	0	0	NR	0
BROWNFIELDS DATABASES								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
BROWNFIELDS		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HALIMAILE	U003541877	MAUI PINEAPPLE CO.	870 HALIMAILE HWY / GAS PUMP	96758	UST
MAUI COUNTY	S103763675	HAWAIIAN COMMERCIAL & SUGAR CO.,	FIELD 7191, WAILUKU		SWF/LF
MAUI COUNTY	S103763653	KAKAHAIA LANDFILL	KALAMAILA MOLOKAI		SWF/LF
MAUI COUNTY	1000160100	KALAUPAPA LANDFILL	KALAUPAPA MOLOKAI		SHWS, SWF/LF
MAUI COUNTY	S103763654	KALUAKOI LANDFILL	KALUAKOI ROAD MAUNALOA		SWF/LF
MAUI COUNTY	S104534094	BEN FRANKLIN STORES PROPERTY	KAUNAKAKAI, MOLOKAI		SHWS
MAUI COUNTY	1000729484	LSNAI LANDFILL (LF-0058-98)	LANAI		SHWS, SWF/LF
MAUI COUNTY	S103763656	MAUNALOA LANDFILL	MAUNALOA MAUI		SWF/LF
MAUI COUNTY	S103763644	MOLOKAI LANDFILL (NAWA LF LF-0030-	NAWA MOLOKAI		SWF/LF, SPILLS
MAUI COUNTY	S103763652	CENTRAL MAUI LF, PHASE I&II LF-0034	PUNENE, MAUI		SWF/LF
MAUI COUNTY	S103763673	MAALEA CAO LF	PUUNENE / KIHEI ROAD		SWF/LF
MAUI COUNTY	S103763674	CENTRAL MAUI LF PHASE IV	PUUNENE		SWF/LF

Map ID
Direction
Distance
Distance (ft.)
Elevation: Site

MAP FINDINGS

EDR ID Number
EPA ID Number

Database(s)

Coal Gas Site Search: No site was found in a search of Real Property Scan's ENVIROHAZ database.

1
North
1/4-1/2
2309 ft.

MAKAWAO FIRE STATION
134 MAKAWAO AVE
MAKAWAO, HI 96768

LUST U003222264
UST N/A

Relative:
Lower

Actual:
1627 ft.

LUST:
Facility ID: 9-502765
Alternate Event ID: 930114
Facility Status Date: 10/20/1997
Facility Status: Site Cleanup Completed
Project Officer: Okoji

UST:
Facility ID: 9-502765
Tank Status: Permanently Out of Use
Tank Capacity: 500
Date Closed: 6/22/1993
Owner: COUNTY OF MAUI - FIRE PREVENTION BUREAU
21 KINIPOPO ST
Makawao, HI 96768

Tank ID: R-1
Installed: Not reported
Substance: Diesel

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List
Source: EPA
Telephone: N/A
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/22/03
Date Made Active at EDR: 08/26/03
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 08/04/03
Elapsed ASTM days: 22
Date of Last EDR Contact: 11/03/03

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 6
Telephone: 214-655-6659

EPA Region 8
Telephone: 303-312-6774

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: N/A

Date of Government Version: 06/10/03
Date Made Active at EDR: 08/26/03
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 08/04/03
Elapsed ASTM days: 22
Date of Last EDR Contact: 11/03/03

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 09/11/03
Date Made Active at EDR: 10/29/03
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 09/24/03
Elapsed ASTM days: 35
Date of Last EDR Contact: 09/24/03

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-413-0223
As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/11/03
Date Made Active at EDR: 10/29/03
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 09/24/03
Elapsed ASTM days: 35
Date of Last EDR Contact: 09/24/03

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/17/03
Date Made Active at EDR: 11/11/03
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 10/01/03
Elapsed ASTM days: 41
Date of Last EDR Contact: 09/08/03

RCRIS: Resource Conservation and Recovery Information System
Source: EPA
Telephone: 800-424-9346
Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/10/03
Date Made Active at EDR: 10/01/03
Database Release Frequency: Varies

Date of Data Arrival at EDR: 09/11/03
Elapsed ASTM days: 20
Date of Last EDR Contact: 11/18/03

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/02
Date Made Active at EDR: 02/03/03
Database Release Frequency: Annually

Date of Data Arrival at EDR: 01/27/03
Elapsed ASTM days: 7
Date of Last EDR Contact: 10/27/03

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/01/01
Database Release Frequency: Biennially

Date of Last EDR Contact: 10/01/03
Date of Next Scheduled EDR Contact: 12/15/03

CONSENT: Superfund (CERCLA) Consent Decrees
Source: EPA Regional Offices
Telephone: Varies
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: N/A
Database Release Frequency: Varies

Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/09/03
Database Release Frequency: Annually
Date of Last EDR Contact: 10/08/03
Date of Next Scheduled EDR Contact: 01/05/04

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: N/A
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/22/03
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/03/03
Date of Next Scheduled EDR Contact: 02/02/04

FINDS: Facility Index System/Facility Identification Initiative Program Summary Report
Source: EPA
Telephone: N/A
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/25/03
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/07/03
Date of Next Scheduled EDR Contact: 01/05/04

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/31/03
Database Release Frequency: Annually
Date of Last EDR Contact: 10/23/03
Date of Next Scheduled EDR Contact: 01/19/04

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/16/03
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/07/03
Date of Next Scheduled EDR Contact: 01/05/04

MINES: Mines Master Index File
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959

Date of Government Version: 08/27/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 10/01/03
Date of Next Scheduled EDR Contact: 12/29/03

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 11/21/03
Date of Next Scheduled EDR Contact: 02/23/04

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-564-3887
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/30/03
Database Release Frequency: Annually
Date of Last EDR Contact: 11/12/03
Date of Next Scheduled EDR Contact: 02/09/04

DOD: Department of Defense Sites
Source: USGS
Telephone: 703-648-5920
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 04/01/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/12/03
Date of Next Scheduled EDR Contact: 02/09/04

STORMWATER: Storm Water General Permits
Source: Environmental Protection Agency
Telephone: 202 564-0746
A listing of all facilities with Storm Water General Permits.

Date of Government Version: N/A
Database Release Frequency: Quarterly
Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become BCRLF cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 07/15/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/15/03
Date of Next Scheduled EDR Contact: 12/15/03

RMP: Risk Management Plans
Source: Environmental Protection Agency
Telephone: 202-564-8600
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: N/A
Database Release Frequency: N/A

Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95
Database Release Frequency: No Update Planned

Date of Last EDR Contact: 09/08/03
Date of Next Scheduled EDR Contact: 12/08/03

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-260-1531
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/01
Database Release Frequency: Annually

Date of Last EDR Contact: 09/23/03
Date of Next Scheduled EDR Contact: 12/22/03

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/98
Database Release Frequency: Every 4 Years

Date of Last EDR Contact: 09/02/03
Date of Next Scheduled EDR Contact: 12/08/03

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-564-2501

Date of Government Version: 10/16/03
Database Release Frequency: Quarterly

Date of Last EDR Contact: 09/23/03
Date of Next Scheduled EDR Contact: 12/22/03

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-5008
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/01
Database Release Frequency: Annually

Date of Last EDR Contact: 10/20/03
Date of Next Scheduled EDR Contact: 01/19/04

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-564-2501
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/16/03
Database Release Frequency: Quarterly

Date of Last EDR Contact: 09/23/03
Date of Next Scheduled EDR Contact: 12/22/03

STATE OF HAWAII ASTM STANDARD RECORDS

SHWS: Sites List
Source: Department of Health
Telephone: 808-586-4249
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 07/12/01
Date Made Active at EDR: 10/16/01
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 09/24/01
Elapsed ASTM days: 22
Date of Last EDR Contact: 09/23/03

SWF/LF: Permitted Landfills in the State of Hawaii
Source: Department of Health
Telephone: 808-586-4245
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/03/99
Date Made Active at EDR: 05/25/99
Database Release Frequency: Varies

Date of Data Arrival at EDR: 05/10/99
Elapsed ASTM days: 15
Date of Last EDR Contact: 10/27/03

LUST: Leaking Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4226
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/01/03
Date Made Active at EDR: 09/17/03
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 09/02/03
Elapsed ASTM days: 15
Date of Last EDR Contact: 09/02/03

UST: Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4226
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/01/03
Date Made Active at EDR: 09/11/03
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 09/02/03
Elapsed ASTM days: 9
Date of Last EDR Contact: 09/02/03

VCP: Voluntary Response Program Sites
Source: Department of Health
Telephone: 808-586-4249

Date of Government Version: 10/10/03
Date Made Active at EDR: 10/21/03
Database Release Frequency: Varies

Date of Data Arrival at EDR: 10/13/03
Elapsed ASTM days: 8
Date of Last EDR Contact: 09/23/03

STATE OF HAWAII ASTM SUPPLEMENTAL RECORDS

SPILLS: Release Notifications
Source: Department of Health
Telephone: 808-586-4249
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 09/01/00
Database Release Frequency: Varies

Date of Last EDR Contact: 09/23/03
Date of Next Scheduled EDR Contact: 12/22/03

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

Disclaimer Provided by Real Property Scan, Inc.

The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to insure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of toxins at any site. This report does not constitute a legal opinion.

BROWNFIELDS DATABASES

BROWNFIELDS: Brownfields Sites
Source: Department of Health
Telephone: 808-586-4249

Date of Government Version: 10/10/03
Database Release Frequency: Varies

Date of Last EDR Contact: 09/23/03
Date of Next Scheduled EDR Contact: 12/22/03

VCP: Voluntary Response Program Sites
Source: Department of Health
Telephone: 808-586-4249

Date of Government Version: 10/04/03
Database Release Frequency: Varies

Date of Last EDR Contact: 09/23/03
Date of Next Scheduled EDR Contact: 12/22/03

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become BCRLF cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: N/A
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

STREET AND ADDRESS INFORMATION

Appendix C:

Qualifications of Environmental Professionals

Vuich Environmental Consultants, Inc.

STATEMENT OF QUALIFICATIONS

for

Robert A. Davis, B.S.

Company Position	Environmental Technician
Responsibilities and Duties:	• Phase I & II Environmental Site Assessments/Investigations • Phase III Environmental Remediation Projects • Underground Storage Tank (UST) Closures • Erosion Control Management • Indoor Air Quality Investigations • Erosion Control Plan (BMP) Development • Hazardous/Regulated Waste Management
Experience:	• Environmental Site Assessments • Environmental Sampling • OSHA & EPA Compliance Inspector (U. S. M. C) • Hazardous Material and Hazardous Waste Management • Project Manager Occupational Safety and Health Program • Respiratory Protection Program Manager • Confined Space Program Manager • Risk Management/Hazard abatement • Safety Officer • Instructor for work place safety • Accident Investigator • 20 years Military Service
Training & Education	• Bachelor of Science, Environmental and Hazardous Materials Management, University Maryland, University College, 1998 • Confined Space Program Manager Course • Respiratory Protection Program Managers Course OSHA 222A • Risk Analysis and Management Managers Course (Instructor Certification) • Accident Investigators Course • Safety Managers Course • Industrial Studies in Hazardous Materials • Environmental Health and Occupational Safety • Integrated Environmental Management • Environmental Law and Code of Federal Regulations

Rev. 7-03

Maui (Main) Office: 1498 Lower Main Street, Suite C, Wailuku, Maui, Hawaii 96793 • (808) 249-2777 Phone (808) 249-2778 Fax
Oahu Office: Hanua Industrial Complex, 91-110 Hanua Street, Unit 317, Kapolei, Oahu, Hawaii 96707
(808) 682-1611 Phone • (808) 682-1616 Fax • Inter-Island: (800) 572-1165 • www.vuichenvironmental.com

Vuich Environmental Consultants, Inc.

STATEMENT OF QUALIFICATIONS

for

Jeffrey E. Kermode, B.A., B. Tech.

Company Position	Environmental Projects Manager
Responsibilities and Duties:	• Phase I & II Environmental Site Assessments/Investigations • Phase III Remediation Projects • Underground Storage Tank (UST) Closures • Asbestos Inspections, Air Monitoring and Supervision of Removal • Lead-Based Paint Inspections, Risk Assessments and Supervision of Removal • Indoor Air Quality Investigations and Mold Remediation Project Management • Erosion Control Plan (BMP) Development • Site Safety Officer for Sampling/Remediation Projects
Experience:	• Soil and Groundwater Investigations/Remediation • UST Removal and Closure • Hazardous Materials Management • Asbestos and Lead-Based Paint Projects (Inspections, Monitoring, Removal) • Air Quality Sampling for Particulate and Microbiological Contaminants • Wetland Delineation • Erosion Control and Pollution Prevention Planning and Implementation for Large Scale Construction Projects • Underground Injection Control (UIC) Permitting • Environmental Report Writing and Compilation • Conducted On-Site Oil Spill Response Training Courses, Assessed Clients' Response Preparedness, and Assisted in the Development of Oil Spill Contingency Plans • Oil Spill Clean-Up Operations • Pelagic and Coastal Fisheries Research as a Scientific Observer
Training & Education	• Bachelor of Technology, Environmental Engineering, B.C.I.T. Burnaby, B.C., 1999 • Bachelor of Arts, Geography, University of B.C., Vancouver, Canada, 1989 • AHERA (Asbestos Hazard Emergency Response Act) Inspector for Asbestos, US EPA Certified • AHERA Asbestos Contractor Supervisor, US EPA Certified • AHERA Project Monitor for Asbestos, US EPA Certified • OSHA HAZWOPER Certification (40 Hr) • On-Scene Incident Commander Certification (24 Hr), US EPA Certified • Lead-Based Paint Inspector, US EPA Certified • Lead-Based Paint Risk Assessor, US EPA Certified • Lead-Based Paint Contractor Supervisor, US EPA Certified

Rev. 6-03

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Vuich Environmental Consultants, Inc.

JOHN S. VUICH

President & CEO

STATEMENT OF QUALIFICATIONS:

M. S. Geological Engineering, University of Arizona
B. S. Geological Engineering, University of Arizona
Registered Geologist (California)
Registered Environmental Assessor (California)
Certified Environmental Manager (Nevada)

AREAS OF EXPERTISE

ENVIRONMENTAL
- Site Assessments, Phase I, II, III Investigations
- Underground Storage Tank Closure
- Asbestos Inspection and Monitoring, Management Planning, and Abatement Project Design and Removal
- Lead-Containing Paint Surveys and Inspections, and Disturbance Design and Removal
- Site Characterization for Remedial Investigations
- Facility Operation Compliance Audits-ISO 14000 Audits
- Soils/Groundwater Remediation
- Hazardous Waste Management
- Risk Assessment Investigations
- RCRA Compliance and Closure Projects
- Expert Witness/Litigation Support
- Industrial Hygiene Qualified/Competent Person
- Mold/Fungi Sampling, Remediation and Abatement Design and Removal

GEOLOGICAL
- Hydrogeology
- Geologic Hazards Analysis
- Landuse Planning
- Subsurface Excavations and Drilling Investigations and Sampling

MANAGEMENT
- Program Director - Project Management
- Client - Agency Liaison
- Field Supervision - Administrative Supervisor

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RELEVANT EXPERIENCE

Owner-President • Vuich Environmental Consultants, Inc.
Wailuku, Maui, and Honolulu, Oahu • (March, 1994 - Present)
Consulting services and project management for Abatement / Remediation Projects property transfers, sampling and site characterization plans, hazardous and toxic waste management, underground storage tanks, regulatory compliance, landfill sites, site remediation and closure plans, permit applications, litigation support, feasibility planning and contingency and emergency response plans.

Director • CEO Haztech Enviro-Systems
Tucson, AZ • July 1988 - February 1994)
Founder of professional environmental engineering and geological consulting firm. Services included site assessments, site contamination characterizations, facility audits, RCRA closure investigations and hazardous/regulated waste management, remediation projects, and asbestos surveys. Prepared regulatory documentation and permitting for Federal, State and local regulatory agencies on all projects. Supervised professional, technical, sales and administrative/clerical staff.

Project Engineer • Hazchem Environmental Services
Tucson, AZ • March 1987 - June 1988
Performed and supervised RCRA remedial projects and waste management projects.

Independent Consultant Geologist
Laguna Hills, CA and Tucson, AZ • 1982 - 1987
Conducted geological investigations in western United States and Mexico. Performed geochemical sampling and geologic mapping. Prepared technical reports for clients and regulatory agencies.

Environmental/Geotechnical Section Supervisor • TRW: Systems Engineering
Redondo Beach, CA • 1978 - 1981
Directed environmental project management for Department of Defense and Department of Energy related projects in Western U.S. Project, including site selection, planning and environmental impact statements. Supervised staff consisting of geologists and environmental scientists.

Assistant Geologist • Arizona Geological Survey
Tucson, AZ • 1972-1978
Participated in environmental impact studies, geologic hazards analysis, landuse planning. Author of several landuse planning technical publications.

Project Geologist and Staff Geologist • Various Geological Consulting & Mining Companies
Southwestern United States • 1968-1972
Performed geochemical sampling, subsurface investigations including drilling, mineral property valuation and geologic mapping. Prepared geologic reports and maps.

Rev. 6/03

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OTHER CERTIFICATIONS, TRAINING AND SECURITY CLEARANCES

- Asbestos & Demolition Contractor (C-19, C-24) **HI LIC #21212**
- Certified Hazardous Materials First Responder, FEMA and Arizona Division of Emergency Services.
- OSHA Hazmat Worker and Supervisor
- Accredited Asbestos Building Inspector, Asbestos Contractor/Supervisor, Project Monitor, and Asbestos Abatement Project Designer.
- Accredited Lead Inspector and Lead Contractor Supervisor
- Continuing Education in Hazardous Materials Management, Environmental Studies and Environmental Regulations: 628 Classroom Hours since 1987 - Arizona State University, Tempe, AZ, Pima Community College, Tucson, AZ., & The Environmental Training Center Tucson, AZ.
- Security Clearance: Department of Defense, **TOP SECRET** (1980)
- Licensed Private Pilot - 1400 Hours, Single Engine, Land

Maui (Main) Office: 1498 Lower Main Street, Suite C, Wailuku, Maui, Hawaii 96793 ● (808) 249-2777 Phone (808) 249-2778 Fax
Oahu Office: Hanua Industrial Complex, 91-110 Hanua Street, Unit 317, Kapolei, Oahu, Hawaii 96707
(808) 682-1611 Phone ● (808) 682-1616 Fax ● Inter-Island: (800) 572-1165 ● www.vuichenvironmental.com

Appendix D:

Acronyms and Abbreviations

Abbreviation	Definition
AST	Aboveground Storage Tank
AHERA	(Federal) Asbestos Hazard Emergency Response Act
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BLM	Bureau of Land Management
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAA	Clean Air Act: Regulates Air Quality
CAMU	Corrective Action management Unit
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act: Federal Superfund for Cleanup of Environmental Contamination (1980, 1986)
CERCLIS	CERCLA Information System (data base)
CESQG	Conditionally Exempt SQG: Hazardous Waste Generator less than 100 kg/mo.
C.F.R.	Code of Federal Regulations: National Standard Regulations
COLIWASA	Composite Liquid Waste Sampler
CRC	Chlorofluorocarbon
CMU	Concrete Masonry Unit
CWA	Clean Water Act: Regulates Water Quality (1972, 1987)
CZMA	Coastal Zone Management Act
DLNR	Department of Land and Natural Resources
DOT	Department of Transportation: Administers hazardous Waste Containers-Marking-Labeling-Placarding and Transportation Procedures.
DOH	Department Of Health (State Of Hawaii)
DRASTIC	EPA Standardized System for Evaluating Groundwater Pollution Potential Using Hydrogeologic Settings.
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency: Administers CERCLA, RCRA and SARA
FID	Flame Ionization Detector
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act: Regulates Pesticides (1972, 1988)
FSP	Field Sampling Plan
FWPCA	Federal Water Pollution Control Act
HAP	Hazardous Air Pollutant
HCS	(OSHA) Hazard Communication Standard
HSWA	(Federal) Hazardous and Solid Waste Amendments of 1984
LEL	Lower Explosive Limit
LQG	Large Quantity Generators; Hazardous Waste Generator in Excess of 100 kg/mo.
LUST	Leaking Underground Storage Tank.
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MSDS	Material Safety Data Sheets: Hazard Information Required for Chemical Substances by OSHA
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants (Under CAA Regulations)
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operating and Maintenance
OCS	Outer Continental Shelf
OSHA	Occupational Safety and Health Act: Established Hazard Communication Program and Employee Right-to-Know Law (1970)
OVA	Organic Vapor Analyzer
PCB	Polychlorinated Biphenyls: Toxic Substance Used in Electric-Device Cooling.
PCi/l	Picocuries Per Liter
PEL	Permissible Airborne Exposure Level

PID	Photoionization Detector
POTW	Publicly Owned Treatment Works
ppb	parts per billion
ppm	parts per million
PWP	Project Work Plan
PRPs	Potentially Responsible Parties
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RBCA	Risk Based Corrective Action and Decision-Making at Sites with Contaminated Soil and Groundwater. (Hawaii DOH)
RCRA	Resource Conservation and Recovery Act: Federal Hazardous Waste Management Law. Regulates Waste Generation, Transportation, Treatment, Storage or Disposal Sites (1976, 1984)
RQ	Reportable Quantity
RUST	Registry of Underground Storage Tanks
SAP	Sampling & Analysis Plan
SARA	Superfund Amendments and Reauthorization Act: Amends CERCLA and Includes Community Right to Know Law. Requires facilities report their chemical inventories and emissions (1986).
SDWA	Safe Drinking Water Act: Establishes maximum contaminant levels for drinking water (1974, 1986).
SHSP	Site Health & Safety Plan
SIC	Standard Industrial Classification
SIP	State implementation plan
SPCC	Spill Prevention Control and Countermeasure
SQG	Small Quantity Generator: Hazardous Waste Generator between 100-1000 kg/mo.
TCLP	Toxicity Characteristic Leaching Procedure: A toxicity test for certain substances declared hazardous by the EPA.
TMK	(Hawaii) Tax Map Key
TPH	Total Petroleum Hydrocarbons
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act: Regulates PCBs in electrical devices and chromium in evaporative cooling towers, asbestos in schools. (1976)
TSD	Treatment, Storage, and Disposal
UEL	Upper Explosive Limit
UIC	Underground Injection Control
USGS	United States Geological Survey
UST	Underground Storage Tank
VOA	Volatile Organic Analyses
VOC	Volatile Organic Compound: EPA listed toxic or carcinogenic organic substances.
Minimal, Minor or Not Significant	1) An unlikely or remote event, i.e., possible, but not anticipated under current conditions and observed features. 2) Insignificant when compared to regulatory acceptance levels, guideline action levels or when compared to background and/or baseline conditions of the local environment. 3) Any potential effect or impact attributed to the subject factor may be considered as the least likely source among a number of potentially responsible factors. 4) Any potential effect may not be measurable or detected by current technology. 5) Education, experience, and background of the investigator were utilized to conclude the situation or condition as trifle.

THE HALLSTROM GROUP INC.

REAL ESTATE CONSULTANTS & APPRAISERS

November 12, 2003

Mr. Don S. Fujimoto
Vice President
Dowling Company, Inc.
2005 Main Street
Wailuku, Maui, Hawaii 96793

Economic Impact Analysis and Public Costs/Benefits Assessment of the Proposed Kualono Subdivision to be Located at Pukalani, Maui, Hawaii

Dear Mr. Fujimoto:

At your request, we have completed a defined-scope assignment quantifying the effects on the Maui economy and state and county governments which would be associated with the development and use of the proposed 49 lot Kualono subdivision. The residential project, featuring one-half acre house lots, will be located on 28.7 acres at the "Five Trees" intersection of Haleakala and Kula Highways in Pukalani, Maui, Hawaii.

The development will offer moderate and above home building opportunities within the expanding Upcountry community. Lot sizes are planned to range from 18,000 to 25,000 square feet with probable selling prices of up to $350,000. The primary purchasers are expected to be relocating regional residents and the finished homes to have values upwards of $500,000. The lots would be sold in fee simple to individual purchasers, who would then construct custom homes, with the large majority of the neighborhood population being comprised of full-time residences.

[illegible]

The subdivision is intended to help service the strong existing and forecast demand for additional residential units in Upcountry (and throughout Maui) being spurred by local population growth, new household creation, and a surging real estate market. The site is proximate to in-place and proposed residential and supporting development, and is within a natural expansion area for Pukalani.

The focus of our study was two fold:

1. Economic Impact Analysis -- Estimating the effects on the Maui economy which will result from the undertaking of the subject development, including capital investment, employment during construction and home use, wages paid, business profits, population and school age demographics, owner/guest incomes and expenditures, and other impacts that will accrue to the island.

2. Public Costs/Benefits Analysis -- Projecting the effects on the public purse arising from the subject project in regards to primary tax revenues which will be received by the state and counties versus the implied and actual costs of providing governmental services to the subdivision and its residents.

In completing our study we have viewed the subject property and its environs; interviewed contractors and reviewed data from similar developments throughout the neighbor islands; researched State of Hawaii and Maui County employment, wage, budgetary and other public statistical sources; and, constructed computer models depicting the commencement, construction, sales and use of the project.

We have not completed a market study forecasting the specific demand/supply, pricing and absorption levels for the Kualono subdivision, but have relied upon market conclusions provided by John Child & Company, and projections made by the development team. These estimates appear generally reasonable based on our experience in the Upcountry residential

sectors, although the finished home prices initially estimated may be slightly conservative given current market strengths. We note that moderate changes in the assumptions would not have a significant impact on our stabilized conclusions.

All figures are expressed in mid-year 2003 U. S. dollars and are not inflated over time. Thus, whether the lot sales and home build-out takes two or six years, the total and annualized impact estimates remain valid. This also results in an inherent understatement of economic and governmental benefits, as the combined effects of wages, spending and tax revenues have historically (on average) escalated faster than the costs of government.

PRIMARY STUDY CONCLUSIONS

Based on our analysis of the proposed subject development and utilization of a ten-year construction, sales and home use model, we have reached the following focal conclusions regarding the economic impact and public costs/benefits associated with the undertaking:

1. The construction of the Kualono subdivision (infrastructure and finished homes) and their on-going use will bring some $21.3 million in direct real property capital investment and create some 233 "worker years" of employment on Maui, generating $9.7 million in total wages, over the initial ten-year building and use period of the project. Profits to local contractors and suppliers resulting from the development are estimated to be $3.0 million. The maintenance, landscaping and upgrading of the homes will create about seven permanent jobs in the regional economy with annual wages of $172,400.

2. The average de facto population of the community at full-absorption is forecast at 206 persons, of which 185 will be full-time residents, 16 will be part-time residents, and the rest being guests. There will be an estimated 46 school age children, of which 31 are likely to attend public institutions. The stabilized discretionary expenditures of

the neighborhood population are estimated at $3.9 million annually, and the household income of full-time residents at $6.2 million per year.

3. The total base economic impact on Maui from the subject project for the first ten years of home construction and residential use is projected at $41.2 million, with a stabilized base impact of $4.6 million per year thereafter. The total overall economic impact during the first decade will be in excess of $80 million and some $9.2 million annually over the long-term.

4. The State of Hawaii will receive $5.3 million in primary tax revenues from the project during the 10-year development and operational model used in our analysis, with an additional $566,000 annually in receipts thereafter. The county of Maui will gain some $1.7 million in taxes during the modeling decade, and $220,524 per year following.

5. In no year of the projection or stabilized periods does Maui County suffer a revenue shortfall (costs exceeding receipts) due to the Kualono subdivision, whether analyzed on a per capita or actual cost basis. The stabilized net annual "benefit" flowing to the county from the development could exceed $100,000. Overall, we would expect the state to show minor net revenue gains from Kualono, with "actual" cost based benefits reaching as high as $300,000 on a stabilized basis.

ECONOMIC IMPACT OF THE PROPOSED DEVELOPMENT

The development of the Kualono subdivision will generate significant efforts and expenditures that will favorably impact the Maui economy on both a direct and indirect basis, increasing the level of capital investment, capital growth and capital flow in the region. The project will pump millions of dollars into Upcountry and central Maui, expanding the economy, widening the tax base and creating stable long-term employment opportunities.

Further, it will help address the acute need for housing opportunities among Upcountry residents. Natural household formation is quickly outpacing unit development throughout Maui, and particularly in the study area, due to a lack of sufficient new supply. The shortfall is exacerbated by non-resident purchasers and a strong real estate market.

From a direct perspective, the proposed 49-lot residential project will create numerous construction, equipment operator and specialty trade jobs on- and off-site during the planning and emplacement of the infrastructure, and building of the homes. After completion, over an estimated five-year development period, there will be a limited number of continuing employment positions created by the use of the homes, including landscape, service, maintenance, and renovation needs.

Numerous local businesses will enjoy meaningful profit opportunities arising for contracting companies constructing the improvements, and for local businesses which would supply a substantial portion of the materials needed in the building efforts.

The general island economy also will benefit from the subject development, as construction and maintenance employees and neighborhood residents spend large amounts of wages and household incomes in Maui shops, restaurants, and service establishments, and in purchasing goods and services.

Indirectly, as these wages, profits, and expenditures move through the regional economy, they will have a ripple, or "multiplier," effect--increasing the amount of capital flowing to the entire community as a result of the subject.

Construction and maintenance/supply workers earning wages from Kualono development and uses will spend the majority of their income on living and entertainment expenses while supporting and patronizing other island businesses, as will the moderate to upper income residents of the subdivision. Much of this spending would then be re-directed by these

businesses to other island industries, with significant portions of these secondary profits in turn being put back through the region's economic and tax structure.

These substantial direct and indirect economic impacts associated with the proposed subject project, as quantified in the following sections, are all the result of the capital investment and entrepreneurship necessary to convert underutilized, non-economic agricultural lands from feral fields into a needed, established residential neighborhood.

Capital Investment and Construction Costs

The subject development will bring an estimated $21.3 million in direct construction capital into Maui over the five-year model build-out period assumed for the project. Following entitlement approvals, final engineering/survey and infrastructure emplacement (on- and off-site) will require an estimated 18 months, with the initial home construction commencing immediately thereafter; the first houses being completed by the end of year 2. Full build-out will take an additional three years, being finished by the end of the fifth year.

A breakdown of the basic expense items, their respective costs and expenditure over time is summarized on Table 1. Also shown are anticipated contractor and supplier profits flowing to local businesses as a result of the project. Site work costs were taken from estimates provided by the development team, as cited on the table. The average home construction cost was estimated at $360,000, based on a 2,200-square-foot home (living area) at a cost of $150 per square foot, plus $30,000 for lot improvements and landscaping. This excludes construction loan financing and other indirect costs.

Infrastructure site work costs (on- and off-site) were estimated at $3.65 million for years 1 and 2. Home construction costs were estimated at a total of $17.46 million in current dollars.

Not included are some "soft/indirect" costs including engineering/architectural, overhead/administration, marketing, and mobilization. These items could total an additional 10-plus percent to the project expenditures.

Kualono direct costs will infuse an anticipated $5.4 million annually into the Maui building industry on average over the build-out period. This is the equivalent of about a two percent boost over recent yearly islandwide construction levels. Indirect expenditures could reach an additional half-million dollars.

Employment Opportunities Created

Based on indicators provided by the construction of comparable sized projects and Hawaii industry averages, we have estimated the demand for on- and off-site, full-time equivalent employment positions associated with laying of initial infrastructure systems, building of the finished homes, and in providing continuing services to the occupied residences.

The employment opportunities created by the construction and use of the subject subdivision will not all be "new" jobs but will be enhanced opportunities for resident construction trade workers, youths reaching employment age, and existing local businesses. The custom nature of the home construction insures the employment positions will be spread among a variety of small contractors and local suppliers, providing proximate work opportunities for Upcountry tradesmen.

It is assumed the off-site/indirect work created will be steered towards existing Maui supply, equipment providers, and other service companies, which despite the upward movement in the county economy over the past several years remain in a recovering period following the massive development upcycle of the late 1980s.

TABLE 1

CONSTRUCTION COSTS AND CONTRACTOR AND SUPPLIER PROFIT ESTIMATES
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

Development Year	1	2	3	4	5	Totals
Construction Costs						
Off-Site Requirements (1)	$250,000					$250,000
Infrastructure/Sitework (1)	$2,267,800	$1,132,200				$3,400,000
Home Construction (2)		$3,600,000	$4,680,000	$4,680,000	$4,680,000	$17,640,000
TOTAL CONSTRUCTION COSTS	$2,517,800	$4,732,200	$4,680,000	$4,680,000	$4,680,000	$21,290,000
CONTRACTOR'S PROFIT	$276,780	$473,220	$468,000	$468,000	$468,000	$2,154,000
SUPPLIER'S PROFIT	$95,712	$189,288	$187,200	$187,200	$187,200	$846,600

(1) Provided by Dowling Company, Inc., October 28, 2003, based on "Cost Analysis for Pukalani Lands", January 30, 2003. Excludes fees, charges and assessments. Subdivision infrastructure period estimated at 18 months, commencing at beginning of model and completing be middle of Year 2.

(2) Assuming average home construction budget of $360,000 based on 2,200 square foot house at $150/SF cost plus $30,000 site work and landscaping. First homes begin construction at middle of Year 2 and are finished by year-end.

Source: Dowling Company, Inc., and The Hallstrom Group, Inc.

Our employment estimates on are based on full-time equivalent "worker/years," although one worker/year (or circa 2,000 working hours) may be comprised of many employees involved in specialized tasks of a much shorter duration.

Estimates are based on a 10-year modeling period of project construction (five years) followed by neighborhood stabilization (five years). The associated number of employment opportunities created are displayed on the top of Table 2. Included in our projections on the table are the full-time equivalent (FTE) off-site and support employment opportunities which will be provided to Maui businesses as a result of the project.

The projections are founded on examples provided by various residential developments undertaken on the neighbor islands over the past decade, and via formulae expressing relationships between total worker wages/benefits and construction/operating tasks and costs.

We have not included the overhead/administration and sales/marketing positions created by the lot construction and disposal program in years two and three of the development model. Project administration will require a staff of about two persons for about a two-year period. The sales program will generate numerous part-time agent opportunities, with perhaps one full-time sales office employee. We estimate some $1 million in commissions and wages will be paid to the marketing staff. This would equate to 14 to 20 worker years of average wages.

Infrastructure and home construction employment forecasts are taken from discussions with developers, review of project records and ratios of direct costs to job creation (assuming an average wage of $57,700/year plus benefits equal to 25 percent of wages). Our analysis assumes one worker/year per $210,000 in contract spending for infrastructure positions (which are heavily oriented towards equipment and materials), and one worker/year per $150,000 in contracts for home construction.

TABLE 2

EMPLOYMENT, JOB COUNT AND WAGE ESTIMATES
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Waiakoa Makai Residential Project
Prepared for Waiakoa Makai Partners
In Constant Year 2003 Dollars

Development Year	1	2	3	4	5	6	7	8	9	10	Total 1 Through 10	Stabilized
Worker Employment (1)												
Infrastructure/Sitework (2)	13	4									17	
Home Construction (3)		54	31	31	31						146	
Home Operation/Maintenance (4)			5	7	14	5	5	5	5	5	51	5
Off-Site Employment (5)	3	12	13	13	14	7	7	7	7	7	82	7
TOTAL EMPLOYMENT CREATED	16	70	49	51	59	12	12	12	12	12	296	12
Worker Wages												
Infrastructure/Sitework (6)		$333,959	$0	$0	$0						$333,959	
Home Construction (6)		$1,384,800	$1,800,240	$1,800,240	$1,800,240						$6,785,520	
Home Operation/Maintenance (7)			$254,800	$353,500	$646,600	$169,200	$169,200	$169,200	$169,200	$169,200	$733,900	$169,200
Off-Site Employees (8)	$138,941	$333,959	$360,240	$373,200	$389,760	$54,600	$54,600	$54,600	$54,600	$54,600	$1,863,467	$54,600
TOTAL ANNUAL WAGES PAID	$138,941	$1,852,383	$2,184,880	$2,226,940	$2,274,600	$223,800	$223,800	$223,800	$223,800	$223,800	$9,716,844	$223,800

(1) All job counts expressed as "full-time" equivalent positions.
(2) Estimated at one worker/year per $210,000 in contract spending.
(3) Estimated at one worker/year per $150,000 in contract spending, or 2.4 workers/year per home.
(4) Estimated at one worker/year for each 14 homes.
(5) Includes all off-site jobs created by work efforts at the project, direct and indirect. Estimated at 0.1 off-site positions per on-site position.
(6) Average annual wage of $57,700/worker/year.
(7) Average annual wage of $24,000/worker/year.
(8) Average annual wage of $28,800/worker/year.

Source: Various and The Hallstrom Group, Inc.

Home operations are forecast to require the equivalent of five full-time workers upon build-out and stabilized use levels; reached in the sixth year of the project lifespan. This is equal to one maintenance/landscape/service worker year for each ten houses.

Off-site employees were estimated at 40 percent of on-site workers, and are comprised of three groups:

- Numerous off-site building industry positions will also be enhanced by the Kualono subdivision development, including such jobs as administration, office help, material providers, equipment maintenance and specialty tasks. Analysis of Maui County labor trends from 1980 through 2002 demonstrate a linkage equal to about 20 to 30 percent between the creation of on-site construction positions and direct off-site employment.

- Off-site support businesses, including contractor/retail/counter sales, fuel providers, shipping, storage and professional services will also benefit. A conservative job creation relationship of five to ten percent relative to on-site positions was used (or, one off-site support worker/year for each ten to 20 on-site worker/years).

- Extrapolation of state Department of Business Economic Development and Tourism (DBEDT) data, along with indicators provided by other state agencies and First Hawaiian Bank studies, demonstrate that each Hawaii worker creates demand for services (and related employment) during and directly attributable to the work day at up to a ten percent ratio. These positions include food businesses, providers of tools and trade goods, payroll/financial and insurance businesses, medical requirements and other secondary indirect/off-site employment.

During the 10-year building and home use modeling period of the project, the number of worker/years created on- and off-site by the development varies from 7 to 49 positions

annually, totaling 233 worker/years over the entire projection timeframe. Of this total, 135 worker/years (an annual average of 27 positions during the five-year construction period) are direct construction-oriented, 31 total (or five per operating year) are on-going home use servicing positions; and 67 are off-site worker requirements.

On a stabilized basis after the modeling timeframe, the project will generate some seven permanent full-time equivalent and/or enhanced employment opportunities--five directly related to on-site activities, and two indirect positions throughout the island.

The average annual on-site job count during the 10-year subject study period of 23.3 positions represents a nominal 0.04 percent increase from the total jobs presently available in Maui County (23.3 additional jobs per year to the average mid-year 2003 job count of 62,700). This number can be readily absorbed by the currently available employment pool. The job creation impact is relatively small and will not create a strain on current employee resources on Maui.

However, any supplementation of the Maui job pool (particularly in the construction trades-available entry sector) is desirable, especially in the Upcountry region. This is because according to the 2000 U.S. census, some 25.5 percent of Maui County's population is under 18 years of age. Therefore, even if no new workers move to the island, the Maui economy will have to generate sufficient jobs to absorb some 34,000 new workers by the year 2020, an average of 1,889 per year. Or, Maui children will have to be exported in search of work.

Wage Income Generated

In accordance with data compiled by the state Department of Labor and Industry Relations, we have estimated the personal income (in the form of wages) which will flow to Maui workers as a result of the Kualono subdivision.

The average wage of a full-time infrastructure construction worker is estimated at $57,700 per year based on DLNR data for 2003. For home construction workers, the average annual pay will also be about $57,700. House maintenance, servicing, and landscaping personnel are forecast to be paid an average of $24,000 per year on average ($12.00 per hour). Off-site building and support industry jobs were estimated to receive an average pay of $28,000 annually.

Overall project average wages are equal to $41,788 per worker/year created during the model period, and $24,640 on a stabilized basis.

Application of these wage estimates to the employment forecasts generates personal income (wage) projections directly resulting from subject development, which were shown at the bottom of Table 2. The wage figures are all presented in constant 2003 dollars, and will undoubtedly escalate over time in accordance with inflationary pressures.

In the first year of development, the "Total Annual Wages Generated" by the subject development effort would be $129,843, increasing to a high of $2,276,400, as the number of construction and home service workers peak in year 5. Following completion of all construction, the on-going maintenance, off-site/indirect and other employment would result in average annual wages of $172,480 thereafter.

Over the first 10 years of the development and use period, on- and off-site, direct and indirect worker wages would total $9.7 million.

Development Costs as Profit Income

While the significant majority of the materials needed to build the subject homes must be imported to Maui, a portion of the construction costs spent in the development will flow to local businesses in the form of contractor profits and supplier profits.

Typically, within the industry net contractor profit margins are expected to be at 8 to 20 percent of total construction costs. We have used a conservative ten percent figure. Supplier profits were extrapolated at four percent of total costs; generally supplies/materials equate to 50 to 60 percent of total cost, with a profit margin for the supplier of six to eight percent.

Application of these estimates to the forecast development parameters of the subject project was shown on Table 1.

The total Contractor's Profit ranges from $276,780 to $468,000 per year, with a cumulative profit of $2.2 million over the five-year construction period. The total annual Supplier's Profit ranges from a low of $95,712 to a high of $187,200, and equates to $846,600 over the development time-frame.

Population, Income and Expenditures

The 49 lots will be marketed as "build-ready", fee simple residential home sites to individual purchasers; the large majority of whom will be relocating, full-time Maui residents. We estimate that 90 percent of the buyers will be permanent residents with the remaining 10 percent being second home (part-time/vacation) buyers. This mix is typical for newer, moderate to upscale residential developments on the island. Together these groups and their guests will contribute to the Maui economy during the use of the subject homes in the form of discretionary expenditures and (for full-time residents) household income levels.

Table 3 displays our population, discretionary expenditures, and household income estimates for the subject project.

The Kualono homes will be larger than the regional average residential unit size and are anticipated to house larger than average household sizes (in numbers of members).

For the 90 percent full-time resident families, the average household size is forecast at 4.2 persons, about ten percent above regional averages, so that by project build-out there will be 185 permanent residents. For the 10 percent of the Kualono houses used as second home/vacation homes, the average party size is estimated at 3.3 persons, with the house occupied about 20 percent of the time. By completion of development, this will create a daily average of 16 second-home users and their guests in the community.

Additionally, the full-time households will have occasional guests, estimated at one guest per ten finished homes on average. The total "guest" population at built-out will be five persons.

The total average daily de facto resident population of the Kualono subdivision upon home build-out will be 206 persons. Of the full-time residents, it is estimated approximately 46 (or 25 percent) will be in the juvenile school age group (three through 19). Of these, it would be expected that 31 would be enrolled in public educational institutions based on State of Hawaii Department of Education figures.

The population of the project will place significant discretionary expenditure dollars into the Maui economy. In light of the cost of the finished homes, the residents and other users will be in the upper-middle to upper household income brackets with substantial available income for such spending.

We estimate that full-time resident households will spend about 50 percent of their total income on local discretionary items based on the most recent data. The daily per capita spending by second-home users and guests into the Maui economy will be on average $100, which is moderately below what the typical Maui visitor spends daily on non-lodging purchases. This pays for all food, entertainment, household goods, locally purchased fixtures and furnishings, utilities, clothing and other daily items.

TABLE 3

DE FACTO POPULATION, DISCRETIONARY EXPENDITURES AND RESIDENT HOUSEHOLD INCOMES
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

Development Year	3	4	5	6	7	8	9	Stabilized 10
Cumulative Residential Development								
Home Construction	10	11	13	13	0	0	0	0
Total Finished Homes	10	21	34	49	49	49	49	49
Average Daily Resident/Guest Population								
Full-Time Residents (1)	38	87	136	185	185	185	185	185
Part-Time Residents (2)	3	8	12	16	16	16	16	16
Guests (3)	1	2	4	5	5	5	5	5
Total De Facto Population	42	97	152	206	206	206	206	206
Total Full-Time Resident Population	38	87	136	185	185	185	185	185
Estimated School Age Children (3)	9	22	34	46	46	46	46	46
Estimated Public School Children (4)	6	14	22	31	31	31	31	31
RESIDENT DISCRETIONARY (TAXABLE) EXPENDITURES (4)	$787,625	$1,811,538	$2,835,450	$3,859,363	$3,859,363	$3,859,363	$3,859,363	$3,859,363
Total Years 1 -10	$14,731,425							
FULL-TIME RESIDENT INCOME (5)	$1,261,350	$2,901,105	$4,540,860	$6,180,615	$6,180,615	$6,180,615	$6,180,615	$6,180,615
Total Years 1 -10	$39,666,390							

(1) 90 percent of homes estimated to be used as full-time residences, with average household size of 4.2 persons, or circa 10% above regional averages.
(2) 10 percent of homes estimated to be used as part-time (second home) residences, occupied 20% of time with average party size of 3.3 persons.
(3) Estimated average guest population (not included in full-time or part-time categories) of 1 guest per 10 finished homes.
(4) Persons between the ages of three and 19 enrolled in public and private schools, estimated at 25% of total full-time resident population.
(5) Persons enrolled in public schools, estimated at 16.5 percent of the full-time resident population.
(4) Estimated at 50% of full-time resident household income, and at $100 per capita daily for part-time residents and guest populations.
(5) Estimated at $140,150 annually per full-time resident household; as would be minimally necessary to support conventional mortgage.

Source: Various, and The Hallstrom Group, Inc.

By build-out, the total resident (full and part-time) and discretionary expenditures made by subject project users in the local market will be at $3.9 million annually on a stabilized basis, in 2003 dollars. During the 10-year development and operation model period, the total sum of these expenditures will be $24.7 million.

The total full-time resident income amount was quantified for use in estimating discretionary expenditures and state income taxes to be paid. In order to conventionally qualify for a home at the prices likely to be sought for the finished subject houses, a household income of $140,150 per year is minimally necessary. We recognize this amount could range widely upwards, and consider this projection conservative.

On a stabilized basis after build-out, the annual full-time taxable resident income at the subject would be some $6.2 million, totaling $39.6 million during the ten-year model time frame.

Summary of Direct, Local Economic Impacts

The various direct, local economic impacts which will flow to the subject region as a result of the subject development are summarized on Table 4.

The wages, profits and expenditures figures are taken from previously presented tables. Home maintenance, repairs and upgrades were estimated at $1,000 per finished home per month.

The annual Total Base Economic Impact increases from $502,335 in year 1 of the development effort to a high of $6.2 million in year 5 (in 2003 dollars). Over the decade long development and home use modeling period, the total is $41.2 million. The estimated stabilized annual base impact thereafter is $4.6 million.

TABLE 4

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kaloko Subdivision
Palaka'ai, North Kona
In Constant Year 2003 Dollars

Development Year	1	2	3	4	5	6	7	8	9	10	Total Years 1 Through 10	Stabilized
ANNUAL WAGES GENERATED	$129,843	$1,052,383	$1,184,880	$2,250,640	$2,256,400	$172,480	$172,480	$172,480	$172,480	$172,480	$9,786,546	$172,480
CONTRACTOR'S PROFIT	$276,780	$471,250	$446,600	$468,900	$468,900						$2,154,800	
SUPPLIER'S PROFIT	$93,712	$169,188	$187,206	$187,206	$187,206						$846,600	
HOME MAINTENANCE, REPAIRS AND UPGRADES (1)			$120,000	$276,000	$432,000	$588,000	$588,000	$588,000	$588,000	$588,000	$3,768,000	$588,000
DISCRETIONARY EXPENDITURES			$797,625	$1,811,538	$2,855,569	$3,859,363	$3,859,363	$3,859,363	$3,859,363	$3,859,363	$24,711,435	$3,859,363
TOTAL BASE ECONOMIC IMPACT	$502,335	$2,714,991	$2,747,705	$4,973,378	$6,199,069	$4,619,843	$4,619,843	$4,619,843	$4,619,843	$4,619,843	$41,216,571	$4,619,843
Multiplier Effect Ratio	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TOTAL OVERALL IMPACT	$1,004,669	$5,429,983	$5,495,410	$9,946,755	$12,398,100	$9,239,685	$9,239,685	$9,239,685	$9,239,685	$9,239,685	$82,473,142	$9,239,685

(1) Estimated at $1,000 per home per month.

Source: Various, and The Hallstrom Group, Inc.

These dollars will be spent, then re-spent, on goods and services on the island, diminishing in impact on the local economy with each turnover as a portion flows off Maui for goods, services and financing commitments. First Hawaiian Bank studies have concluded the appropriate economic multiplier rates in Hawaii are from 1.2 to 3.5 times (or 20 to 250 percent) of the base impact amount. Mainland studies (by the Urban Institute and others) tend toward the upper end of this range, and reach multipliers as high as 4.0.

Due to the need to import more than 85-plus percent of supplies/goods used on Maui, the multiplier impact for the island is not as great as for mainland locales, particularly for construction-based expenditures. We have therefore tested multiplier rates at the mid-point of the market spectrum, ranging from 1.5 to 3.5 times.

On a conservative basis, using a relatively low-end multiplier effect ratio of 2.0, the total overall direct impact on the Maui island economy resulting from the Kualono subdivision would be $82.5 million over the 10-year projection period (in constant 2003 dollars). On a stabilized annual basis thereafter, the overall impact would be at $9.2 million.

PUBLIC COSTS/BENEFITS ASSESSMENT

The purpose of this analysis is to delineate the direct areas in which the proposed subject residential subdivision will potentially impact the sphere of public agency resources, and quantify (where possible) the costs of providing expanded services to the project, versus the economic benefits that accrue to the community through an increase in local and state tax payments.

For most developments, potential direct costs to governmental services and programs include:

- Police Protection
- Fire Protection
- Public Oversight Agencies
- Infrastructure Services
- Recreational Demands
- Educational Needs
- Infrastructure Costs
- Various Other Services and Financial Commitments

However, due to the small size of the project, with only 49 total homes, many of these costs will not be noticeably increased on the state or county levels as a direct result of the Kualono neighborhood. There will be some public safety and educational needs directly attributable to the subject development along with secondary recreational and support demands. But, the major off-site public infrastructure items (highway and primary water/sewer mains) are already in place; and the development will require no specific public subsidies, welfare services, bonding or capital improvements.

Direct tax benefits to the state and county coffers will primarily flow from the project and its operation over time from three major sources:

- Real Property Taxes
- Gross Excise Tax Receipts
- State Income Taxes

Some cost/benefit issues are considered as off-setting, or "a wash," as the cost of the services to the government is theoretically directly reimbursed in the form of user fees. Building permits and utility hook-up fees are two prime examples. Other such items include workers compensation premiums and benefits, utility operations and associated use billing rates, and

business oversight/registration verses licensing fees. These items are excluded from this study.

A concern of this analysis is the integration of the subject project into the overall state and Maui governmental services plan on both an actual and pro rata perspective.

From an actual public service cost perspective to Maui and state agencies, Kualono's 49 households will represent only a fraction of the county and state residential inventory and overall urban lands in use. Given the vast number of housing units, resorts, businesses, and agricultural lands on the island, it is difficult to assert that of themselves the subject population and guests will create the need for meaningful expansion of existing public services.

No new schools, parks, highways, recreational facilities, service agencies, hospitals, or other public enterprises will be required specifically because of this project. The impact on the total regional land base will be minimal. Public safety facilities in Makawao/Pukalani are proximate, generally have the personnel and equipment available to service residents and homes in the subdivision, and will expand in response to overall community growth over the next decade as the neighborhood is built.

However, the need for additional services is a cumulative effect, each project, each resident, tourist and, to a lesser degree, business adds a little bit to the community base until increased "need thresholds" are reached.

In regard to some services, the effective actual impact may not be apparent from a cost perspective, merely creating nominally greater demands which can be readily met through existing agencies and facilities without the need for additional workers or funds.

Our analysis of Maui County and state budgets indicate the actual effect of governmental services arising from the Kualono homes would not create the need to meaningfully expand county and state services in and of itself.

As an alternative to actual cost estimates, which are often disparate as they inherently cannot provide for unexpected and/or atypical items, it is most common to project public costs on a per capita allocation.

This approach is generally appropriate for residential developments, as public costs and services generally accrue to where a person lives (or in the case of a tourist, where they are lodging).

Government services are holistic in nature, providing a foundation throughout a community, regardless of actual, specific impact on any given land holding. A development may not generate a large need for parks or schools, but they are essential to the health of the island community and help create the desirable lifestyle climate which supports residential demand. Similarly, government administration, capital projects and public welfare items may have no direct relation to a particular project, but provide the economic underpinnings that enhances overall economic success.

In order to meaningfully quantify public costs that may be associated with the subject development, we have therefore looked at the issue from both perspectives, on an actual cost basis and on a per capita allocation basis.

Public Costs

Actual Costs

Maui County will directly incur several areas of measurable cost increases as a result of the Kualono subdivision, primarily in regards to emergency services. Based on analysis of response frequencies, time/cost data, and past discussions with affected agencies, we have made general allowances for these items as summarized below.

Police/Enforcement -- The Maui County police department anticipates making 193,486 total responses in 2003, resulting in a total budget requirement of $32,158,001. The average cost per response is projected at $166 and the cost per capita of de facto population (175,000 persons) is $183.76.

Application of this per capita estimate to the projected Kualono population (206 persons) results in a projected additional police program cost to the county of $37,855 per year in 2003 dollars.

This figure is supported by projections of subject-specific responses based on typical allowances made in the budgeting process. Using a base cost of $140 per hour for a responding officer (wages and benefits for responding/support/administrative personnel, overhead, capital costs, and amortized equipment), we estimate the annual additional police/enforcement cost to Maui County on a stabilized basis after project build-out will be about $39,760.

This is comprised of:

- One miscellaneous call per week at an average of two total officer hours each. (2 hrs. x $140/hr. x 1 x 52 = $14,560).

- One "minor" incident/traffic accident each month requiring on average five hours of officer time. (5 hrs. x $140 x 1 x 12 = $8,400).

- One "major" incident/traffic accident every other month requiring on average of 20 hours of officer time. (20 hrs. x $140 x 6 = $16,800).

This demand for $40,000 (rounded) of direct police support, or 284 hours of response time is the equivalent to 14.2 percent of one new officer position (2,000 total hours).

Fire Protection and Emergency Services -- Overall, Maui County fire control and emergency services expect some 4,285 responses in 2003, with a commensurate budget demand of $17,116,382. This equates to $3,994.49 per response or $97.81 per year for each person of countywide de facto population.

Application of this per capita figure to the subject population results in an additional cost to the county of $20,148 annually.

Again, these figures can be supported by estimating specific subject direct response needs. Our forecasts are based on a crew cost of $800/hour (four to five firemen, wages, benefits, overhead and amortized equipment). Using this method, we estimate that at build-out, the yearly additional costs to Maui County resulting from Kualono is $33,200 per year.

This is comprised of:

- One "minor" fire/rescue event every other month requiring one crew for a total of three hours (response and/or clean-up). (3 hrs. x $800/hr. x 6 = $14,400).

- One "major" fire/rescue event every year requiring two crews for a total of eight hours each. (2 crews x 8 hrs. x $800/hr. x 1 = $12,800).

- One emergency medical response each month, with an average cost per response of $500. The total cost to the county would be $6,000 per year on a stabilized basis after build-out. ($500/response x 1 per month x 12 = $6,000).

Parks and Recreation -- Maui County projects expenditures of $22,485,128 for this item in the coming year, or $128.49 per person in the de facto population. The subject residents cost would equate to $26,468 per year.

Road Maintenance -- An allowance of $20,000 per year was made for this item.

The total annual "actual" cost to the county on a stabilized basis at build out of the subject development is estimated at $117,000 (rounded). This cost would be reached on an escalating basis over time, beginning in year 3 as the first homes are finished and populated, and increasing through build-out.

Actual State of Hawaii costs would include highway frontage work and other minor oversight duties. An allowance of $20,000 per year was made for these items, increasing to the stabilized level as the neighborhood is completed.

Additionally, an estimated 31 resident children would enter the public school system. The cost per student in public schools statewide is presently at about $7,000 per year. We have used a stabilized allowance of $7,500 per potential student, or $232,500 in costs to the state each year for public education purposes.

The total direct state costs on an "actual" stabilized basis resulting from the Kualono would be about $252,000 annually.

Per Capita Costs

An alternative method for determining public costs is through per capita expenditures incurred by the State of Hawaii and Maui County in accordance with the de facto population area of the jurisdiction. This is founded on the principal that each individual on the island equitably benefits from all governmental costs, regardless of type or focus throughout the day, with each new member of the community (whether resident or visitor) creating a proportionate new cost burden in their daily home and working life.

As previously noted, this is the standard method for resort and residential application as a majority of public costs are viewed as accruing to the housing or lodging aspects of a persons lifestyle and land use. We have included it as a means of demonstrating the overall public fiscal impact potential of the proposed subject project even when viewed from this maximum potential cost perspective. We consider this approach as setting the absolute upper limit on all public costs (actual, indirect and inferred).

However, most public agencies now recognize that public costs are a component of each aspect of community life and the constituent underlying land uses, and not just limited to the home. Businesses and other use-types also contribute to government service demands.

It is the prevailing methodology to now allocate public costs among the population based on proportion of daily use. Generally about two-thirds are now attributed to the residential component of a persons life and one-third of governmental costs to business, commercial, industrial or other supporting development types. We have utilized this ratio in our analysis.

According to the Department of Budget and Finance database,[1] the state expects to spend a total of $7.48 billion on services, salaries, infrastructure, and financing in fiscal 2003. The

(1) "Executive Branch FY2003 Operating Appropriations by Department (All Funds)."

total de facto population in the state on an average daily basis at year-end 2002 was about 1,356,000 persons, including residents, tourists, and military personnel.

The per capita expenditure by the state will thus be about $5,516 for 2003, an increase of several percent from 2002. The proportionate amount attributable to the residential lodging component (67 percent) would be $3,696 per capita. From 1979 through 2002, state government expenditures increased at a rate of just over five percent annually compounded.

The stabilized average de facto population on-site at the subject at build-out will be 206 persons, a figure reached in year 6 of the development model. Employing the proportionate use allocated state cost per de facto "resident" of $3,696 per year, the total annual "costs" to the state purse at stabilization by the project using the per capita allowance method would be $761,376 in constant year 2003 dollars.

Analyzed on a similar basis, Maui County's budget for the local government in fiscal year 2003[2] is $268,885,834, which represents an escalation over time of more than four percent compounded annually since 1995.

The current de facto population in Maui County is some 175,000 persons. The resulting de facto per capita county expenditure for this year is therefore anticipated to be $1,536. Attributing two-thirds of this amount to the residential land uses of each persons lifestyle equates to an allocated per capita cost of $1,029 per year.

Application of this figure to the total on-site de facto population of the Kualono neighborhood build out would be about $211,974 annually in costs to the county government on a stabilized basis (206 de facto residents x $1,029).

(2) "Revenue and Expenditure Summary - FY2003 County Funds."

Total Public Costs -- On a per capita allowance cost basis, the rounded state and county expenses associated with the subject development would range from $457,506 in year 4 of the project (the first year of finished home occupancy) to a stabilized maximum of $974,687 at build-out in year 6 and beyond in year 2003 dollars.

On an actual (or direct) cost basis, which we acknowledge may be a minimized accounting of the universe of expenditures, the total governmental costs at build-out to the state and county would be about $369,000 annually.

Public Fiscal Benefits

Real Property Taxes -- Property taxes paid by landowners in the subject project were calculated using the 2003 tax rates for both land and buildings, improved or unimproved.

The assessed values for the improvements were based upon the estimated construction cost of $360,000 per home (2,200 square feet at $150 per square foot, plus $30,000 site work), plus an allowance of 30 percent for indirect, financing, profits and other costs which would inure to the home building process. The total estimated assessed values of the finished homes (improvements only) upon completion is $22.9 million.

The assessed values for the land components were estimated at $5.74 million (or $200,000 per acre for 28.7 acres) for the site in its fully entitled undeveloped state during year 1 of our development model, increasing to final values following substantial completion of subdivision during year 2. The lots were forecast to have an average assessed value of $300,000 per home site.

It was assumed the land would be classified as residential and be taxed at the rate of $5.86 annually per $1,000 of assessed value. The improvements are also assumed to have a residential tax rate of $5.86 per $1,000 of assessment.

All real property value of the subject holding is assumed to be vested in the completed "salable" components, with no assessment placed against open spaces, roads, or other systems.

The total real property tax to be paid to Maui County in 2003 dollars ranges from $33,636 in year 1 of development, to a stabilized level of $220,524 at build-out in year 6 and beyond. The aggregate real property taxes paid over the 10-year study time-frame will be $1.67 million.

State Income Tax -- The state will receive income taxes from three sources:

- the wages of the workers associated with the construction and maintenance of the Kualono subdivision homes;
- the household incomes of full-time residents in the community; and
- the corporate profits from contractors and suppliers serving the construction phase of the development, and as generated through home maintenance/repairs.

According to DBEDT data, individual State of Hawaii income tax liability as a ratio to gross income has ranged from 5.5 to 5.9 percent during the past decade, with the more current figures tending toward the mid to upper-end of the range. We have employed an effective tax rate of 5.80 percent of gross income for individual workers and full-time residents.

The effective tax rate for the corporate income is estimated at 2.00 percent of gross operating profits, based on available DBEDT statistics.

The total income tax revenues to be received by the state are projected at $14,981 in the first year of construction increasing to a maximum level at year 5 of $414,867 annually in constant 2003 dollars.

On a stabilized basis, after build-out, the on- and off-site maintenance workers and full-time project residents would pay an annual state income tax of $377,139. Over the 10-year modeling period, the cumulative income taxes paid are estimated at $2,977,394.

We have not included any corporate income or other taxes which will be paid by the developers as a result of their profits from undertaking the subject development, or from the secondary jobs created by the discretionary spending of workers and businesses. Such items have the potential to be substantial contributions to the state coffers.

State Gross Excise Tax -- This 4.166 percent of expenditures tax was applied against:

- the total estimated construction contract costs;
- the total estimated home maintenance and repair costs; and
- the discretionary expenditures of the de facto resident and worker populations of the subject.

The anticipated state excise tax receipts arising from the subject development grow from an estimated $118,011 in the first year of development to a peak of $378,508. Over the 10-year study period, the receipts total $2,287,455 million and stabilize at circa $188,870 per year.

We have not included any excise tax revenues associated with the direct, local "multiplier effect" expenditures on Maui.

Total Public Benefits (Revenues) -- In constant 2003 dollars, the aggregate annual tax revenues flowing from the subject development at full project build-out range from:

- $33,636 to $220,524 per year for Maui County, stabilizing over time at the higher figure, totaling $1.67 million over the 10-year development projection model;
- $132,992 to $793,375 annually for the State of Hawaii, stabilizing at $566,009 per year, and cumulatively at $5,364,849 over the 10-year forecast period; and
- $166,628 to $978,247 per year for total tax receipts (county and state), totaling $6.93 million for the initial 10 years of the Kualono community, and stabilizing at $786,532 per year.

Correlation

Our public cost/benefit assessment model is displayed on Table 5, depicting the correlation of public service costs (on both "actual" and "per capita allocation" bases) with the anticipated tax revenue benefits.

Table 6 summarizes our costs/benefits findings on both an actual cost and per capita allowance basis for the proposed Kualono subdivision.

Certification

The undersigned do hereby certify that, to the best of our knowledge and belief, the statements of fact contained in this report are true and correct. It is further certified that the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are our personal, impartial, and unbiased professional analyses, opinions, and conclusions. We further certify that we have no present or prospective interest

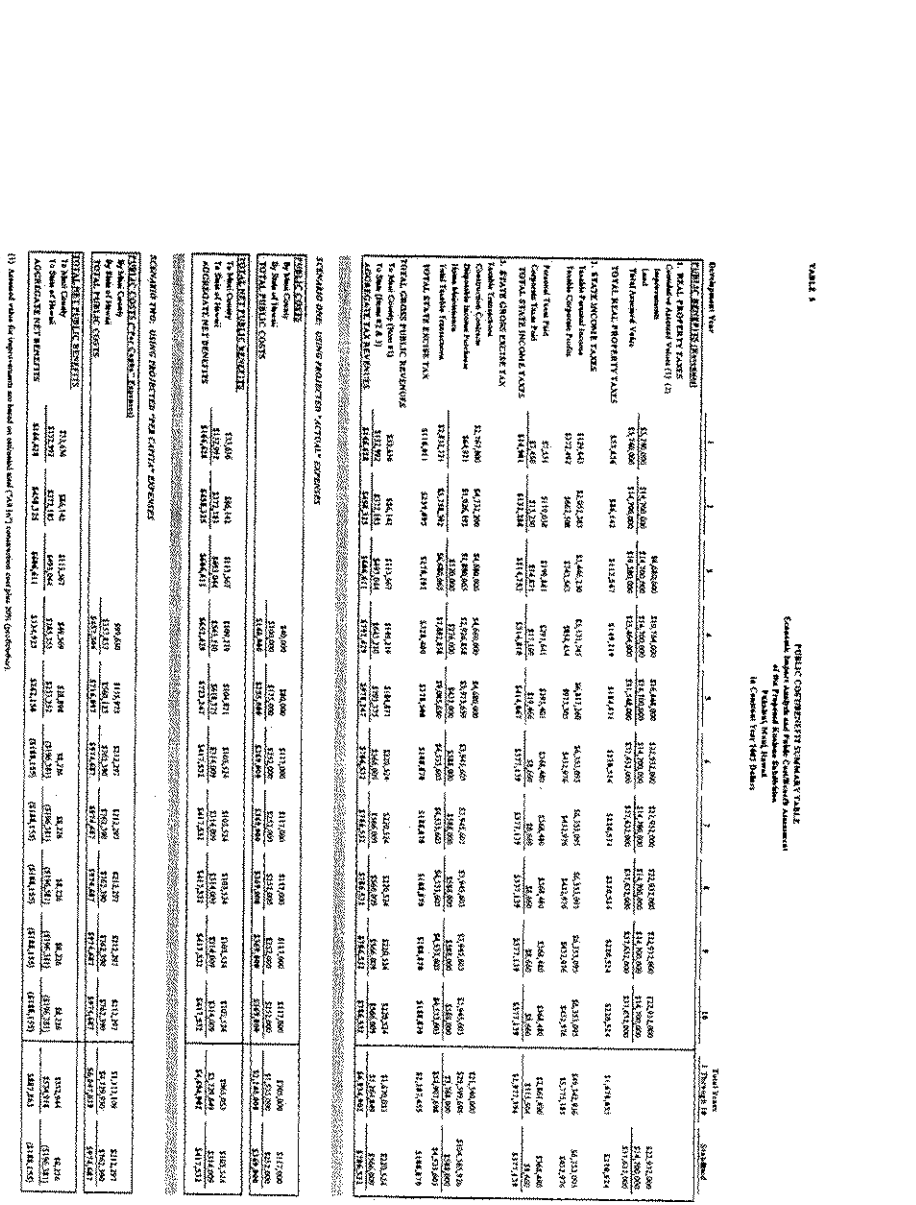


TABLE 5

PUBLIC COST/BENEFIT SUMMARY TABLE
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Project Build-Out Scenario
In Constant Year (2003) Dollars

Source: The Hallstrom Group, Inc.

in the property that is the subject of this report, and have no personal interest with respect to the parties involved. We have no bias with respect to the property that is the subject of this report or the parties involved with this assignment. Our engagement in this assignment was not contingent upon developing or reporting predetermined results. Our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal. The appraisal analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice. The use of this report is subject to the requirements of the Appraisal Institute relating to review by duly authorized representatives. The undersigned certify that they have made personal inspections of the property that is the subject of this report. No other persons provided significant real property appraisal assistance other than the undersigned.

The Appraisal Institute conducts programs of continuing education for their designated members. As of the date of this report, James E. Hallstrom, Jr. has completed the requirements of the continuing education program of the Appraisal Institute.

James E. Hallstrom, Jr., MAI, CRE
Hawaii State Certified
General Appraiser, CGA-178
Expiration Date December 31, 2003

Tom W. Holliday

TABLE 6

SUMMARY OF ANNUAL PRIMARY GOVERNMENTAL TAX RECEIPTS AND PUBLIC SERVICE COSTS
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

	State of Hawaii					
	Actual Cost Comparison			Per Capita Allocation Comparison		
On Stabilized Basis At Build-Out	Receipts	- Costs	= Net Benefits or (Costs)	Receipts	- Costs	= Net Benefits or (Costs)
Amount per Year	$566,009	($252,000)	$314,009	$566,009	($762,390)	($196,381)

	Maui County					
	Actual Cost Comparison			Per Capita Allocation Comparison		
On Stabilized Basis At Build-Out	Receipts	- Costs	= Net Benefits or (Costs)	Receipts	- Costs	= Net Benefits or (Costs)
Amount per Year	$220,524	($117,000)	$103,524	$220,524	($212,297)	$8,227

Source: The Hallstrom Group, Inc.

LIMITING CONDITIONS AND ASSUMPTIONS

The research, analysis, conclusions, and certification for valuation or market studies performed by The Hallstrom Group, Inc. are subject to and influenced by the following:

- The report expresses the opinion of the signers as of the date stated in the letter of transmittal, and in no way has been contingent upon the reporting of specified values or findings. It is based upon the then present condition of the national and local economy and the then purchasing power of the dollar.

- Legal descriptions used within the report are taken from official documents recorded with the State of Hawaii, Bureau of Conveyances, or have been furnished by the client, and are assumed to be correct. No survey is made for purposes of the report.

- Any sketches, maps, plot plans, and photographs included in the report are intended only to show spatial relationships and/or assist the reader in visualizing the property. They are not measured surveys or maps and we are not responsible for their accuracy or interpretive quality.

- It is assumed that the subject property is free and clear of any and all encumbrances other than those referred to herein, and no responsibility is assumed for matters of a legal nature. The report is not to be construed as rendering any opinion of title, which is assumed to be good and marketable. No title information or data regarding easements which might adversely affect the use, access, or development of the property, other than that referenced in the report, was found or provided. The property is analyzed as though under responsible ownership and competent management.

- Any architectural plans and/or specifications examined assume completion of the improvements in general conformance with those documents in a timely and workmanlike manner.

- Preparation for, attendance, or testimony at any court or administrative hearing in connection with this report shall not be required unless prior arrangements have been made therefor.

- If the report contains an allocation of value between land and improvements, such allocation applies only under the existing program of utilization. The separate valuations for land and building must not be used in conjunction with any other purpose and are invalid if so used.

- If the report contains a valuation relating to a geographical portion or tract of real estate, the value reported for such geographical portion relates to such portion only and should not be construed as applying with equal validity to other portions of the larger parcel or tract; and the value reported for such geographical portion plus the value of all other geographical portions may or may not equal the value of the entire parcel or tract considered as an entity.

- If the report contains a valuation relating to an estate in land that is less than the whole fee simple estate, the value reported for such estate relates to a fractional interest only in the real estate involved, and the value of this fractional interest plus the value of all other fractional interest may or may not equal to the value of the entire fee simple estate considered as a whole.

- It is assumed that there are no hidden or inapparent conditions of the property, subsoil, or structures which would render it more or less valuable; we assume no responsibility for such conditions or for engineering which might be required to discover such factors.

- Nothing in the report should be deemed a certification or guaranty as to the structural and/or mechanical (electrical, heating, air-conditioning, and plumbing) soundness of the building(s) and associated mechanical systems, unless otherwise noted.

- Information, estimates, and opinions provided by third parties and contained in this report were obtained from sources considered reliable and believed to be true and correct. However, no responsibility is assumed for possible misinformation.

- Possession of the report, or a copy thereof, does not carry with it the right of publication, and the report may not be used by any person or organization except the client without the previous written consent of the appraiser, and then only in its entirety. If the client releases or disseminates the reports to others without the consent of the appraiser, the client hereby agrees to hold the appraiser harmless, and to indemnify the analysts from any liability, damages, or losses which the analysts might suffer, for any reason whatsoever, by reason of dissemination of the report by the client. Further, if legal action is brought against the analyst by a party other than the client concerning the report or the opinions stated therein, the client agrees, in addition to indemnifying the analysts for any damages or losses, to defend said analysts in said action at client's expense. However, nothing herein shall prohibit the client or analysts from disclosing said report or opinions contained therein as may be required by applicable law.

- Disclosure of the contents of this report is governed by the By-Laws and Regulations of the Appraisal Institute. Neither all nor any part of the contents of this report

(especially any conclusions as to value, the identity of the appraisers or the firm which they are connected, or any reference to the Appraisal Institute or to the MAI designation) shall be disseminated to the public through advertising media, public relations media, news media, sales media, or any public means of communication without the prior consent and approval of the appraisers.

- Unless otherwise stated in this report, the existence of hazardous material, which may or may not be present on the property, was not observed by the appraiser. The appraiser has no knowledge of the existence of such materials on or in the property. The appraiser, however, is not qualified to detect such substances. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The 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. No responsibility is assumed for any such conditions, or for any expertise or engineering knowledge required to discover them. The client is urged to retain an expert in this field, if desired.

- The Americans with Disabilities Act (ADA) became effective January 26, 1992. We have not made a specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA. It is possible that a compliance survey together with a detailed analysis of the requirements of the ADA could reveal that the property is not in compliance with one or more of the requirements of the act. If so, this fact could have a negative effect upon the value of the property. We did not consider possible noncompliance with the requirements of ADA in estimating the value of the property.

- The function of this report is for the sole purpose(s) stated herein. It may not be used in connection with any proposed or future construction for a real estate syndicate(s), real estate investment trust(s) or limited partnership to solicit investors or limited partners, and may not be relied upon for such purposes.

THE HALLSTROM GROUP INC
REAL ESTATE
CONSULTANTS
& APPRAISERS

PROFESSIONAL BACKGROUND AND SERVICES

The Hallstrom Group, Inc. is a Honolulu based independent professional organization that provides a wide scope of real estate consulting services throughout the State of Hawaii with particular emphasis on valuation studies. The purpose of the firm is to assist clients in formulating realistic real estate decisions. It provides solutions to complex issues by delivering thoroughly researched, objective analyses in a timely manner. Focusing on specific client problems and needs, and employing a broad range of tools including after-tax cash flow simulations and feasibility analyses, the firm minimizes the financial risks inherent in the real estate decision making process.

The principals and associates of the firm have been professionally trained, are experienced in Hawaiian real estate, and are actively associated with the Appraisal Institute and the Counselors of Real Estate, nationally recognized real estate appraisal and counseling organizations.

The real estate appraisals prepared by The Hallstrom Group accomplish a variety of needs and function to provide professional value opinions for such purposes as mortgage loans, investment decisions, lease negotiations and arbitrations, condemnations, assessment appeals, and the formation of policy decisions. Valuation assignments cover a spectrum of property types including existing and proposed resort and residential developments, industrial properties, high-rise office buildings and condominiums, shopping centers, subdivisions, apartments, residential leased fee conversions, special purpose properties, and vacant acreage, as well as property assemblages and portfolio reviews.

Market studies are research-intensive, analytical tools oriented to provide insight into investment opportunities and development challenges, and range in focus from highest and best use determinations for a specific site or improved property, to an evaluation of multiple (present and future) demand and supply characteristics for long-term, mixed-use projects. Market studies are commissioned for a variety of purposes where timely market information, insightful trends analyses, and perceptive conceptual conclusions or recommendations are critical. Uses include the formation of development strategies, bases for capital commitment decisions, evidence of appropriateness for state and county land use classification petitions, fiscal and social impact evaluations, and the identification of alternative economic use/conversion opportunities.

PROFESSIONAL QUALIFICATIONS OF JAMES E. HALLSTROM, JR., MAI, CRE

Business Background

President	The Hallstrom Group, Inc. Honolulu, Hawaii (1980 - Present)
Former Senior Vice President and Treasurer	Hastings, Martin, Hallstrom and Chew, Ltd., Honolulu, Hawaii (1972-1980)
Former Real Property Appraiser and Analyst	Administration, Inc., a subsidiary of C. Brewer and Company, Limited Honolulu, Hawaii (1971-1972)
Former Senior Real Property Appraiser and Analyst	Opitz Realty, Madison, Wisconsin (1969-1971)

National Designations and Memberships

- CRE Designation (1998) - The Counselors of Real Estate
- MAI Designation (1976) - American Institute of Real Estate Appraisers
- SRPA Designation (1975) - Society of Real Estate Appraisers

The American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated in 1991, forming the Appraisal Institute (AI).

Education

- M.S. (Real Estate Appraisal and Investment Analysis) 1971, University of Wisconsin at Madison
- B.A. (Economics) 1969, Brigham Young University at Provo
- Additional numerous specialized real estate studies in connection with qualifying for national professional designations, and uninterrupted Continuing Education.
- Completed Continuing Education requirements with the Appraisal Institute through December 31, 2002.

Professional Involvement

- Former President and Officer for Hawaii AIREA and SREA Chapters
- Instructor for Society of Real Estate Appraisers Course 101, "Introduction to Appraising Real Property" and Course 201, "Principles of Income Property Appraising"
- Contributing author to the "Hawaii Real Estate Investor"
- Lecturer at many professional seminars and clinics.
- Appointed numerous times as an Arbitrator and Mediator.

Qualified Expert Witness

Federal and State Courts
State Land Use and County Hearings
Arbitration Proceedings

State of Hawaii Certification

Certified General Appraiser, License Number CGA-178, Exp. Date December 31, 2003

Community Service

Active registered member of the Boy Scouts of America; former Director of Le Jardin Academy; former Advisory Board Member of the School of Business, Brigham Young University, Hawaii Campus; Director of Hawaii Reserves, Inc.

PROFESSIONAL QUALIFICATIONS OF THOMAS W. HOLLIDAY

Business Background

Supervisor/ Senior Analyst	The Hallstrom Group, Inc. Honolulu, Hawaii
Former Staff Appraiser	Davis-Baker Appraisal Co. Avalon, Santa Catalina Island, California

Education

- B.A. (Communications/Journalism) 1978 California State University at Fullerton
- SREA Course 201- Principles of Income Property Appraising
- Expert witness testimony before State of Hawaii Land Use Commission and various state and county boards and agencies since 1983.
- Numerous professional seminars and clinics
- Contributing author to **Hawaii Real Estate Investor**, Honolulu Star Bulletin

On January 1, 1991, the American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated, forming the Appraisal Institute (AI).

Recent Maui Assignments (since 2000)

- Market Study, Economic Impact Analyses and Public Costs/Benefits Assessments
  - Wailea Ranch (Master Planned Community)
  - Palauea Bay (Resort/Residential)
  - Upcountry Town Center (Mixed-Use Planned Development)
  - Maui Lani (Residential and Industrial Components of Master Planned Community)
  - Maui Business Park, Phase II (Industrial/Commercial)
  - Four Seasons Private Estates and Residences Club (Resort/Residential)
  - Kualono Subdivision (Residential)
  - Kapalua Mauka (Master Planned Community)
  - Hailiimailii (Commercial)
- Major Valuation Assignments
  - Sheraton Maui Hotel
  - Outrigger Wailea Resort Hotel
  - Maui Lu Hotel
  - Coconut Grove Condominiums
  - Palauea Bay Holdings
  - Wailea Ranch
  - Maui Coast Hotel
  - Westin Maui Hotel
  - Maui Marriott Hotel
  - Waihee Beach

TABLE 2

EMPLOYEE JOB COUNT AND WAGE ESTIMATES
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kuulono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

Development Year	1	2	3	4	5	6	7	8	9	10	Total 1 Through 10	Stabilized
Worker Requirements (1)												
Infrastructure/Sitework (2)	12	6									17	
Home Construction (3)		24	31	31	31						118	
House Operations/Maintenance (4)			1	2	4	5	5	5	5	5	31	5
Off-Site Employees (5)	5	12	13	13	14	2	2	2	2	2	67	2
TOTAL EMPLOYMENT CREATED	16	42	45	47	49	7	7	7	7	7	233	7
Worker Wages												
Infrastructure/Sitework (6)		$333,959	$0	$0	$0						$333,959	
Home Construction (6)		$1,384,800	$1,800,240	$1,800,240	$1,800,240						$6,785,520	
House Operations/Maintenance (7)			$24,000	$55,200	$86,400	$117,600	$117,600	$117,600	$117,600	$117,600	$753,600	$117,600
Off-Site Employees (8)	$129,843	$333,624	$360,640	$375,200	$389,760	$54,880	$54,880	$54,880	$54,880	$54,880	$1,863,467	$54,880
TOTAL ANNUAL WAGES PAID	$129,843	$2,052,383	$2,184,880	$2,230,640	$2,276,400	$172,480	$172,480	$172,480	$172,480	$172,480	$9,736,546	$172,480

(1) All job counts expressed as "full-time" equivalent positions.
(2) Estimated at one worker/year per $210,000 in contract spending.
(3) Estimated at one worker/year per $150,000 in contract spending; or 2.4 worker years per home.
(4) Estimated at one worker/year for each 10 houses.
(5) Includes all off-site jobs created by work efforts at the project; direct and indirect. Estimated at 0.4 off-site positions per on-site position.
(6) Average annual wage of $57,700/worker year.
(7) Average annual wage of $24,500/worker year.
(8) Average annual wage of $28,000/worker year.

Source: Various, and The Hallstrom Group, Inc.

TABLE 1

CONSTRUCTION COSTS AND CONTRACTOR AND SUPPLIER PROFIT ESTIMATES
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kuulono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

Development Year	1	2	3	4	5	Totals
Construction Costs						
Off-Site Requirements (1)	$250,000					$250,000
Infrastructure/Sitework (1)	$2,267,800	$1,132,200				$3,400,000
Home Construction (2)		$3,600,000	$4,680,000	$4,680,000	$4,680,000	$17,640,000
TOTAL CONSTRUCTION COSTS	$2,517,800	$4,732,200	$4,680,000	$4,680,000	$4,680,000	$21,290,000
CONTRACTOR'S PROFIT	$276,780	$473,220	$468,000	$468,000	$468,000	$2,154,000
SUPPLIER'S PROFIT	$95,712	$189,288	$187,200	$187,200	$187,200	$846,600

(1) Provided by Dowling Company, Inc., October 28, 2003, based on "Cost Analysis for Pukalani Lands", January 30, 2003. Excludes fees, charges and assessments. Subdivision infrastructure period estimated at 18 months, commencing at beginning of model and completing be middle of Year 2.
(2) Assuming average home construction budget of $360,000 based on 2,200 square foot house at $150/SF cost plus $30,000 site work and landscaping. First homes begin construction at middle of Year 2 and are finished by year-end.

Source: Dowling Company, Inc., and The Hallstrom Group, Inc.

TABLE 4

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

Development Year	1	2	3	4	5	6	7	8	9	10	Total Years 1 Through 10	Stabilized
ANNUAL WAGES GENERATED	$129,843	$2,052,383	$2,184,880	$2,230,640	$2,276,400	$172,480	$172,480	$172,480	$172,480	$172,480	$9,736,546	$172,480
CONTRACTOR'S PROFIT	$276,780	$473,220	$468,000	$468,000	$468,000						$2,154,000	
SUPPLIER'S PROFIT	$95,712	$189,288	$187,200	$187,200	$187,200						$846,600	
HOME MAINTENANCE, REPAIRS AND UPGRADES (1)			$120,000	$276,000	$432,000	$588,000	$588,000	$588,000	$588,000	$588,000	$3,768,000	$588,000
DISCRETIONARY EXPENDITURES			$787,625	$1,811,538	$2,835,450	$3,859,363	$3,859,363	$3,859,363	$3,859,363	$3,859,363	$24,731,425	$3,859,363
TOTAL BASE ECONOMIC IMPACT	$502,335	$2,714,891	$3,747,705	$4,973,378	$6,199,050	$4,619,843	$4,619,843	$4,619,843	$4,619,843	$4,619,843	$41,236,571	$4,619,843
Multiplier Effect Ratio	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TOTAL OVERALL IMPACT	$1,004,669	$5,429,783	$7,495,410	$9,946,755	$12,398,100	$9,239,685	$9,239,685	$9,239,685	$9,239,685	$9,239,685	$82,473,142	$9,239,685

(1) Estimated at $1,000 per house per month.

Source: Various, and The Hallstrom Group, Inc.

TABLE 3

DE FACTO POPULATION, DISCRETIONARY EXPENDITURES AND RESIDENT HOUSEHOLD INCOMES
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

Development Year	3	4	5	6	7	8	9	Stabilized 10
Cumulative Residential Development								
Home Construction	10	13	13	13	0	0	0	0
Total Finished Homes	10	23	36	49	49	49	49	49
Average Daily Resident/Guest Population								
Full-Time Residents (1)	38	87	136	185	185	185	185	185
Part-Time Residents (2)	3	8	12	16	16	16	16	16
Guests (3)	1	2	4	5	5	5	5	5
Total De Facto Population	42	97	152	206	206	206	206	206
Total Full-Time Resident Population	38	87	136	185	185	185	185	185
Estimated School Age Children (3)	9	22	34	46	46	46	46	46
Estimated Public School Children (4)	6	14	22	31	31	31	31	31
RESIDENT DISCRETIONARY (TAXABLE) EXPENDITURES (4)	$787,625	$1,811,538	$2,835,450	$3,859,363	$3,859,363	$3,859,363	$3,859,363	$3,859,363
Total Years 1 -10	$24,731,425							
FULL-TIME RESIDENT INCOME (5)	$1,261,356	$2,901,185	$4,540,860	$6,180,615	$6,180,615	$6,180,615	$6,180,615	$6,180,615
Total Years 1 -10	$39,666,398							

(1) 90 percent of homes estimated to be used as full-time residences, with average household size of 4.2 persons, or circa 10% above regional averages.
(2) 10 percent of homes estimated to be used as part-time (second home) residences, occupied 20% of time with average party size of 3.3 persons.
(3) Estimated average guest population (not included in full-time or part-time categories) of 1 guest per 10 finished homes.
(4) Persons between the ages of three and 19 enrolled in public and private schools, estimated at 25% of total full-time resident population.
(5) Persons enrolled in public schools, estimated at 16.5 percent of the full-time resident population.
(4) Estimated at 50% of full-time resident household income, and at $100 per capita daily for part-time residents and guest populations.
(5) Estimated at $140,150 annually per full-time resident household; as would be minimally necessary to support conventional mortgage.

TABLE 6

SUMMARY OF ANNUAL PRIMARY GOVERNMENTAL TAX RECEIPTS AND PUBLIC SERVICE COSTS
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

State of Hawaii

On Stabilized Basis At Build-Out	Actual Cost Comparison			Per Capita Allocation Comparison		
	Receipts	- Costs	= Net Benefits or (Costs)	Receipts	- Costs	= Net Benefits or (Costs)
Amount per Year	$566,009	($252,000)	$314,009	$566,009	($762,390)	($196,381)

Maui County

On Stabilized Basis At Build-Out	Actual Cost Comparison			Per Capita Allocation Comparison		
	Receipts	- Costs	= Net Benefits or (Costs)	Receipts	- Costs	= Net Benefits or (Costs)
Amount per Year	$220,524	($117,000)	$103,524	$220,524	($212,297)	$8,227

Source: The Hallstrom Group, Inc.

TABLE 5

PUBLIC COST/BENEFIT SUMMARY TABLE
Economic Impact Analysis and Public Cost/Benefit Assessment
of the Proposed Kualono Subdivision
Pukalani, Maui, Hawaii
In Constant Year 2003 Dollars

Development Year	1	2	3	4	5	6	7	8	9	10	Total Years 1 Through 10	Stabilized
PUBLIC BENEFITS (Revenues)												
1. REAL PROPERTY TAXES												
Cumulative Assessed Values (1) (2)												
Improvements			$4,680,000	$10,764,000	$16,848,000	$22,932,000	$22,932,000	$22,932,000	$22,932,000	$22,932,000		$22,932,000
Land	$5,760,000	$14,700,000	$14,700,000	$14,700,000	$14,700,000	$14,700,000	$14,700,000	$14,700,000	$14,700,000	$14,700,000		$14,700,000
Total Assessed Value	$5,760,000	$14,700,000	$19,380,000	$25,464,000	$31,548,000	$37,632,000	$37,632,000	$37,632,000	$37,632,000	$37,632,000		$37,632,000
TOTAL REAL PROPERTY TAXES	$33,636	$86,142	$113,567	$149,219	$184,871	$220,524	$220,524	$220,524	$220,524	$220,524	$1,670,053	$220,524
2. STATE INCOME TAXES												
Taxable Personal Income	$129,843	$2,092,383	$3,446,230	$5,131,745	$6,817,260	$6,353,095	$6,353,095	$6,353,095	$6,353,095	$6,353,095	$49,342,936	$6,353,095
Taxable Corporate Profits	$372,492	$662,508	$743,563	$858,434	$973,305	$432,976	$432,976	$432,976	$432,976	$432,976	$5,775,183	$432,976
Personal Taxes Paid	$7,531	$119,038	$199,881	$297,641	$393,401	$368,480	$368,480	$368,480	$368,480	$368,480	$2,861,890	$368,480
Corporate Taxes Paid	$5,456	$13,258	$14,871	$17,169	$19,466	$8,660	$8,660	$8,660	$8,660	$8,660	$115,504	$8,660
TOTAL STATE INCOME TAXES	$14,987	$132,288	$214,753	$314,810	$414,867	$377,139	$377,139	$377,139	$377,139	$377,139	$2,977,394	$377,139
3. STATE GROSS EXCISE TAX												
Taxable Transactions												
Construction Contracts	$2,767,800	$4,332,200	$4,680,000	$4,680,000	$4,680,000						$21,540,000	
Disposable Income Purchases	$64,921	$1,026,192	$1,880,865	$2,926,858	$3,973,850	$3,945,603	$3,945,603	$3,945,603	$3,945,603	$3,945,603	$29,999,698	$104,385,926
Home Maintenance			$126,000	$276,000	$432,000	$588,000	$588,000	$588,000	$588,000	$588,000	$5,766,000	$588,000
Total Taxable Transactions	$2,832,721	$5,358,392	$6,680,865	$7,882,858	$9,085,850	$4,533,603	$4,533,603	$4,533,603	$4,533,603	$4,533,603	$54,907,698	$4,533,603
TOTAL STATE EXCISE TAX	$118,651	$239,895	$278,592	$328,490	$378,389	$188,870	$188,870	$188,870	$188,870	$188,870	$2,287,455	$188,870
TOTAL GROSS PUBLIC REVENUES												
To Maui County (Item #1)	$33,636	$86,142	$113,567	$149,219	$184,871	$220,524	$220,524	$220,524	$220,524	$220,524	$1,670,053	$220,524
To State (Items #2 & 3)	$132,992	$372,183	$493,044	$643,219	$793,255	$566,009	$566,009	$566,009	$566,009	$566,009	$5,264,849	$566,009
AGGREGATE TAX REVENUES	$166,628	$458,325	$606,611	$792,429	$978,247	$786,532	$786,532	$786,532	$786,532	$786,532	$6,934,902	$786,532

SCENARIO ONE: USING PROJECTED "ACTUAL" EXPENSES

PUBLIC COSTS												
By Maui County				$40,000	$80,000	$117,000	$117,000	$117,000	$117,000	$117,000	$765,000	$117,000
By State of Hawaii				$106,000	$175,000	$252,000	$252,000	$252,000	$252,000	$252,000	$1,595,000	$252,000
TOTAL PUBLIC COSTS				$146,000	$255,000	$369,000	$369,000	$369,000	$369,000	$369,000	$2,360,000	$369,000
TOTAL NET PUBLIC BENEFITS												
To Maui County	$33,636	$86,142	$113,567	$109,219	$104,871	$103,524	$103,524	$103,524	$103,524	$103,524	$965,053	$103,524
To State of Hawaii	$132,992	$372,183	$493,044	$543,219	$618,255	$314,009	$314,009	$314,009	$314,009	$314,009	$3,729,849	$314,009
AGGREGATE NET BENEFITS	$166,628	$458,325	$606,611	$652,429	$723,247	$417,532	$417,532	$417,532	$417,532	$417,532	$4,694,902	$417,532

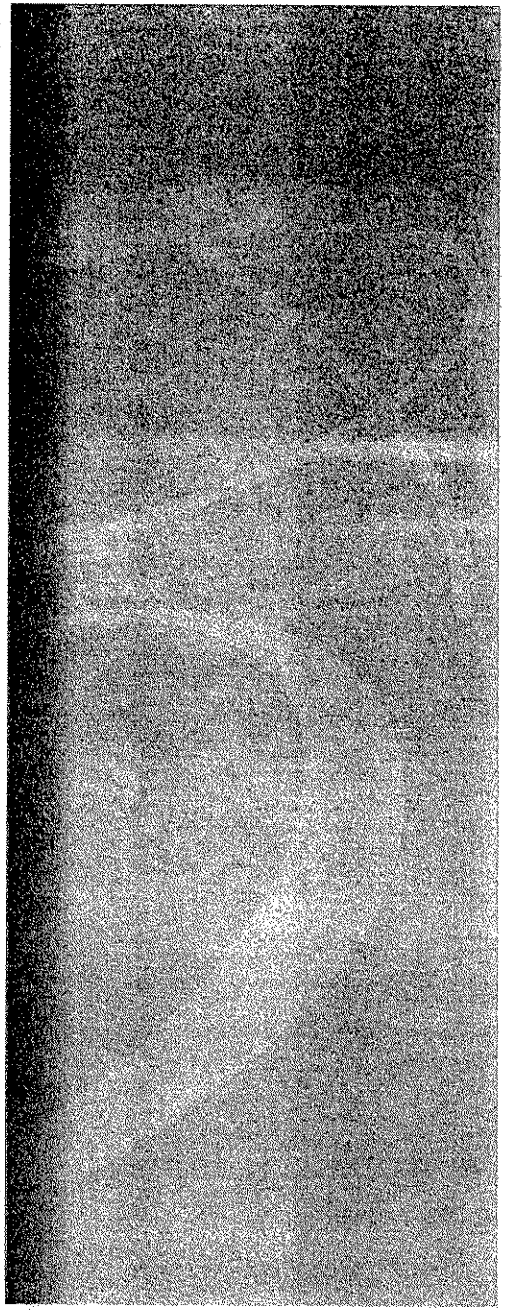
SCENARIO TWO: USING PROJECTED "PER CAPITA" EXPENSES

PUBLIC COSTS ("Per Capita" Expenses)												
By Maui County				$99,650	$156,973	$212,297	$212,297	$212,297	$212,297	$212,297	$1,317,109	$212,297
By State of Hawaii				$357,857	$560,133	$762,398	$762,398	$762,398	$762,398	$762,398	$4,729,930	$762,398
TOTAL PUBLIC COSTS				$457,506	$716,097	$974,687	$974,687	$974,687	$974,687	$974,687	$6,047,039	$974,687
TOTAL NET PUBLIC BENEFITS												
To Maui County	$33,636	$86,142	$113,567	$49,569	$26,898	$8,226	$8,226	$8,226	$8,226	$8,226	$352,944	$8,226
To State of Hawaii	$132,992	$372,183	$493,044	$285,353	$233,257	($196,381)	($196,381)	($196,381)	($196,381)	($196,381)	$534,928	($196,381)
AGGREGATE NET BENEFITS	$166,628	$458,325	$606,611	$334,923	$261,159	($188,155)	($188,155)	($188,155)	($188,155)	($188,155)	$887,863	($188,155)

(1) Assessed value for improvements are based on estimated total ("All In") construction cost plus 20% (profit/other).

(2) Current land value estimated at $200,000 per acre, assuming all state and county entitlements in place. Finished lots at average value of $300,000 per lot.

Source: The Hallstrom Group, Inc.



Report to

Hanohano LLC

Covering the

PROPOSED KUALONO SUBDIVISION

Haleakala Highway, Pukalani, Maui, Hawaii

July 2003

JOHN CHILD & COMPANY
APPRAISERS & CONSULTANTS

JOHN CHILD & COMPANY
APPRAISERS & CONSULTANTS

August 4, 2003

Karen Char, MAI, CRE
Paul D. Cool, MAI, CRE
Cynthia C. Nakamura
Shelly Tanaka
Cora A. Wakatsuki

Robert J. Vernon, MAI, CRE

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Maui, Hawaii 96793

Dear Don:

Re: Proposed Kualono Subdivision

At your request, John Child & Company has evaluated the market support for the proposed Kualono Subdivision. This letter summarizes the study background and market assessments that are presented in the accompanying report.

STUDY BACKGROUND

The Kualono Subdivision is a proposed residential subdivision to be located on about 28.7 acres at the Five Trees intersection of the Haleakala Highway and Kula Highway, Pukalani, Maui, Hawaii (tax map keys 2-3-11:01 and 02 of the Second Taxation Division).

The property is within the Agricultural State Land Use District. The property has been designated for single-family development under the Makawao-Pukalani-Kula Community Plan.

Dowling Company, Inc. is in escrow to purchase the property. A Dowling Company affiliate, Hanohano LLC, proposes to subdivide the property into 49 half-acre residential lots to be known as Kualono Subdivision. In order to do so, the property must be reclassified from the existing Agricultural State Land Use District to an Urban State Land Use District.

As a part of your State Land Use reclassification petition, you asked us to assist you by assessing the market support for the proposed Kualono Subdivision.

STUDY OBJECTIVE AND PURPOSE

The objective of our assistance is to assess the market support for the proposed Kualono Subdivision in terms of:

841 Bishop Street, Penthouse • Honolulu, Hawaii 96813
T 808.533.2951 • F 808.523.7672 • email: info@johnchild.com

- Target markets and buyer profile
- Market share
- Sales prices
- Projected annual sales absorption.

The purpose of our assistance is to provide market assessments and supporting documentation for submission to the State Land Use Commission in conjunction with Hanohano LLC's petition for land use reclassification from Agriculture to Urban.

As a result, this report is intended for the sole and exclusive use of Hanohano LLC, the State Land Use Commission and related State agencies. In accepting this report, the client specifically agrees that our report is not intended for any other purpose or user(s) and is not to be relied upon by any third parties for any purpose, whatsoever.

EFFECTIVE DATE OF REPORT

The effective date of this report is July 25, 2003.

STUDY CONDITIONS

This report is subject to the Study Conditions included in Section I of the accompanying report.

MARKET ASSESSMENTS FOR THE KUALONO SUBDIVISION LOTS

The market assessments for the proposed Kualono Subdivision are summarized under the following subheadings.

Recommended Pricing

The Kualono Subdivision will include 49 residential house lots of about 18,000sf to about 25,000sf in the Pukalani neighborhood of Maui's Upcountry district. House lots would be afforded views towards Haleakala and the West Maui Mountains.

Based on the size, location, and view potential of the proposed lots in the Kualono Subdivision, the individual lots could be priced from about $250,000 to about $350,000. Considering current construction costs, the price of an improved house and lot in the proposed subdivision would start at about $425,000.

Target Market And Buyer Profile

The Kualono Subdivision lots are expected to appeal to existing homeowners seeking to trade up. The lots would be marketed for build-to-suit single-family residential development. Equity from the sale of an existing residence is typically used as the basis for a down payment.

The primary demand for the 49 lots is expected to come from the resident population in Upcountry Maui. The supply of existing and planned single-family housing on Maui is limited. Therefore, secondary demand could come from other neighborhoods on Maui including Wailuku, Kahului, and Kihei.

Projected Demand for Residential Development

Based on the anticipated population growth and other demographic considerations, the demand for new housing in the primary market area is projected to average about 134 new housing units annually through 2005 and about 181 new housing units annually through 2010. The new housing demand in the secondary market area is projected to average 310 new housing units annually through 2005 and 441 new housing units annually through 2010, as shown as follows:

Projected Annual New Housing Demand
2003 - 2010

	Primary market area	Secondary market area	Total
2003 - 2005	134	310	444
2006 - 2010	181	441	622

Of this total, about 40 new housing units priced at $425,000 or more (or, alternatively, vacant lots priced from about $250,000) are projected to be required in the primary market area between 2003 and 2005. The annual demand for residential product in this price category is projected to increase to about 54 units in 2006. Similarly, the annual effective new housing demand in the secondary market area is projected at about 81 units over the next three years and 115 units annually through 2010, as shown as follows:

Projected Annual New Housing Demand
for Single-Family Homes Priced at $425,000+
or Vacant House Lots Priced at $250,000+
(Annual Effective New Housing Demand)
2003 - 2010

	Primary market area	Secondary market area	Total
2003 - 2005	40	81	121
2006 - 2010	54	115	169

Projected Absorption of the Kualono Subdivision Lots

In assessing the competitive position and projected market share for the Kualono Subdivision, the following factors were considered.

- Convenient location in Upcountry Maui
- Physical characteristics of the lots, including half-acre lot size and view potential
- Estimated retail prices for the lots
- Limited supply of competitive product planned or under construction
- Lack of comparable development sites with entitlements and/or utilities.

Based on these considerations, the Kualono Subdivision lots could capture at least 50% of the annual effective new housing demand in the primary market area and 25% of the annual effective new housing demand in the secondary market area. Consequently, the projected demand for the Kualono Subdivision lots is about 40 lots per year, or about 3 to 4 lots per month, as shown as follows:

Projected Annual Demand for the Kualono Subdivision
2003 - 2005

	Primary market area	Secondary market area	Total
Annual effective new housing demand	40	81	
Kualono Subdivision market share	50%	25%	
Projected demand for the Kualono Subdivision lots, rounded	20	20	40

The projected absorption rate is considered to be reasonable based on the estimated absorption rates for recent residential subdivisions on Maui.

Based on the project absorption rate, the 49 lots in the proposed Kualono Subdivision could be marketed and sold within two years.

REPORT FORMAT

This report presents the market assessments for the proposed Kualono Subdivision in four sections, shown as follows:

Section	Description
I	Study Background
II	Historical and Projected Housing Demand
III	Competitive Supply and Demand
IV	Assessment of Market Support

* * * * *

We appreciate having the opportunity to assist you on this interesting assignment. Please contact us if you have any questions.

Sincerely,

JOHN CHILD & COMPANY, INC.

Paul D. Cool, MAI, CRE
Vice President

Shelly H. Tanaka
Appraiser

LETTER OF TRANSMITTAL
TABLE OF CONTENTS

This section presents the study background, study objectives and purpose, effective date of report, definitions, and study conditions.

STUDY BACKGROUND

The Kualono Subdivision is a proposed residential subdivision to be located on about 28.7 acres at the Five Trees intersection of the Haleakala Highway and Kula Highway, Pukalani, Maui, Hawaii. The property is further identified as tax map keys 2-3-11:01 and 02 of the Second Taxation Division, as shown in Exhibit I-A.

The property is within the Agricultural State Land Use District. The property has been designated for single-family development under the Makawao-Pukalani-Kula Community Plan.

Dowling Company, Inc. is in escrow to purchase the property. A Dowling Company affiliate, Hanohano LLC, proposes to subdivide the property into 49 half-acre residential lots to be known as Kualono Subdivision. In order to do so, the property must be reclassified from the existing Agricultural State Land Use District to an Urban State Land Use District.

As a part of your State Land Use reclassification petition, you asked us to assist you by assessing the market support for the proposed Kualono Subdivision.

STUDY OBJECTIVES AND PURPOSE

The objective of our assistance is to assess the market support for the proposed Kualono Subdivision in terms of:

- Target markets and buyer profile
- Market share
- Sales prices
- Projected annual sales absorption.

The purpose of our assistance is to provide market assessments and supporting documentation for submission to the State Land Use Commission in conjunction with Hanohano LLC's petition for land use reclassification from Agriculture to Urban.

As a result, this report is intended for the sole and exclusive use of Hanohano LLC, the State Land Use Commission and related State agencies. In accepting this report, the client specifically agrees that our report is not intended for any other purpose or user(s) and is not to be relied upon by any third parties for any purpose, whatsoever.

EFFECTIVE DATE OF REPORT

The effective date of this report is July 25, 2003.

CONSULTING ASSIGNMENT

This assignment is a consulting service that conforms with Standard 4 and 5 as described in the Uniform Standards of Professional Appraisal Practice (USPAP).

REPORTING

Our analyses are presented in a report that summarizes the data, reasoning and analyses that were used to develop the market and impact assessments. Data and analyses not included in the report are available in our workfiles.

STUDY APPROACH

The study approach that was used to complete our assistance is summarized as follows:

1. Met with you to review the development proposal and the scope of our assistance.
2. Visited the property and competitive neighborhoods.
3. Reviewed existing and planned residential developments in Kula, Pukalani, Makawao and other competitive areas on Maui in terms of:
   a. Sales prices
   b. Buyer profile
   c. Annual absorption of residential house lots.
4. Analyzed demographic trends and their influence on housing demand in relevant market areas.
5. Projected the residential house lot requirements in the relevant market areas in terms of:
   a. Sales prices
   b. Buyer profile
   c. Annual absorption of residential house lots.
6. Evaluated the competitive position of the proposed Kualono Subdivision and projected the market support in terms of:
   a. Target markets and buyer profiles
   b. Market share
   c. Sales prices
   d. Projected annual sales absorption.
7. Presented our market assessments and supporting documentation in a summary report.

Kualono Subdivision

TAX MAP

Exhibit I-A

Source: Title Guaranty of Hawaii, Title Guaranty Express.

STUDY CONDITIONS AND ASSUMPTIONS

The study conditions and assumptions that are the basis of the analyses, opinions and conclusions of this report are summarized as follows:

Basis of Analyses,
Opinions, and Conclusions

The assessments are based on assumptions that have been formulated based on information and descriptions provided by Hanohano LLC. These assumptions are significant to the valuation or are key factors upon which the valuation depends. Some assumptions inevitably will not materialize and unanticipated events and circumstances may occur subsequent to the date of this report. Therefore, the actual results may vary from the projections and the variations could be material.

In addition, the analyses, opinions, and conclusions of this report rely on data and information provided by others. The information is believed to be reliable; however, no responsibility is assumed for the accuracy of information provided by others.

The analyses, opinions, and conclusions of this report rely on data and information provided by others. The information is believed to be reliable; however, no responsibility is assumed for the accuracy of information provided by others.

The analyses, opinions, and conclusions assume:

1. No hidden or unapparent surface or subsurface conditions of the property, structures, soils, subsoils, geological formations, ground water, or drainage conditions exist that would render the property more or less valuable.

2. Existing improvements comply with all applicable public and private zoning codes, regulations and covenants, unless stated otherwise.

3. The client has provided us with all significant, relevant information covering the subject of this report.

No responsibility is assumed for matters legal in nature affecting the property or its title, which is assumed to be good and merchantable.

Properties in Hawaii typically include a reservation in favor of the State of Hawaii of all mineral and metallic mines. Our analyses, opinions and conclusions assume these reservations do not have an impact on the value or use of the property.

Any drawings, maps, photographs, and similar exhibits accompanying this report are included to assist the reader in visualizing the property. No responsibility is assumed for the accuracy of these exhibits.

Hazardous Substances

The existence of hazardous substances (actual, alleged or threatened discharge, disposal, seepage, migration, release, growth, infestation, spread or escape of mold(s), mildew(s), fungi and/or spores or any materials, goods or products containing, harboring or nurturing these substances) that could be present on the property, or other environmental conditions that could impact the property, were not brought to the attention of the appraisers nor observed during the site visit.

The appraisers are not trained or qualified to detect hazardous substances or conditions even if these hazards, or evidence of potential presence of these hazards, are visible on the property.

This report assumes no hazardous substance or condition exists that would impact the analyses, opinions or conclusions. If a hazardous substance or condition exists, it could have a negative effect on the value of the property.

Native Hawaiian Rights

The legality of the traditional gathering rights of native Hawaiians that could be exercised on the property, or other native Hawaiian rights that could impact the property, was not considered in this report. This report assumes that the "traditional gathering rights" or any other "rights of native Hawaiians" would not be exercised on the property or properties that are the subject of this report and on any comparable properties that are included in this report. If native Hawaiian rights exist on the property and not the comparable properties, it could have a negative effect on the value of the property.

Archaeological or Historically Significant Conditions

The existence of archaeological or historically significant conditions that could be present on the property were not identified nor observed during the site visit. The appraisers are not trained or qualified to recognize archaeological or historically significant conditions, even if these conditions are visible on the property.

This report assumes no archaeological or historically significant condition exists that would impact the analyses, opinions or conclusions. If an archeological or historically significant condition exists, it could impact the value of the property.

Endangered Species

The presence of flora and/or fauna on the property qualified for protection under the Endangered Species Act of 1973 was not identified. The appraisers are not trained or qualified to recognize endangered flora or fauna, even if visible on the property.

This report assumes no endangered species are present on the property. The presence of endangered species could impact the value of the property.

Americans With Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) became effective January 26, 1992. This report was not based on any specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA. A survey of the property together with a detailed analysis of the requirements of the ADA could reveal that the property is not in compliance with one or more of the requirements of the ADA. If so, it could have a negative effect on the value of the property.

Terms of Assignment

We have no obligation to update our report because of events and transactions occurring subsequent to the effective date of the report.

Neither our fees nor payment were contingent upon the results of the report.

Use of Report

This report is valid only if presented in whole, with original photographs and exhibits, if any, and the official seal of John Child & Company embossed on the letter of transmittal and certification.

This report or any portion of this report may not be reproduced or published without the prior written consent of John Child & Company, and then only with proper qualification.

The contents of this report or portions of this report, the identity of the appraisers or any reference to John Child & Company, the Appraisal Institute, the Counselors of Real Estate, or the American Society of Appraisers, or to their respective designations may not be disseminated to the public through advertising media, public relations media, news media, sales media, or any other public means of communication.

Limitation on Liability

John Child & Company shall not be liable to Client or to any third party (including without limitation lenders and other persons to whom Client may show this report for the purposes of obtaining credit, insurance or any other benefit or promise) in the event that the use or value of the subject property is or becomes different from the use or value estimates, analyses, opinions or conclusions in this report unless it is established by clear and convincing evidence that John Child & Company acted in bad faith or willfully and recklessly failed to exercise an appropriate standard of care in the community while performing this assignment. In any event, John Child & Company's liability to Client or to any third party shall be limited to the amount of the fees to complete this assignment.

This report may not be shown to any third party without our consent and without receiving a written acknowledgement from any person to whom it is shown that such person has read, understands and agrees to be bound by the limitation of liability in this paragraph.

This section identifies the primary and secondary market areas for the proposed Kualono Subdivision and presents the historical and projected new housing demand.

IDENTIFICATION OF PRIMARY AND SECONDARY MARKET AREAS

The identification and delineation of the primary and secondary market areas for the proposed Kualono Subdivision are presented under the following subheadings.

Primary Market Area

The primary demand for the 49 lots in the proposed Kualono Subdivision is expected to come from the resident population in Upcountry Maui that includes the following neighborhoods and census tracts:

Neighborhood	2000 census tract
Haiku-Pauwela	302
Kula	303.01
Makawao	304.01
Pukalani	304.02

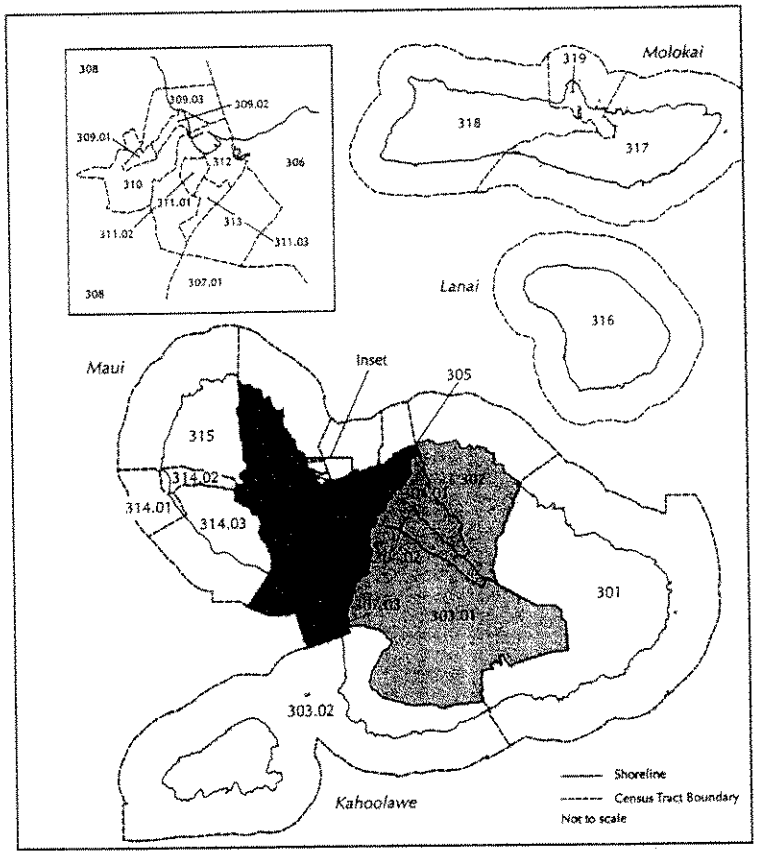
Secondary Market Area

Based on the geographical attributes of the Upcountry region including the relative proximity and ease of access to areas of employment, additional demand could come from the following neighborhoods on Maui:

Neighborhood	2000 census tract
Paia	305
Spreckelsville	306
Maalaea	307.01
Kihei	307.02 and 307.03
Waihee-Waikapu	308
Wailuku	309.01, 309.02, 309.03 and 310
Kahului	311.01, 311.02 and 311.03
Puunene	313

The census tracts included in the primary and secondary market areas for the Kualono Subdivision lots are shown in Exhibit II-A.

MAUI COUNTY CENSUS TRACTS



Legend
Primary market area
Secondary market area

Source: U.S. Bureau of the Census, Redistricting Census 2000 TIGER/Line files, processed by the Hawaii SBDC Network Business Research Library.

The Kualono Subdivision lots are not expected to compete with residential product in the resort communities of Wailea, Makena, Kaanapali, and Kapalua. Additionally, the Lahaina and Hana districts were also excluded from the demand projections based on time-distance relationships and geographical differences between these neighborhoods and the Upcountry district.

However, the scarcity of competitively priced developments have prompted residents from these areas to relocate to subdivisions within the primary and secondary market areas such as the Wailuku Country Estates and Maui Lani subdivisions. Interviews with representatives of these developments also indicate the potential for off-island demand from residents relocating to or planning to retire on Maui. The projections of demand are, therefore, understated to the extent that they do not consider this tertiary level of demand.

HISTORICAL HOUSING DEMAND

The historical housing demand is presented under the following subheadings.

Historical Resident Population Trends

The resident population in the primary market area nearly quadrupled over the past 30 years, from 8,214 persons in 1970 to 32,193 persons in 2002. Population growth in the primary market area has slowed over the past decade and averages about 2% annually.

About twice as many people reside in the secondary market area that includes the more densely populated areas of Wailuku, Kahului and Kihei. The 2002 resident population in the secondary market area is estimated to have been about 67,070 persons representing about one-half of the County population, as shown in Exhibit II-B.

Households and Household Size

In 2000, there were about 10,836 households in the primary market area and 21,188 households in the secondary market area. The number of households in the primary and secondary market areas has nearly doubled since 1980, as shown in Exhibit II-C.

Since 1980, the average household size in the primary market area has declined from about 3.2 persons per household to 2.9. Similarly, the average household size in the secondary market area has declined from about 3.1 persons per household to about 3.0, as also shown in Exhibit II-C.

In 2000, the primary market area included 660 vacant housing units representing about 6% of the housing inventory. The vacancy rate was nearly 20% in the secondary market area and is primarily the result of higher vacancies reported for rental and seasonal housing units in the Spreckelsville, Maalaea, and Kihei neighborhoods, as shown in Exhibit II-D.

HISTORICAL RESIDENT POPULATION
1970 – 2002

Year		Primary Market Area [1] Total	Primary Market Area [1] % of County	Secondary Market Area [2] Total	Secondary Market Area [2] % of County	Maui County [3]
1970		8,214	18%	23,884	52%	46,156
1980		16,068	23	33,806	48	70,991
1990		24,618	25	47,769	48	100,374
1995	[4]	28,295	24	58,948	50	117,895
2000		30,891	24	63,819	50	128,241
2001	[4]	31,631	24	65,899	50	131,797 [5]
2002	[4]	32,193	24	67,070	50	134,139 [5]
Annual % change:						
2000 - 2001		2.4%		3.3%		2.8%
2001 - 2002		1.8		1.8		1.8
Annual compound % change:						
1970 - 1980		6.9%		3.5%		4.4%
1980 - 1990		4.4		3.5		3.5
1990 - 2000		2.3		2.9		2.5
2000 - 2002		2.1		2.5		2.3

[1] Upcountry Maui, includes the Haiku-Pauwela, Kula, Makawao and Pukalani census tracts.
[2] Includes the rest of the island of Maui, excluding Wailea, Hana, Lahaina and Kaanapali-Kapalua.
[3] Includes the islands of Maui, Lanai and Molokai.
[4] The County population in these years is allocated to the primary and secondary market areas based on the historical distribution, for illustration purposes only.
[5] As of July 1. All other years as of April 1.

Source: State of Hawaii, Department of Business, Economic Development and Tourism (DBEDT), **The State of Hawaii Data Book**, 1986 and 1997 and **Maui County Data Book**, 2002.

Kualono Subdivision — Exhibit II-G

PROJECTED NEW HOUSING DEMAND
2003 - 2010

	Increase in Resident Population			Average Household Size		Additional Housing Units Required					
						Unadjusted Demand			Demand Adjusted for Vacancy [1]		
Year	Primary market area	Secondary market area	Total	Primary market area	Secondary market area	Primary market area	Secondary market area	Total	Primary market area	Secondary market area	Total
2003	369	743	1,112	2.9	3.0	127	248	375	134	310	444
2004	369	743	1,112	2.9	3.0	127	248	375	134	310	444
2005	369	744	1,113	2.9	3.0	127	248	375	134	310	444
2006	500	1,060	1,560	2.9	3.0	172	353	525	181	441	622
2007	500	1,060	1,560	2.9	3.0	172	353	525	181	441	622
2008	500	1,060	1,560	2.9	3.0	172	353	525	181	441	622
2009	500	1,060	1,560	2.9	3.0	172	353	525	181	441	622
2010	500	1,060	1,560	2.9	3.0	172	353	525	181	441	622

[1] Assuming a stabilized occupancy of 95% in the primary market area and 80% in the secondary market area

Source: John Child & Company and DBEDT.

Kualono Subdivision — Exhibit II-F

INTERPOLATION OF PROJECTED RESIDENT POPULATION
2000 - 2010

	Primary Market Area			Secondary Market Area			Total Primary and Secondary Market Areas		
		Annual Increase			Annual Increase			Annual Increase	
Year	Persons	Total	%	Persons	Total	%	Persons	Total	%
Actual historical:									
2000	30,891	---	---	63,819	---	---	94,710	---	---
2001	31,631	740	2.4%	65,899	2,080	3.3%	97,530	2,820	3.0%
2002	32,193	562	1.8	67,070	1,171	1.8	99,263	1,733	1.8
Projected:									
2003	32,562	369	1.1%	67,813	743	1.1%	100,375	1,112	1.1%
2004	32,931	369	1.1	68,556	743	1.1	101,487	1,112	1.1
2005 [1]	33,300	369	1.1	69,300	744	1.1	102,600	1,113	1.1
2006	33,800	500	1.5	70,360	1,060	1.5	104,160	1,560	1.5
2007	34,300	500	1.5	71,420	1,060	1.5	105,720	1,560	1.5
2008	34,800	500	1.5	72,480	1,060	1.5	107,280	1,560	1.5
2009	35,300	500	1.4	73,540	1,060	1.5	108,840	1,560	1.5
2010 [1]	35,800	500	1.4	74,600	1,060	1.4	110,400	1,560	1.4

[1] Projected by DBEDT.

Source: John Child & Company and DBEDT.

This section overviews the competitive supply and demand for residential housing in terms of general real estate trends, historical new home sales and development trends, and the competitive supply of housing.

GENERAL REAL ESTATE TRENDS

Residential real estate activity and prices have increased significantly since 1996.

According to resales data published by the Maui Board of Realtors, the number of single-family homes, condominium units, and vacant land sold through the Maui Multiple Listing Service (MLS) nearly tripled from 1,142 sales in 1996 to 2,922 sales in 2002. Year-to-date sales as of June 30, 2003 (YTD 2003) are on pace to match or exceed 2002 sales levels, as shown in Exhibit III-A.

The median sales price of a single-family home was $401,750 as of YTD 2003, about 7% higher than the median sales price of $375,000 in 2002 and 58% higher than the low of $255,000 in 1997. Similarly, the median sales price of vacant land sold through the MLS during the first half of 2003 was about 51% higher than the median sales price in 1997. With the exception of 1999, sales prices of condominium units also increased each year, from about $154,900 in 1997 to $229,500 as of June 2003, as shown in Exhibit III-B.

As a result of the increased sales activity and prices, the total dollar volume of single-family homes, condominium and land sales more than tripled from about $330 million in 1996 to about $1.1 billion in 2002. YTD sales of nearly $660 million are 20% higher than sales for the same period a year ago and could top $1.3 billion by year-end, as shown in Exhibit III-C.

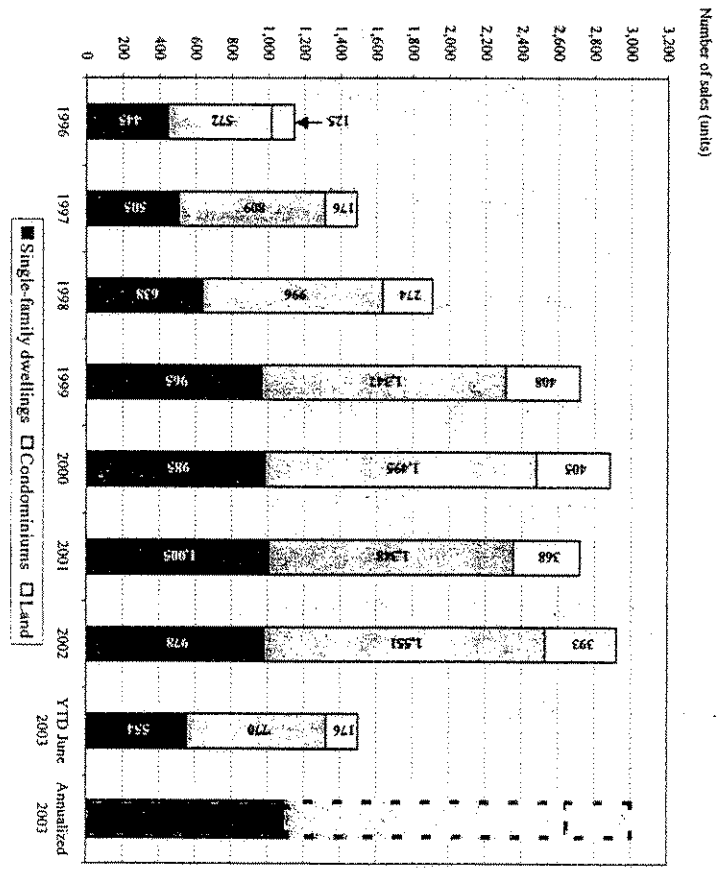
HISTORICAL NEW HOME SALES AND DEVELOPMENT TRENDS

Sales of single-family lots and homes (house and lots) in new residential subdivisions in the primary and secondary market area were reviewed for trends in sales activity, product and pricing, absorption rates and buyer profile. The subdivisions selected for analysis primarily include the following:

Primary Market Area:

- Kulamalu Subdivision
- Kulamanu Estates
- Kula Meadows
- West Kuiaha Meadows
- Maunaolu Plantation
- Kula Ekahi
- Mountain View
- Haiku Gardens
- Makawao Highlands.

Source: Maui Board of Realtors, Multiple Listing Service.



Kualono Subdivision

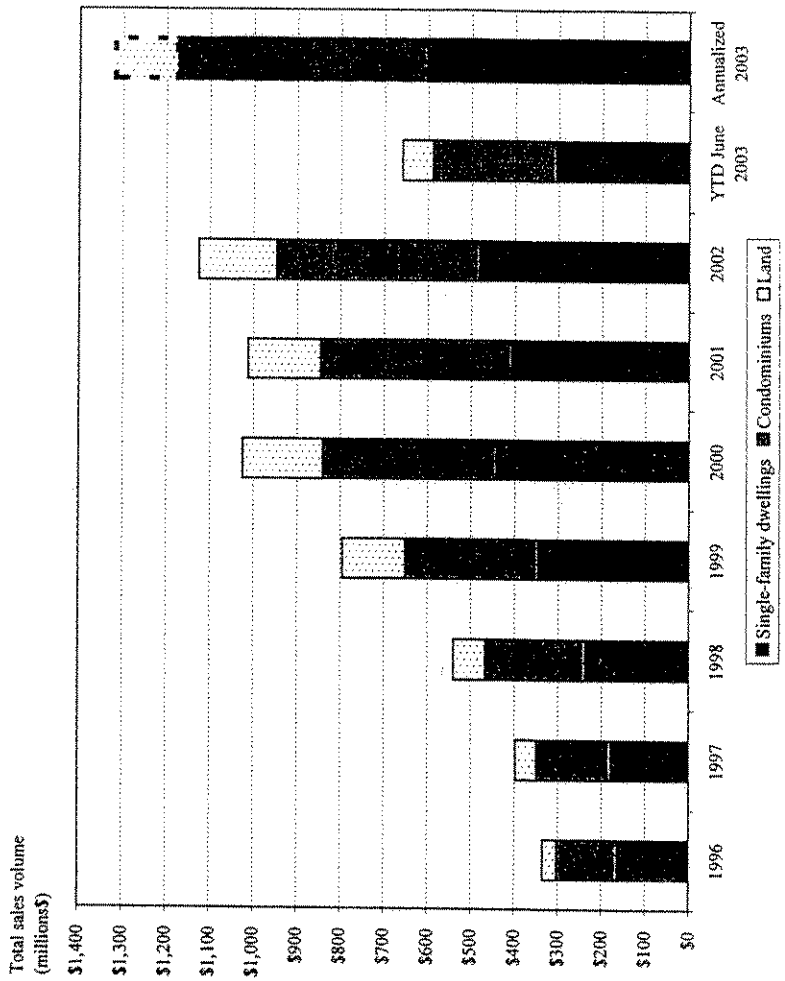
RESIDENTIAL SALES ACTIVITY IN MAUI COUNTY
1996 - May 2003

Exhibit III-A

Kualono Subdivision

Exhibit III-C

TOTAL SALES VOLUMES
1996 - May 2003

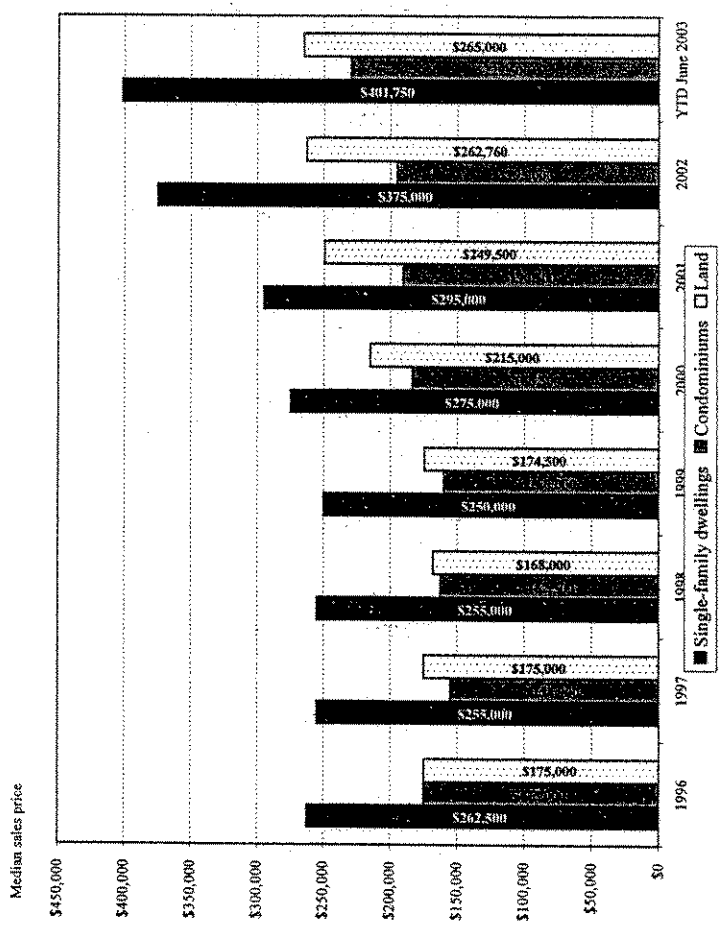


Source: Maui Board of Realtors, **Multiple Listing Service.**

Kualono Subdivision

Exhibit III-B

MEDIAN SALES PRICES IN MAUI COUNTY
1996 - May 2003



Source: Maui Board of Realtors, **Multiple Listing Service.**

Secondary Market Area:

- Piilani Village II and III
- Maui Lani subdivisions
- Kehalani subdivisions
- Ke Alii Kai
- Wailuku Country Estates
- Wailuku Parkside I and II
- Kamaole Heights
- Haiku Gardens
- Keawakapu Views.

Sales Volumes

The total number of new single-family lot and home sales in the primary market area declined from 111 new housing units in 1998 to 24 new housing units in 2001 and is primarily attributed to the lack of new developments during this period. Fifty-seven lots in the Kulamalu Subdivision were marketed and sold in 2002. As a result, total sales increased to 93 new housing units in 2002, as shown in Exhibit III-D.

New housing development in the primary market area mainly consists of vacant lots sold for individual build-to-suit construction. On occasion, individuals have acquired lots within a development for speculative home development and resale. However, there have been no recent large-scale developments of improved single-family subdivisions in the area.

In comparison, the new single-family housing inventory in the secondary market area has historically consisted of improved single-family homes by developers that include Schuler Homes, Spencer Homes, Stanford Carr and Towne Development. Sales of improved single-family homes totaled 259 in 2001 and 174 in 2002 and represented about three-fourths of new home sales in the area.

Total vacant lot and single-family home sales in the secondary market fluctuated between about 200 and 300 sales annually between 1998 and 2002. Nearly all of the 184 lots in the 2-acre Wailuku County Estates subdivision that were marketed between 2002 and 2003 are sold or under contract. As a result, YTD sales as of May 2003 have already surpassed new single-family lot and home sales in all of 2002, as also shown in Exhibit III-D. [1]

Lot Sizes

Residential lot sizes in the rural Upcountry market area tend to be larger than lots in the more urban secondary market area. Since 2000, about 45% of single-family lots sold in the primary market area are about 10,000sf to half-acre in size. Agricultural-zoned properties are also frequently subdivided and developed with lots of 2 acres or more. Sales of estate lots in these subdivisions comprised about 53% of all lot sales since 2000.

[1] The data excludes intermediate sales of vacant lots to homebuilders that were subsequently developed with speculative homes for resale to the public.

NEW SINGLE-FAMILY LOT AND HOME SALES
1998 – May 2003

	Vacant Lots		House & Lots		
Year	Total	% of total	Total	% of total	Total
Primary market area:					
1998	57	51%	54	49%	111
1999	41	53	36	47	77
2000	28	90	3	10	31
2001	23	96	1	4	24
2002	91	98	2	2	93
YTD 2003 [1]	18	100	0	0	18
Secondary market area:					
1998	45	28%	116	72%	161
1999	127	42	179	58	306
2000	123	54	103	46	226
2001	78	23	259	77	337
2002	63	27	174	73	237
YTD 2003 [1]	156	61	99	39	255

[1] Includes recorded sales up to and including June 6, 2003.

Source: John Child & Company based on information provided in the MLS Hawaii, Inc. REsearch TMK database.

In comparison, over 90% of the improved single-family house and lot developments in the secondary market area included lots of 10,000sf or less. With the exception of gentlemen estate lots in the Wailuku Country Estates and Kahakuloa Agricultural Park subdivisions, vacant lots in the secondary market have also been about 10,000sf or smaller, as shown in Exhibit III-E

New Home Prices

Prices for vacant residential lots in the primary market area are mainly influenced by the size of the lot. Smaller residential-zoned lots of a quarter-acre or less, including the 57 golf course frontage lots in the Kulamalu residential subdivision developed by Dowling Company, were generally priced from the upper $100,000 price range to the low $200,000 price range.

About 43% of the vacant lots that were sold in the primary market area since 2000 were at prices that ranged from about $200,000 to $400,000, as shown in Exhibit III-F. These sales primarily involve agricultural estate lots of about 2 acres.

Similarly, prices for vacant lots in the secondary market area since 2000 have ranged from below $200,000 for residential house lots of 10,000sf or less to about $250,000 to $300,000 for two-acre estate lots in the Wailuku Country Estates subdivision.

About 65% of new single-family homes in the secondary market sold between $200,000 and $400,000. About a quarter of new homes sold for $400,000 or higher and include semi-custom built homes.

Absorption and Buyer Profile

The sales experiences of selected subdivisions in the primary and secondary market areas were further analyzed for absorption times and buyer profiles. These developments are described as follows:

Primary Market Area

- All 57 lots in the Kulamalu Subdivision and 39 two-acre estate lots in the Maunaolu Plantation were sold out in a little over a year after final subdivision approval was received. The combined sales indicate an absorption rate of almost 90 lots per year or just over 7 lots per month.

- Since marketing began in about November 2002, 13 of the 16 five-acre+ lots in the gated Kula Meadows Subdivision have been sold or are reserved. The remaining three lots are 16 to 25 acres each and are priced from $1,250,000. A representative of the seller indicated these lots are expected to be sold within the next couple of months.

- The 57-lot Ridge at Kulamanu subdivision is pending final subdivision approval. However, according to the broker-in-charge, 50 of the 57 lots are under contract at prices

DISTRIBUTION OF SINGLE-FAMILY LOT AND NEW HOME SALES BY LOT SIZE
2000 – YTD May 2003

	Vacant Lots		House & Lots			
	Total	% of total	Total	% of total	Total	% of total
Primary market area:						
Under 5,000 square feet	0	0%	0	0%	0	0%
5,000 to 10,000 square feet	3	2	0	0	3	2
10,001 square feet to half-acre	72	45	6	100	78	47
2 to 5 acres	75	47	0	0	75	45
5 to 10 acres	10	6	0	0	10	6
Total	160	100%	6	100%	166	100%
Secondary market area:						
Under 5,000 square feet	42	10%	160	25%	202	19%
5,000 to 10,000 square feet	110	26	420	66	530	50
10,001 square feet to half-acre	83	20	55	9	138	13
2 to 5 acres	177	42	0	0	177	17
5 to 10 acres	8	2	0	0	8	1
Total	420	100%	635	100%	1,055	100%

Source: John Child & Company based on information provided in the MLS Hawaii, Inc. REsearch TMK database.

DISTRIBUTION OF SINGLE-FAMILY LOT AND NEW HOME SALES BY PRICE
2000 – YTD May 2003

	Vacant Lots		House & Lots			
	Total	% of total	Total	% of total	Total	% of total
Primary market area:						
Less than $100,000	2	1%	0	0%	2	1%
$100,000 - $199,999	80	50	0	0	80	48
$200,000 - $299,999	48	30	1	17	49	30
$300,000 - $399,999	20	13	3	50	23	14
$400,000 - $499,999	7	4	2	33	9	5
$500,000+	3	2	0	0	3	2
Total	160	100%	6	100%	166	100%
Secondary market area:						
Less than $100,000	51	12%	1	0%	52	5%
$100,000 - $199,999	163	39	51	8	214	20
$200,000 - $299,999	190	45	317	50	507	48
$300,000 - $399,999	13	3	104	16	117	11
$400,000 - $499,999	2	0	133	21	135	13
$500,000+	1	0	29	5	30	3
Total	420	100%	635	100%	1,055	100%

Source: John Child & Company based on information provided in the MLS Hawaii, Inc. REsearch TMK database.

generally ranging from about $180,0000 to about $225,000. Buyers are primarily from the Upcountry area but include residents from other areas of Maui.

Secondary Market Area

- An estimated 249 vacant lots and improved single-family dwellings in the Maui Lani multi-phased community developed by Schuler Homes and others were sold over the past three years since 2000.
  - Vacant lot prices have generally ranged from about $100,000 to about $200,000 depending on size, frontage and views. Improved house and lot packages range from about $250,000 to about $500,000 for semi-custom built homes.
  - While Maui Lani buyers are predominantly existing residents of Wailuku-Kahului neighborhood, the project has attracted residents from as far as Lahaina and Kihei who cite the development's central location and affordability as strong selling points.
  - The 139-lot Legends at Maui Lani subdivision by Schuler Homes is the newest development within the Maui Lani community. A representative of the developer indicated over 300 buyers were qualified for the first 10 units released by lottery. Based on the strong demand for these homes and the estimated development timeline, the project could be sold out within a year.
- Kihei developments include 95 single-family dwellings in the Ke Ali'i Kai Subdivision and 66 lots in the Honu Alahele subdivision.
  - The 95 house and lots in Ke Ali'i Kai sold in just over a year at prices generally ranging from about $360,000 to $540,000. Based on a 15-month sell-out period, the project's average monthly absorption rate is estimated to be about 6 units per month.
  - The 66-lot Honu Alahele subdivision recently received final subdivision approval in July 2003. According to the principal broker for the development, marketing efforts were minimal, and all 66 house lots are under contract. About 60% of the buyers are relocating from the mainland U.S. Prices for the primarily 7,500± vacant house lots range from about $165,000 to about $200,000 and average $180,000.
- Marketing of the 184 2- to 3-acre estate lots in the Wailuku Country Estates subdivision began in about May 2002. As of May 2003, all but 12 lots were sold or in escrow, and the remaining 12 are expected to be sold within the next couple of months. The 172 lots that sold between May 2002 and May 2003 indicate an average monthly absorption rate of 14 lots. An estimated 80% of the buyers of the Wailuku Country Estates are Maui residents relocating from all over the island. Most are planning to build their primary residence and cite the project's central location, size and affordability as key attributes.

SELECTED RESIDENTIAL SUBDIVISION DEVELOPMENTS

No.	Subdivision name	Location	Date of final subdivision approval	Product [1]	Typical price range	Available lots (units)	Sales to Date: Total	Sales to Date: % sold	Estimated absorption period (months) [2]	Average absorption/ month
Primary market area:										
1	Kulamalu Subdivision	Pukalani	Mar-02	1/4 acre house lots	$170,000 - 200,000	57	57	100%	13	4
2	The Ridge at Kulamanu	Kula	Aug-03	1/4 acre house lots	180,000 - 225,000	57	50	88	N/A [3]	
3	West Kuiaka Meadows	Haiku	Jan-01	2 to 5 acre estate lots	230,000 - 310,000	14	16 [4]	100	8	2
4	Mauisolu Plantation	Haiku	Mar-02	2 acre estate lots	260,000 - 345,000	39	39	100	13	3
5	Kula Meadows	Kula	Oct-02	5 acre estate lots	410,000 - 575,000	16	13	81	9 [5]	-
Secondary market area:										
1	Hana Alakele Ph I & II	Kihei	Jul-03	7,500 sf house lots	165,000 - 200,000	66	66	100%	< 1 month	66
2	Wailuku Country Estates	Wailuku	Dec-02	2 to 3 acre estate lots	250,000 - 300,000	184	172	93	16 [6]	11
3	Ke Alii Kai Subdivision	Kihei	Feb-02	7,500 sf house and lots	360,000 - 540,000	95	95	100	15	6
4	Maui Lani Subdivision Incr. 5	Kahului	Mar-00	7,500 sf to 10,000sf house lots	Vacant- 100,000 140,000 Improved- 250,000 380,000	82	81	99	28	3 [7]
5	Maui Lani Islands & Bluffs	Kahului	Apr-00	7,500 sf to 10,000sf house lots	Vacant- 185,000 - 200,000 Improved- 360,000 500,000	100	99	99	29	3 [7]
6	Maui Lani Island & Bluffs II	Kahului	Jan-02	7,500 sf to 10,000sf house lots	Vacant- 185,000 - 265,000 Improved- 400,000 - 500,000	90	69	77	16	4 [7]

[1] Lot sizes shown are typical.

[2] Estimated based on the date the final subdivision approval was received or the reported date that the lots were first marketed and the date of the last recorded sale (or contract).

[3] The project was first marketed in the Multiple Listing Service in February 2000 as improved house and lots. The project was subsequently marketed as a vacant lot subdivision with final subdivision approval expected within a few weeks. To date, 50 of the 57 lots are reserved, and the project is expected to be fully sold within the next couple of months.

[4] Subdivision approval was granted for 14 lots in the West Kuiaka Meadows Subdivision. However, public records show sales of 16 lots.

[5] Thirteen lots of 3 to 6 acres were reportedly sold or reserved as of July 2003. The estimated absorption period assumes the remaining 3 lots of 16 to 25 acres each are sold within the next two months.

[6] Marketing began in about May 2002. By May 2003, all but 12 lots were sold. The estimated absorption period assumes the remaining 12 lots are sold within the next two months.

[7] Bozoff Brothers and Schuler Homes acquired vacant lots for speculative single-family home construction and resale. The estimated absorption period is based on the last recorded sale date of the improved product (i.e., intermediate sales from the developer to the homebuilders were not considered in the analysis).

Source: Maui County Department of Planning & Development - Services Administration, MLS Hawaii, Inc. Research TMK database and other public records, and/or interviews with parties involved.

The selected subdivision developments are identified in Exhibit III-G.

COMPETITIVE SUPPLY

The supply of existing and planned single-family housing on Maui is limited. As shown in Exhibit III-H, the current available inventory of new single-family lots and homes in the primary market area that are comparable to the proposed Kualono Subdivision are limited to 7 lots in the Ridge at Kulamanu and 3 large (16+ acres) estate lots in the Kula Meadows subdivision. Both projects are expected to be sold-out within the next couple of months.

Dowling Company is currently under construction on 12 lots at Kulamalu Hilltop. These lots average 10,000sf. The 12 lots at Kulamalu Hilltop are planned to go on market in August 2003 and to be sold-out by February 2004. The average price is expected to be greater than $225,000 per lot.

Discussions with real estate agents active in the residential real estate market indicate there are no other projects under construction. Including the 12 lots at Kulamalu Hilltop, a total of 94 lots in six subdivisions are proposed and pending final subdivision approval, as also shown in Exhibit III-H [1]. In comparison, 93 new single-family lots in the primary market area closed in 2002, as previously shown in Exhibit III-D. Based on the historical sales activity and reported pent-up housing demand in the area, the entire planned inventory could be absorbed within a year.

The current supply of competitive housing in the secondary market area includes 12 remnant lots in the Wailuku Country Estates and 129 single-family homes currently marketed as the Legends at Maui Lani subdivision by Schuler Homes [2]. A maximum of 142 lots are approved for four subdivisions in Kihei and Wailuku for a collective inventory of 293 new housing units. In comparison, a total of 255 lots and single-family homes sold within the first five months of 2003, as also shown in Exhibit III-D.

Nineteen projects with a maximum of 914 lots are pending final subdivision approval. These projects include additional phases within the Maui Lani and Kehalani communities. Based on the experience of other subdivisions within these communities, sales of lots or single-family homes within these proposed subdivisions could also be sold or reserved within a year after subdivision approval.[3]

[1] Excludes projects proposed by the Department of Hawaiian Home Lands.

[2] The Legends at Maui Lani subdivision includes 139 single-family homes. The first ten have already been reserved.

[3] The analysis does not consider the potential impacts on residential development in the secondary market area that could result from the recent designation of the Tao and Waihe'e aquifers as a state water management area.

Exhibit III-H

EXISTING AND PLANNED COMPETITIVE SUPPLY [1]

No.	Subdivision name	Location	Status of subdivision approval	Available (proposed) lots
Current inventory:				
Primary market area:				
1	Kula Meadows	Kula	Received	3 [2]
2	The Ridge at Kulamanu	Kula	Received	2 [3]
	Total primary market area			10
Secondary market area:				
1	The Legends at Maui Lani	Kahului	Pending	129 [4]
2	Honua Alahele Subdivision Ph I & II	Kihei	Received	0 [5]
3	Kilohana Honua Subdivision	Kihei	Received	30
4	Kilohana Mauka Subdivision	Kihei	Received	73
5	North Shore Village Subdivision	Paia	Received	24
6	Wailuku Country Estates	Wailuku	Received	12 [6]
7	Waiolani Elua Subdivision	Wailuku	Received	25
	Total secondary market area			293
Proposed projects [6]:				
Primary market area:				
1	Kaahikoa Hill Agricultural Subdivision	Haiku	Pending	18
2	Peahi Hui Lands	Haiku	Pending	19
3	Puen Hill Estates Subdivision	Kula	Pending	10
4	Kulamalu Hilltop Subdivision	Kula	Pending	12 [7]
5	Omalumalu Subdivision	Kula	Pending	25
6	Pithole Farms Subdivision	Makawao	Pending	10
	Total primary market area			94
Secondary market area:				
1	Maui Lani Island & Bluff-III	Kahului	Pending	37
2	Kenolio Mauka Subdivision	Kihei	Pending	13
3	One Wailea	Kihei	Pending	21
4	Alii Village Subdivision	Kihei	Pending	27
5	Honuani Subdivision	Kihei	Pending	28
6	Kihei Kauhale Subdivision	Kihei	Pending	59
7	Ke Alii Kai II Subdivision	Kihei	Pending	90
8	Waipuilani Subdivision	Kihei	Pending	97
9	Malaihi Ag Subdivision	Wailuku	Pending	10
10	Kehalani Mauka (Large-Lot) Subdivision No. 2	Wailuku	Pending	10
11	Waihee Mauka Ag Subdivision	Wailuku	Pending	14
12	Waiehu Aina Subdivision	Wailuku	Pending	17
13	Waiko Baseyard Subdivision	Wailuku	Pending	19
14	Wailuku Project District C-2 S	Wailuku	Pending	32
15	Waiolani Pikake Subdivision	Wailuku	Pending	38
16	Subdivision of Sites 1 & 4 at Kehalani	Wailuku	Pending	71
17	Subdivision of Site 20 of Kehalani	Wailuku	Pending	83
18	Waiehu Kou, Phase III	Wailuku	Pending	114
19	Subdivision of Site 21 of Kehalani	Wailuku	Pending	140
	Total secondary market area			914

[1] Residential subdivisions of 10 or more lots. Excludes subdivisions by the Department of Hawaiian Home Lands.
[2] Only three lots of 16 to 25 acres remain. These lots are expected to be sold within the next couple of months.
[3] Final subdivision approval is expected shortly. To date, all but 7 lots have been sold or are under contract, and the project is expected to be sold out within the next couple of months.
[4] The subdivision includes a total of 139 lots. Final subdivision is pending; however, the first ten lots have already been reserved.
[5] Final subdivision approval was recently received on July 3, 2003. All 66 lots are under contract.
[6] Only 12 of the total 184 lots were available as of May 2003. The project is expected to be sold out within the next couple of months.
[7] The 12 lots in the proposed subdivision are currently under construction. The project is expected to be sold by February 2004.

Source: John Child & Company based on public records and interviews with parties familiar with the subdivision developments.

IV – ASSESSMENT OF MARKET SUPPORT

This section presents the assessment of the market support for the proposed Kualono Subdivision in terms of the recommended sales prices and buyer profile for the proposed lots, the projected housing demand for the subdivision, and the assessment of the competitive position of the Kualono Subdivision.

CHARACTERISTICS OF THE PROPOSED KUALONO SUBDIVISION

The proposed Kualono Subdivision will include 49 residential house lots of about 18,000ℊ to about 25,000ℊ, as shown on the conceptual development plan included in Exhibit IV-A. House lots would be afforded views towards Haleakala and the West Maui Mountains. The proposed subdivision would be compatible with surrounding land uses.

The Kualono Subdivision lots are expected to appeal to existing homeowners seeking to trade up. The lots would be marketed for build-to-suit single-family residential development. Equity from the sale of an existing residence is typically used as the basis for a down payment.

Recent sales prices of comparable residential house lots in the primary and secondary market areas generally range from about $200,000 for a 10,000ℊ golf-course frontage lot in the Kulamalu Subdivision to over $500,000 for a 5-acre lot in the gated Kula Meadows subdivision.

Based on the size, location, and view potential of the proposed lots in the Kualono Subdivision, the individual lots could be priced from about $250,000 to about $350,000. Considering current construction costs, the price of an improved house and lot in the proposed subdivision could range between about $425,000 and $525,000.

Considering anticipated price levels and current mortgage underwriting criteria, households with annual incomes in excess of $72,000 constitute the income segment that could afford a property in the Kualono Subdivision, as shown in Exhibit IV-B.

PROJECTED HOUSING DEMAND

Based on the analyses presented in Section II, the annual demand for new housing in the primary and secondary market areas is projected to be as follows:

Projected Annual New Housing Demand

	Primary market area	Secondary market area	Total
2003 - 2005	134	310	444
2006 - 2010	181	441	622

CONCEPTUAL DEVELOPMENT PLAN

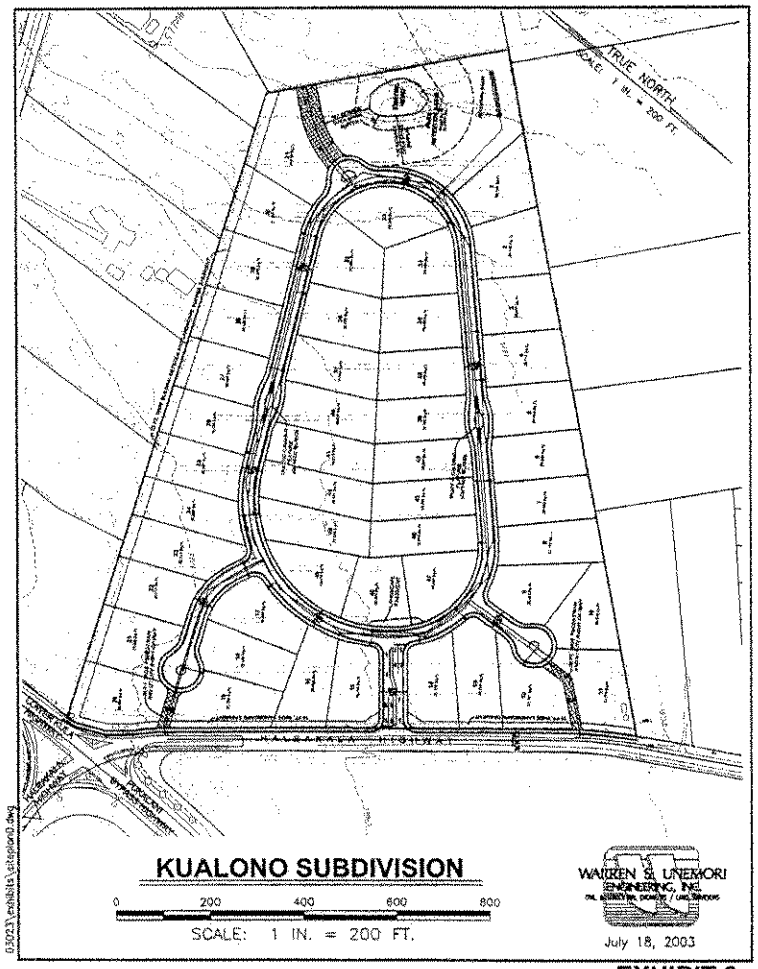


EXHIBIT 2

Source: Hanohano LLC

ANNUAL HOUSEHOLD INCOME REQUIREMENT

Estimated retail price of a vacant, Kualono Subdivision lot	$250,000	-	350,000
Estimated cost of new home construction [1]	175,000		175,000
Total house and lot cost	425,000	-	525,000
Less: down payment	30%	-	20%
Amount financed	300,000		420,000
Annual mortgage payment assuming a 6% interest rate and 30-year term, rounded	21,600	-	30,200
Divided by housing ratio	30%	-	25%
Estimated annual household income requirement, rounded	$72,000	-	$121,000

[1] Estimated cost for a standard, 1,500 square foot dwelling, for purposes of this analysis only.

Source: John Child & Company.

The annual effective new housing demand for the Kualono Subdivision lots considers the portion of the new housing demand able to afford the total cost of the vacant lot and cost to construct a primary residence.

About 70% of the population in the primary and secondary market areas have a household income of $75,000 or less, as shown in Exhibit IV-C. Households in this segment of the population are considered unlikely purchasers of single-family homes at the $425,000+ price level and are excluded from the estimates of effective demand for the Kualono Subdivision lots.

Based on the historical income distribution, about 30% of new households in the primary market area and 26% of new households in the secondary market area are projected to have an annual household income of $75,000 or more. This household segment is considered to be the most likely purchasers of the Kualono Subdivision lots and competitively priced single-family developments.

Based on the analysis, about 40 new housing units priced at $425,000 or more (or, alternatively, vacant lots priced from about $250,000) are projected to be required in the primary market area between 2003 and 2005. The annual demand for residential product in this price category is projected to increase to about 54 units in 2006. Similarly, the annual effective new housing demand in the secondary market area is projected at about 81 units over the next three years and 115 units annually through 2010, as shown in Exhibit IV-D.

ASSESSMENT OF COMPETITIVE POSITION

In assessing the competitive position and projected market share for the Kualono Subdivision, the following factors were considered.

- Convenient location in Upcountry Maui
- Physical characteristics of the lots, including half-acre lot size and view potential
- Estimated retail prices for the lots
- Limited supply of competitive product planned or under construction
- Lack of comparable development sites with entitlements and/or utilities.

Based on these considerations, the Kualono Subdivision lots could capture at least 50% of the annual effective new housing demand in the primary market area and 25% of the annual effective new housing demand in the secondary market area. Consequently, the projected absorption rate for the Kualono Subdivision lots is about 40 lots per year, or about 3 to 4 lots per month, as shown in Exhibit IV-E. The projected absorption rate is considered to be reasonable based on the estimated absorption rates for recent residential subdivisions on Maui including the Wailuku Country Estates and Kulamalu subdivision, as previously shown in Exhibit III-G.

Based on the projected absorption rate, the 49 lots in the proposed Kualono Subdivision are projected to be absorbed within two years.

DISTRIBUTION OF HOUSEHOLDS BASED ON ANNUAL HOUSEHOLD INCOME
2000

	Primary Market Area		Secondary Market Area	
Annual household income	Total households	% of total	Total households	% of total
Less than $50,000	5,054	46.6%	11,039	52.1%
$50,000 - $74,999	2,546	23.5	4,644	21.9
$75,000 - $100,000	1,510	13.9	2,424	11.4
$100,000+	1,726	15.9	3,081	14.5
Total	10,836	100.0%	21,188	100.0%

Source: 2000 U.S. Census.

Kualono Subdivision

Exhibit IV-D

PROJECTED EFFECTIVE NEW HOUSING DEMAND
2003 - 2010

	Projected New Housing Demand		Income Qualied Households		Projected Effective New Housing Demand		
Year	Primary market area	Secondary market area	Primary market area	Secondary market area	Primary market area	Secondary market area	Total
2003	134	310	30%	26%	40	81	121
2004	134	310	30	26	40	81	121
2005	134	310	30	26	40	81	121
2006	181	441	30	26	54	115	169
2007	181	441	30	26	54	115	169
2008	181	441	30	26	54	115	169
2009	181	441	30	26	54	115	169
2010	181	441	30	26	54	115	169

Source: John Child & Company.

Kualono Subdivision

Exhibit IV-E

PROJECTED DEMAND FOR KUALONO SUBDIVISION LOTS
2004 - 2010

	Annual Effective New Housing Demand		Kualono Subdivision Market Share		Projected Demand for the Kualono Subdivision Lots		
Year	Primary market area	Secondary market area	Primary market area	Secondary market area	Primary market area	Secondary market area	Total
2004 [1]	40	81	50%	25%	20	20	40
2005	40	81	50	25	20	20	40
2006	54	115	50	25	27	29	56
2007	54	115	50	25	27	29	56
2008	54	115	50	25	27	29	56
2009	54	115	50	25	27	29	56
2010	54	115	50	25	27	29	56

[1] Assumes the 49 lots in the Kualono Subdivision would not be available until 2004.

Source: John Child & Company.

CERTIFICATION

We certify, to the best of our knowledge and belief:

- Reported statements of fact are true and correct.
- Reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and are our unbiased professional analyses, opinions and conclusions.
- We have no present or prospective interest in the property that is the subject of this report, and we have no personal interest or bias with respect to the parties involved.
- Our engagement was not contingent upon developing or reporting predetermined results.
- Our compensation is not contingent on the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event and is not contingent on an action or event resulting from the analyses, opinions or conclusions in, or use of, this report.
- The reported analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Appraisal Institute's Code of Professional Ethics and Standards of Professional Appraisal Practice, which include the Uniform Standards of Professional Appraisal Practice.
- The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives. It is also subject to the same review by the Counselors of Real Estate and the American Society of Appraisers.
- The State of Hawaii has a Real Estate Appraiser Certification program. As of the date of this report, Paul D. Cool, MAI (CGA-71) and Shelly H. Tanaka (CGA-648) are certified general appraisers by the State of Hawaii.
- As of the date of this report, Paul D. Cool, MAI has completed the requirements of the continuing education program of the Appraisal Institute.
- Paul D. Cool, MAI and Shelly H. Tanaka made a personal visit to the real estate that is the subject of this report.
- No one other than the undersigned prepared the analysis, opinions and conclusions in this report.

JOHN CHILD & COMPANY, INC.

Paul D. Cool, MAI, CRE
Vice President

Shelly H. Tanaka
Appraiser

Date signed: August 4, 2003

QUALIFICATIONS OF JOHN CHILD & COMPANY

SCOPE OF PROFESSIONAL SERVICES

Background

John Child & Company is a professional corporation that specializes in real estate consulting, appraisal, and business valuation. Since 1937, it has continued to revolutionize the field with innovative ways of ensuring and expanding the growth of its clients.

The Company provides a critical knowledge of local market conditions and trend, gained from analysis and interpretation of the community and economy of Hawaii. As a result, clients receive sound alternatives and progressive solutions backed by experience and insight.

Its professional team members hold local, regional and national leadership positions in their professional organizations and teach at universities, helping to establish and promote the highest standards of professional practice and ethics for the industry.

The strength of the Company is based on its commitment to quality and timeliness, expressed in the accountability through which it has achieved its growth and earned the trust and confidence of its clients for over 60 years.

Real Estate Consulting and Appraisal

The Company's real estate consulting and appraisal practice includes a range of specialized services covering real estate in Hawaii and the Pacific area. Professional services include:

- Valuation of real estate
- Market and financial feasibility analyses
- Highest and best use studies
- Economic and fiscal impact assessments
- Arbitration
- Litigation support
- Valuation of fractional interests in real estate.

Prior assignments cover a variety of real estate interests including fee simple, leasehold, leased fee and other partial rights and fractional interests. These assignments cover a variety of land uses and property types such as:

- Agricultural, conservation and vacant land
- Golf courses
- Healthcare facilities
- Hotels and resort properties
- Industrial property
- Master planned and mixed-use projects
- Office buildings and commercial property
- Residential developments (single-family, multi-family and condominium)

- Redevelopment projects
- Shopping centers and retail facilities
- Special-purpose property
- Timeshare intervals.

Business Valuation

The Company's business valuation practice includes the valuation of closely-held businesses, including controlling and minority interests in corporations, partnerships, limited liability companies (LLCs) and limited liability partnerships (LLPs). Its business valuation practice provides assistance in:

- Analysis of minority interest and marketability discounts
- ESOP valuation
- Estate planning, estate and gift tax reporting
- Litigation support
- Lost earnings
- Marital dissolution
- Mergers and acquisitions
- Stock transfers and redemptions.

REPRESENTATIVE ASSIGNMENTS

The Company has prepared real estate consulting and appraisal assignments and business valuations for over 60 years. Recent assignments that are representative of its current real estate consulting and business valuation practices are briefly described.

Real Estate Consulting and Appraisal

The Company's real estate appraisal and consulting practice covers a variety of properties and property interests. Real estate interests include fee simple, leasehold, leased fee and other partial rights and fractional interests. Representative projects are listed by development type as follows:

Redevelopment

Aloha Tower	Kakaako Revelopment Plan	Pawaa Redevelopment Masterplan
Honolulu Waterfront Master Development Plan	Kakaako Waterfront Park	Kapalama Development Complex

Resorts

Kaanapali North Beach	Mauna Kea	Hawaiian Rivera (proposed)
Kauai Lagoons	Princeville	Kaupulehu (proposed)
Ko Olina	Waikoloa Beach Resort	Manini'owali (proposed)
Kuilima	Wailea Resort	Regents International (proposed)

Hotels

Ala Moana Hotel	Hyatt Regency Maui	Pacific Beach Hotel
Coco Palms	Kahala Hilton	Princeville Hotel
Embassy Suites Kaanapali	Kea Lani Hotel	Sheraton Poipu Beach
Hilton Hawaiian Village	Kona Village	Wailea Beach Resort
Hotel Hana Maui	Maui Marriott	Waikiki Circle Hotel
Hyatt Regency Waikiki	Maui Wailea Inter-Continental Hotel	Waikiki Beachcomber

Shopping Centers

Ala Moana	Koolau Center	Princeville
Coconut Grove	Lanihau Center	Royal Hawaiian
Enchanted Lakes	Mililani	Wailea Shopping Village
Hawaii Kai	Pearl City	Windward City
Hawaii Kai Towne Center	Prince Kuhio Mall	Windward Mall
Koko Marina		

Golf Courses

Asahi Kanko Olomana Course	Ko Olina	Waikapu Country Club
Dunes at Maui Lani (proposed)	Mid-Pac Country Club	Waikele
Hawaii Country Club	Pearl Country Club	Waikoloa (Kings)
Hawaii Kai	Princeville (Makai and Prince)	Waikoloa Village (two proposed)
Kaanapali	Sandalwood Golf Course	Wailea (Blue, Emerald, Gold)
Kauai Lagoons (Kiele and Lagoons)		

Office Buildings

1164 Bishop	Financial Plaza of the Pacific	HMSA Building
Ala Moana Building	Grosvenor Center	Pan Am Building
Ala Moana Pacific Center	Harbor Court	Waialae Building
ANA Kalakaua Center	Hawaiian Life Building	Waikiki Bank of Hawaii Building
Commerce Tower	Hawaii National Bank	Waikiki Trade Center
Davies Pacific Center		

Industrial Properties

Airport Trade Center	Halawa Center	Panasonic/Technics Center
Bougainville Commercial Center	Hawaii Business Center	Robinson Industrial Tract
	Lihue Industrial Park	

Residential

Ewa by Gentry	Kamehame Ridge	One Archer Lane
Harbor Court	Ko Olina Fairways	Royal Capitol Plaza
Honolulu Park Place	Makakilo	Uplands at Maunakea
Imperial Plaza	Mawaena Kai	Victoria Tower
Kalele Kai	Mililani	Wailea Golf Vistas
Kamaole Heights	Nauru Tower	Wailea Pualani Estate

Healthcare

Arcadia Retirement Residence	Regency at Hualalai (assisted living)	Straub Hospital & Clinic
Kauai Care Center (skilled nursing facility)		

Special Purpose

- Cemeteries/Memorial Parks
- Chinese Cultural Plaza
- Condominium Lease to Fee Conversion
- Hawaii Newspaper Agency Building
- Hawaiian Home Land Claims
- Kanepuu Conservation Easement
- Kapaa Land Fill
- Kaumalapau Harbor
- Kealia Pond
- NAS Barbers Point Electrical Distribution System
- Palmyra Atoll
- Residential Lease to Fee Conversation
- State of Hawaii Airports
- Telecommunications Sites
- Visitor Attractions

Business Valuation

The Company's business valuation practice focuses on closely-held businesses in Hawaii. Business valuation assignments typically estimate the market value of a closely-held corporation or partnership and the value of minority interests in the business.

These assignments are prepared to assist in estate planning and estate and gift tax reporting to the Internal Revenue Service. Business valuations are also used to assist in litigation, mergers and acquisitions covering controlling and minority interests in the closely-held businesses.

Recent valuations of closely-held businesses include:

Corporations

- Aala Produce, Inc. - supplier of provisions to vessels
- Finance Investment, Ltd. - real estate developer, investor and provider of diversified financial services
- Gay & Robinson, Inc. - sugar grower
- Jas W. Glover Holding Company, Ltd. - construction contractor
- K. Inouye Properties, Inc. - real estate investor and manager
- Loyalty Development Company, Inc. - real estate developer, investor and manager
- Palani Ranch Company, Inc. - cattle rancher
- Sen Plex Corporation - plumbing and air conditioning contractor, real estate manager
- SSFM Engineers - professional engineering services

Limited Partnerships and Limited Liability Companies

- Aaron Properties Partners of Hilo - Hilo Burger King
- Caroline J. Robinson Limited Partnership - real estate investor
- CGB Partners - real estate investor
- J.L.P. Robinson LLC - real estate investor
- K.J.L. Associates - real estate investor and manager
- KVH Partners - real estate investor
- Lanihau Partners - real estate developer and manager
- Leong Brothers - real estate investor and manager
- Loyalty Investments - real estate investor
- Taihook Associates - real estate investor and manager

CLIENTS

The Company provides professional services to a range of clients representing private, non-profit and public interests. Selected clients in private industry, non-profit organizations and public agencies are listed.

PRIVATE INDUSTRY

Attorneys/Accountants

- Alston Hunt Floyd & Ing
- Ashford & Wriston
- Cades Schutte Fleming & Wright
- Carlsmith Ball
- Case & Lynch
- Chun Kerr Dodd Beaman & Wong
- Dwyer Imanaka Schraff Kudo Meyer & Fujimoto
- Goodsill, Anderson, Quinn & Stifel
- Hong Iwai & Hulbert
- Ing Horikawa Kuwada & Jorgensen
- Kobayashi, Sugita & Goda
- KPMG Peat Marwick
- McCorriston Miller Mukai McKinnon
- Milberg Weiss Bershad Hynes & Lerach
- Oshima Chun Fong & Chung
- Paul Johnson Park & Niles
- Price Okamoto Himeno & Lum
- Rush Moore Craven Sutton Morry & Beh
- Tom & Petrus
- Torkildson Katz Jossem Fonseca Jaffe Moore & Hetherington
- White & Tom

Architects/Planners

- AM Partners, Inc.
- Belt Collins & Associates
- C.H. Guernsey & Company
- Helber, Hastert & Fee Planners
- Kober/Hanssen/Mitchell Architects
- Leo H. Daley/Alfred A. Yee Division
- Parsons Brinckerhoff Quade & Douglas, Inc.
- PBR Hawaii
- RM Towill Corp.
- Townscape, Inc.

Banks/Lenders

- Bank of America
- Bank of Hawaii
- Chemical Bank
- Citibank, N.A.
- City Bank
- Continental Bank, Chicago
- First Federal Savings and Loan Association
- First Hawaiian Bank
- Fukuoka City Bank
- GE Capital Hawaii, Inc.
- GE Capital Real Estate
- GMAC Commercial Mortgage
- Hawaii National Bank
- Honolulu Federal Savings
- Key Commercial Mortgage
- Liberty Bank, Connecticut
- Nippon Credit Bank
- Orix Corporation
- Sanwa Bank, Ltd.
- The Bank of Tokyo-Mitsubishi, Ltd.
- The Chuo Mitsui Trust & Banking Co., Ltd.
- The Daiwa Bank, Ltd.
- The Industrial Bank of Japan, Ltd.
- The Kyowa-Saitama Bank
- The Long-Term Credit Bank of Japan, Ltd.
- Wells Fargo Bank

Builders

- Armstrong Builders, Ltd.
- Charles Pankow Builders
- Pacific Construction Co., Ltd.
- Tokyu Construction Co., Ltd.

Closely Held Corporations/Limited Partnerships/Family Trusts

- Akala Partners (Twigg-Smith family)
- Gay & Robinson (Selwyn Robinson family)
- Jas. W. Glover Holding Company, Ltd. (Van Orden family)
- J.L.P. Robinson LLC (James L.P. Robinson family)
- KJL Associates (Luke family)
- KVH Partners and CGB Partners (Knudsen Trust beneficiaries)
- Lanihau Partners, LP
- Leong Brothers
- Loyalty Development, Loyalty Investments (Ching family)
- MAR Trusts (Mark A. Robinson, Sr. Family)
- Palani Trust (Greenwell family)
- Sen Plex Corp. (Sen family)
- Taihook Associates

Developers/Landowners

- A&B Properties, Inc.
- Aloha Towers Associates
- Bedford Properties, Inc. (fka Kaiser National Housing Corporation Development Company)
- Bradley Holdings
- Central Pacific Realty
- Chiyoda Hawaii Corporation
- Dowling Company, Inc.
- Finance Realty
- Gentry Companies
- Hanalei Land Company
- Haseko (Hawaii), Inc.
- Hemmeter/Tokyu Waterfront Joint Venture
- Kaneohe Ranch
- McCormack Properties
- Nansay Hawaii
- Niu Pia Farms
- O. G. Hawaii Corporation
- Pahio Development
- Pauahi Management Corp.
- Stone Companies
- Tesoro Hawaii Corporation
- The Estate of James Campbell
- The Myers Corporation
- The Queen Emma Foundation
- Toyo Real Estate Co., Ltd.
- Violet Hee Lum Properties, Inc.

Diversified Corporations

- Amfac/JMB Hawaii, Inc.
  - Amfac Property Development Co.
- Azabu USA Corporation
- Dole Foods (fka Castle & Cooke, Inc.)
  - Castle & Cooke Retail
  - Mililani Town, Inc.
  - Oceanic Properties, Inc.
- Kitano Indo Gaisa Co., Ltd.
- Kokusai-Motorcars Co., Ltd.
- Nissho Iwai Corporation
- Shimizu Corporation
- Shinwa Golf Kabushiki Kaisha

Investors/Investment Bankers/Insurance Companies

- IDG Realty, Ltd.
- ITOCHU Corporation (C. Itoh & Co., Ltd.)
- MassMutual
- Meridian Pacific
- The Equitable Life Assurance Society of the United States of American

Resort Operators/Owners

- Alpha U.S.A., Inc.
- Kapalua Land Company, Ltd.
- Princeville Development Company
- Wailea Resort Company, Inc.
- Shinwa International

Retailers

- City Mill Co., Ltd.
- J.C. Penney Company, Inc.
- Kyotaru International
- Louis Vuitton Hawaii, Inc.
- McDonald's Restaurants of Hawaii

Trust Companies and Trusts

- Bishop Trust Co., Ltd.
- First Hawaiian Trust
- Hawaiian Trust Co., Ltd.
- Knudsen Trusts
- Liliuokalani Trust

NON-PROFIT ORGANIZATIONS

- Chaminade College
- Kamehameha Schools
- KCAA Pre-Schools of Hawaii
- Nature Conservancy
- Punahou School
- Straub Hospital
- Young Women's Christian Association (YWCA)
- Trust for Public Land

PUBLIC AGENCIES

Bank Regulatory Agencies

- Federal Depository Insurance Corporation (FDIC)
- Federal Home Loan Bank Board (FHLBB)

City & County of Honolulu

- Honolulu Public Transit Authority
- Dept. of Housing and Community Development
- Department of Public Works
- Department of the Corporation Counsel

County of Hawaii

- Department of Finance

County of Kauai

- Department of Water

Federal Agencies

- Internal Revenue Service
- U.S. Attorney General
- U.S. Department of the Army
- U.S. Department of the Navy
- U.S. Dept. of Interior, Fish & Wildlife Service

Public Utilities

- Citizens Utilities Company - Kauai Electric
- GTE Hawaiian Telephone Co.
- Hawaiian Electric Industries (HEI, Inc.)
- Pacific Resources, Inc.

State of Hawaii

- Attorney General
- Department of Hawaiian Home Lands
- Department of Land & Natural Resources
- Department of Transportation
- Hawaii Community Development Authority
- Housing Finance and Development Corporation
- Office of State Planning

PROFESSIONAL TEAM QUALIFICATIONS

The Company's professional team has a wide range of real estate experience gained through a range of field experience, professional accomplishments, training and education. Team members have earned their reputation for quality work and professional service.

Professional Designations

Team members hold designations earned from the major professional organizations. Team members have earned the MAI (Members Appraisal Institute) designation from the Appraisal Institute, the CRE (Counselor of Real Estate) from The Counselors of Real Estate (formerly the American Society of Real Estate Counselors and ASA (Senior Member) from the American Society of Appraisers.

State Certification

Members of the professional team are Certified General Appraisers under the State of Hawaii license and certification program and are qualified to prepare appraisal reports for mortgage financing purposes for federally insured lending institutions.

Other Qualifications and Training

Professional team members are qualified as expert witnesses in the courts of Hawaii, California and Massachusetts; instruct and lecture at the University of Hawaii and for various business and professional organizations; serve as review appraisers and arbitrators; and continue to attend courses, seminars and workshops to strengthen their own specialized appraisal skills and education.

Professional Team Members

Professional team members include:

- Karen Char, MAI, CRE, ASA, President
- Paul D. Cool, MAI, CRE, Vice President
- Robert J. Vernon, MAI, CRE, ASA
- Cynthia C. Nakamura, Appraiser
- Shelly H. Tanaka, Appraiser
- Cora A. Wakatsuki, Appraiser

The education and professional experiences of team members are outlined in their accompanying resumes.

PAUL D. COOL, MAI, CRE
Vice President

Paul joined John Child & Company in 1972. He has appraised property on all the major islands in Hawaii. He was recently involved in an assignment on the island of Diego Garcia in the Indian Ocean; he has also valued properties on the U.S. Mainland and on Guam.

Paul has extensive knowledge about Hawaii's resort properties. Over the past 10 years, Paul has appraised over $10 billion in hotel and resort properties.

Paul serves in leadership positions in NAIOP Hawaii (the Hawaii Chapter of the National Association of Industrial and Office Properties), the Hawaii Chapter of the Counselors of Real Estate, and the Appraisal Institute.

Education

- Bachelor of Business Administration, Business Economics and Quantitative Methods, University of Hawaii, 1980

- Successfully completed various courses, workshops, and seminars sponsored by the Appraisal Institute, including:
  - Appraisal Institute, Scope of Work, 2002
  - Appraisal Institute, Specialized Appraisal Issues, 2002
  - Appraisal Institute, Real Estate Disclosure, 2001
  - Appraisal Institute, Real Estate Fraud, 2001
  - Appraisal Institute, Conservation Easements, 2001
  - Appraisal Institute, Standards of Professional Practice Part C, 1999
  - Appraisal Institute, The Appraiser as an Expert Witness, 1999
  - Appraisal Institute, Detrimental Conditions in Hawaii, 1997
  - Appraisal Institute, Standards of Professional Practice Part A, 1996
  - Appraisal Institute, Environmental Risk and the Real Estate Appraisal Process, 1995
  - Appraisal Institute, Highest and Best Use and Market Analysis, 1994
  - Appraisal Institute, Valuation of Leased Fee Interests, 1993
  - Appraisal Institute, Valuation of Leasehold Interests, 1993

Professional Associations

- Member, Appraisal Institute (MAI designation)
  - President, Hawaii Chapter, 2001
  - Member, Regional Ethics Panel, 1998
  - Chair, Hawaii Chapter Admissions Committee, 1997
  - Chair, Hawaii Chapter External Affairs Committee, 1996
  - Chair, Hawaii Chapter Candidate Guidance Committee, 1994 - 1995
  - Member, Young Advisory Council, 1996.

- Member, The Counselors of Real Estate (formerly the American Society of Real Estate Counselors, CRE designation)
  - Chairperson, Hawaii Chapter, 2001
  - Alternate Chief Delegate, 20th Pan Pacific Congress - Auckland, New Zealand, 2000
  - Alternate Chief Delegate, 19th Pan Pacific Congress - Singapore, 1998

Other Real Estate Associations

- Member, Hawaii Chapter of the National Association of Office and Industrial Properties (NAIOP Hawaii)
  - President, Hawaii Chapter, 2002
  - Chair, Public Relations Committee, 2000 - 2003
  - Chair, Membership Committee, 1998 - 1999
  - Chair, Government Affairs Committee, 1997

Professional Experience

- Vice President, John Child & Company, Inc. (1972 to present)

Professional Certification

- The Appraisal Institute conducts a voluntary program of continuing education for its designated members. Members who meet the minimum standards of this program are awarded periodic educational certification. Paul D. Cool, MAI is certified under this program.

State Certification

- Certified General Appraiser, State of Hawaii, License Number CGA-71, expiring December 31, 2003.

Court Testimony

- Qualified as an expert witness in the valuation of real property in the Courts of the State of Hawaii.

SHELLY H. TANAKA
Appraiser

Shelly prepares valuations of closely held businesses and real estate. Her business valuations include limited partnerships, corporations, and limited liability companies (LLCs) and limited liability partnerships (LLPs). Because of her familiarity with both real property and business valuation, she is able to effectively assist clients in their acquisitions and mergers, stock transfers and redemptions, estate planning and gifting decisions, internal accounting, ESOP reporting, and divorce settlement.

Shelly's real estate valuations include commercial, industrial, residential, and agricultural properties on Oahu, Maui, Kauai, and Hawaii. Shelly appraises leasehold, leased fee, and fee simple interests, undivided fractional interests, and timeshare intervals for attorneys, landowners and developers, U.S. and Japanese banks, trusts, estates and corporations. Recently, Shelly completed health care market assessments and real estate appraisals for a skilled nursing home, an assisted living project and other health care facilities on Oahu, Kauai, and the island of Hawaii.

In addition Shelly is proficient in research and analysis for litigation. She has worked on two class action lawsuits providing complex and timely analysis to assist in settlement negotiations.

Shelly joined the Company in August 1998 while pursuing a Master in Business Administration degree at the University of Hawaii at Manoa. During her study, she was admitted to the Beta Gamma Sigma honor society and graduated from the MBA program With Distinction in December 1998. Shelly obtained her undergraduate degree in psychology at the University of California at Los Angeles where she graduated Cum Laude in 1994.

Education

- Master of Business Administration, With Distinction, University of Hawaii at Manoa, 1998
  - Beta Gamma Sigma Honor Society, 1997
- Bachelor of Arts, Psychology, Cum Laude, University of California at Los Angeles, 1994
  - Golden Key Honor Society, 1994
  - Phi Eta Sigma Honor Society, 1990
  - Alpha Lambda Delta Honor Society, 1990
- Iolani School, Magna Cum Laude, 1990
- Successfully completed courses, workshops and seminars including:
  - Appraisal Institute, Standards of Professional Practice Parts A and B, 2001
  - Appraisal Institute, Appraisal Principles, 2001
  - Appraisal Institute, Appraisal Procedures, 2001
  - Appraisal Institute, Industrial Valuation, 1998
  - Appraisal Institute, Advanced Sales Comparison, 2000

Professional Association

- Associate, Appraisal Institute (candidate for MAI designation)

Professional Experience

- Appraiser, John Child & Company, Inc. (1998 to present)
- Corporate Loan Representative, Central Pacific Bank (1997 - 1998)

State Certification

- Certified General Appraiser, State of Hawaii, License Number CGA-648, expiring December 31, 2003.

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

MAY 18 2004

ALAN M. ARAKAWA
Mayor

ALICE L. LEE
Director

HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

May 12, 2004

Ms. Gwen Ohashi Hiraga
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Ohashi Hiraga:

SUBJECT: PROPOSED KUALONO (fka HANOHANO) SUBDIVISION, PUKALANI, MAUI, HAWAII

In response to your letter of March 19, 2004, this is to provide confirmation that the affordable housing requirements for the proposed 49-lot subdivision is 10%. As we discussed, Hanohano, LLC will be required to provide a per unit cash contribution for a total of $125,000.00 (10% of 49 lots = 5 lots x $25,000.00).

As we further discussed, these funds would be provided as a donation to Habitat for Humanities for its use in providing affordable housing units. Payment of the cash contribution (donation) is expected to be paid up front, and will be a condition of final subdivision approval.

Please proceed in preparing the appropriate Affordable Housing Agreement for review by my office. You may also proceed in contacting Habitat for Humanities to discuss the details of a Donor Agreement with the organization.

Should you have any questions, please feel free to call me.

Sincerely,

ALICE L. LEE
Director

cc: Don Fujimoto, Hanohano, LLC

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

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

DEPARTMENT OF PARKS & RECREATION

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

May 17, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

Dear Mr. Fujimoto:

SUBJECT: KUALONO SUBDIVISION

This letter is to confirm that the Department of Parks and Recreation approves the utilization of park credits from the Kulamalu Park to satisfy the park assessment requirement for the Kualono Subdivision. A draft dedication agreement is currently being reviewed by the Department. We understand that the park is currently under construction. This assignment shall be executed once construction is complete and the dedication agreement approved.

Sincerely,

GLENN T. CORREA
Director

c: Patrick Matsui, Chief of Parks Planning and Development

TRAFFIC IMPACT ANALYSIS REPORT
KUALONO SUBDIVISION
PUKALANI, MAUI, HAWAII

December 1, 2003

Prepared for:

Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817-5031
Telephone: (808) 533-3646
Facsimile: (808) 526-1267
E-mail: atahnl@atahawaii.com
Honolulu • Wailuku, Hawaii

TRAFFIC IMPACT ANALYSIS REPORT
KUALONO SUBDIVISION
PUKALANI, MAUI, HAWAII

Prepared for

Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

Prepared by
Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku, Hawaii

December 1, 2003

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TRAFFIC IMPACT ANALYSIS REPORT
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PUKALANI, MAUI, HAWAII

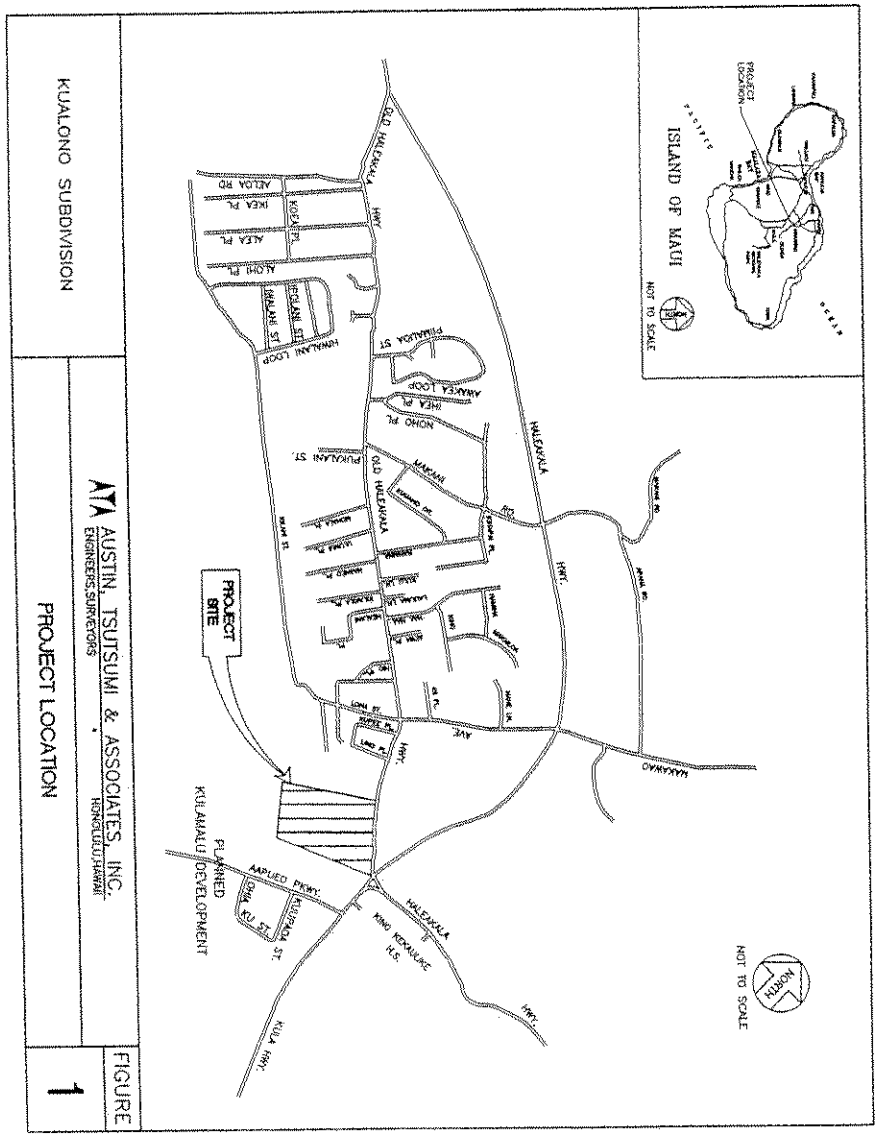
VI. INTRODUCTION

C. Purpose and Scope

This report documents the findings and recommendations of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. to evaluate the potential traffic impacts resulting from the development of the Kualono Subdivision (herein after referred to as the Project).

D. Project Location

The proposed Project is located in the Pukalani area on the Island of Maui, west of the Haleakala Highway/Kula Highway/Old Haleakala Highway intersection (also known as the Five Trees junction). Presently, lands to the north, west, and most of the area south of the Project site are vacant and undeveloped. The eastern boundary of the Project site fronts Old Haleakala Highway. The Project site encompasses approximately 28.7 acres and is more specifically identified as TMK: 2-3-11: 01 and 02. Figure 1 shows the location of the Project site.



E. Project Description

The Project will consist of approximately 49 single-family house lots with a minimum lot size of 18,000 square feet. The Project will also include a drainage retention basin located along the northwestern boundary of the Project site, and adjacent 9.232 acre park. Construction of the Project is anticipated to be completed by the first quarter of 2005. Owners of the house lots will be responsible for construction of individual single-family homes at their leisure. A new Project roadway, referred to in this report as Road A, will intersect with Old Haleakala Highway and provide vehicular access to the Project. Figure 2 shows the site plan for the Project.

F. Study Methodology

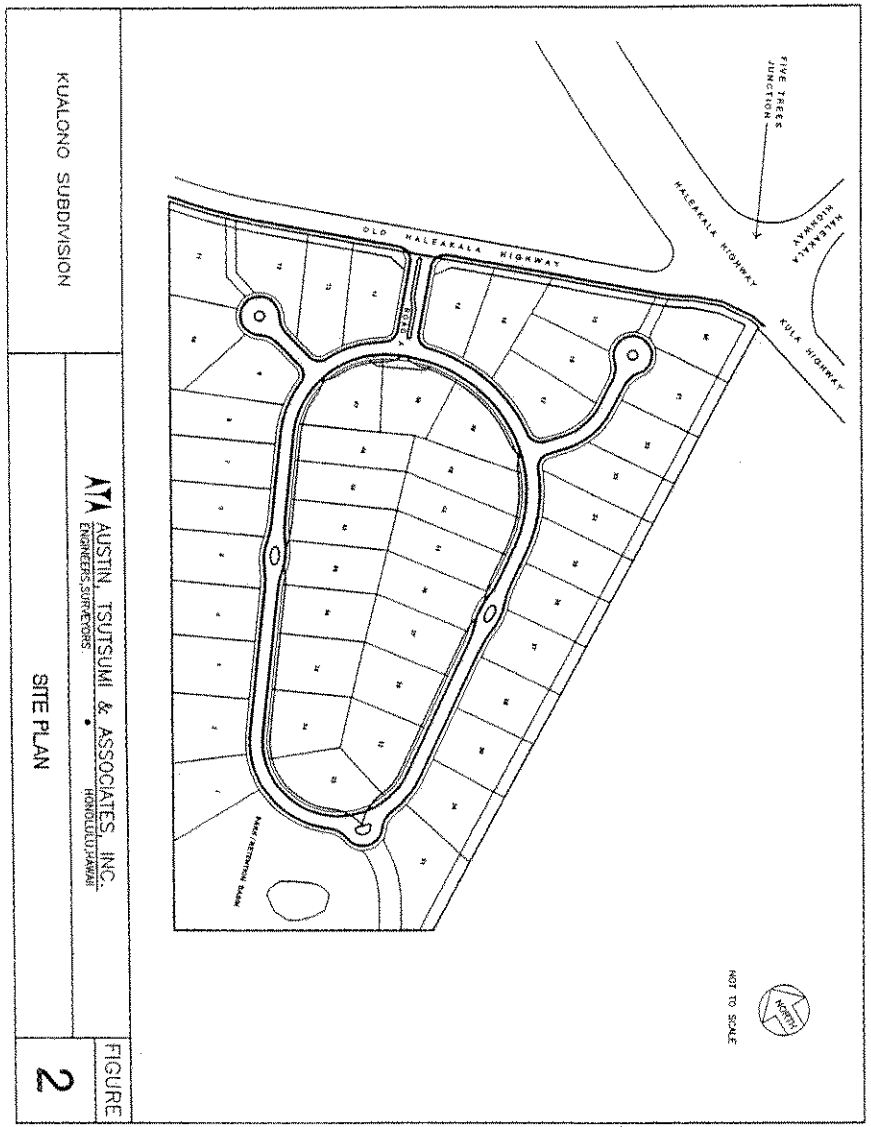
This study will address the following:

1. Existing traffic operating conditions at key locations 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 Upcountry Maui which are expected to be completed and occupied by the base year, and generate significant traffic demand within the study area.
3. Trip generation and traffic assignment characteristics for the proposed Project.
4. The potential impact(s) of Project-generated traffic on base year traffic operations.
5. Traffic mitigation measures as appropriate, to mitigate the traffic impacts resulting from background and Project-generated traffic within the study area.

VII. EXISTING CONDITIONS

C. Roadway System

The following is a brief description of the existing roadway network in the vicinity of the Project:



Haleakala Highway is generally a two-lane, State highway that links Kahului with Haleakala National Park. The roadway intersects Hana Highway in Kahului on the west side of Kahului Airport. Haleakala Highway is generally oriented in the east-west direction, beginning in Kahului, intersecting Old Haleakala Highway and Kula Highway at the Five Trees junction and terminating at Haleakala National Park. Haleakala Highway is a three-lane facility from Hana Highway to Makawao Avenue with two lanes in the eastbound (mauka) direction and a single lane in the westbound (makai) direction. Haleakala Highway has a posted speed limit of 45 miles per hour (mph) on the section between Makawao Avenue and Kula Highway. East of the Five Trees junction, Haleakala Highway has a posted speed limit of 30 mph except for the section fronting King Kekaulike High School, where the speed limit is reduced to 25 mph during the morning and afternoon peak periods of school traffic.

Kula Highway is a two-lane, rural, arterial, State highway that connects the Pukalani area with the Ulupalakua area. Kula Highway is generally oriented in the north-south direction and begins in Pukalani at the Five Trees junction of Old Haleakala Highway and Haleakala Highway. Kula Highway eventually becomes Piilani Highway south of the study area. In the vicinity of the Project site, Kula Highway has a posted speed limit of 45 mph. Fronting King Kekaulike High School, the speed limit is reduced to 25 mph during the morning and afternoon peak hours of school traffic. Fronting Kula Elementary School, the speed limit is reduced to 20 mph during school hours.

Old Haleakala Highway is a two-lane, County collector road that serves the Pukalani area. Old Haleakala Highway provides a parallel route to Haleakala Highway through the town of Pukalani. Old Haleakala Highway is oriented in the north-south direction as it intersects with Haleakala Highway approximately one-half mile east of Hali'imaile Road and changes to an east-west roadway through Pukalani and terminates at the Five Trees junction at Haleakala Highway and Kula Highway. Old Haleakala Highway has a posted speed limit of 35 mph.

Makani Road is a two-lane, County collector road that serves Pukalani town and Makawao town. Makani Road is generally oriented in the north-south direction, originating within Pukalani at its intersection with Old Haleakala Highway, and extending northeasterly to eventually intersect with Makawao Avenue.

Pukalani Street is a two-lane, County collector roadway serving residential and commercial areas in Pukalani town. Pukalani Street is generally oriented in the north-south direction, originating at its intersection with Old Haleakala Highway, and extending southwesterly to the Pukalani Country Club Golf Course.

Within the study area, Makawao Avenue is a two-lane, County collector road that serves Pukalani town and Makawao town. Makawao Avenue is generally oriented in the north-south direction, originating within Pukalani at its intersection with Old Haleakala Highway, and extending northeasterly through Makawao town. North of its intersection with Baldwin Avenue, Makawao Avenue terminates across from Kaupakuiua Road.

Loha Street is a two-lane, County collector roadway serving residential areas in Pukalani. Loha Street is a continuation of Makawao Avenue south of its intersection with Old Haleakala Highway.

D. Study Intersections

A weekday peak period of traffic turning movement count survey was conducted by Austin, Tsutsumi & Associates, Inc. on Thursday, May 1, 2003, morning (AM) and on Wednesday, April 30, 2003 afternoon (PM) at the following study intersections:

- Haleakala Highway/Old Haleakala Highway (western intersection) - unsignalized
- Haleakala Highway/Makani Road - unsignalized
- Haleakala Highway/Makawao Avenue - signalized
- Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees junction) - signalized

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

- Old Haleakala Highway/Pukalani Street - signalized
- Old Haleakala Highway/Makawao Avenue/Loha Street - signalized

Haleakala Highway/Old Haleakala Highway (western intersection) is a modified "tee" intersection with traffic on the Old Haleakala Highway approach controlled by a stop sign. Old Haleakala Highway is the northbound approach at this intersection and is striped with exclusive lanes for left-turn and right-turn traffic (Old Haleakala Highway makes a 90 degree turn as it approaches this intersection). Right-turn traffic on the Old Haleakala Highway northbound approach is yield sign-controlled and channelized by a traffic island. The Haleakala Highway westbound approach is striped with a single through lane, as westbound left-turns are not allowed at this intersection. The Haleakala Highway eastbound approach is striped with two through lanes and an exclusive right-turn lane. Right-turn traffic from the eastbound approach is "free" as this movement is channelized by a traffic island and there is no conflicting traffic.

A contraflow operation on Haleakala Highway is implemented during the weekday AM peak period of traffic. When the contraflow operation is in effect, all traffic on the Haleakala Highway eastbound approach is forced to exit via right turn onto Old Haleakala Highway and right-turns from the Old Haleakala Highway approach onto Haleakala Highway are prohibited. As a result of the AM contraflow operation, there is no conflicting traffic for the northbound to westbound left-turn movement from the Old Haleakala Highway approach. The AM contraflow operation is discussed in more detail in the "Field Observations" section.

Haleakala Highway/Makani Road is a "cross" intersection with traffic on Makani Road controlled by a stop sign. The Makani Road northbound and southbound approaches are striped with a shared left-turn/through lane and an exclusive right-turn lane. Right-turn traffic on the northbound and southbound approaches is channelized by traffic islands and is yield sign-controlled. The Haleakala Highway westbound approach is striped with an exclusive left-turn lane and a shared through/right-turn lane. The Haleakala Highway eastbound approach is striped with an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. Right-turn traffic from the westbound and eastbound approaches is yield sign-controlled.

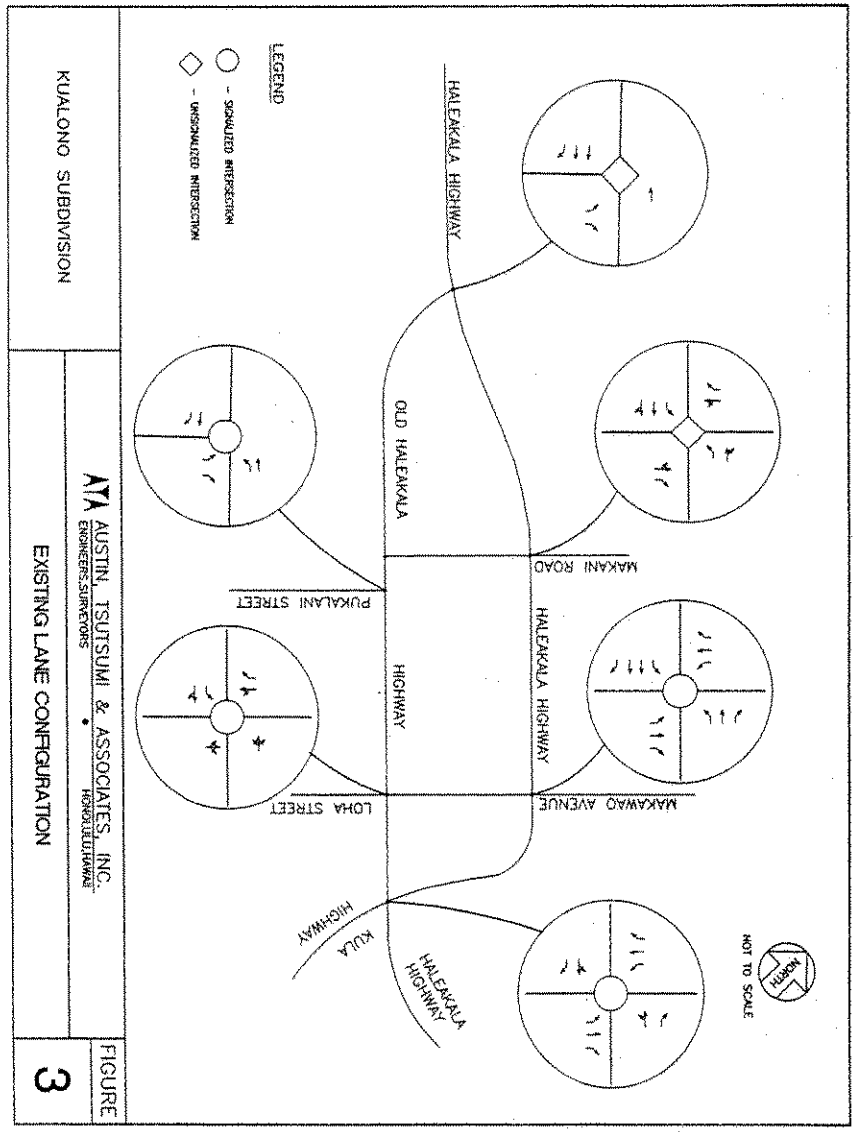
Haleakala Highway/Makawao Avenue is a signalized "cross" intersection. The Makawao Avenue northbound and southbound approaches and the Haleakala Highway westbound approach provide exclusive lanes for left-turn traffic, through traffic and right-turn traffic. The Haleakala Highway eastbound approach is striped with an exclusive left-turn lane, two through lanes and an exclusive right-turn lane. Right-turn traffic on each approach is yield sign-controlled and channelized by raised traffic islands.

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees junction) is a signalized "cross" intersection. Haleakala Highway is the southbound and westbound approaches of the intersection (Haleakala Highway makes a 90 degree turn at this intersection). Kula Highway is the northbound approach and Old Haleakala Highway is the eastbound approach at this intersection. The northbound Kula Highway and southbound Haleakala Highway approaches provide exclusive lanes for left-turn traffic, through traffic and right-turn traffic. The westbound Haleakala Highway and eastbound Old Haleakala Highway approaches are striped with a shared left-turn/through lane and exclusive right-turn lane. Right-turn traffic on each approach is yield sign-controlled and channelized by raised traffic islands.

Old Haleakala Highway/Pukalani Street is a signalized "tee" intersection with Pukalani Street as the stem. The northbound Pukalani Street approach provides exclusive lanes for left-turn traffic and right-turn traffic. The Old Haleakala Highway westbound approach is striped with an exclusive left-turn lane and a through lane. The Old Haleakala Highway eastbound approach is striped with a through lane and an exclusive right-turn lane.

Old Haleakala Highway/Makawao Avenue/Loha Street is a signalized "cross" intersection. The Loha Street northbound and Old Haleakala westbound approaches provide a single lane, which is striped as a shared left-turn/through/right-turn lane. The southbound Makawao Avenue approach is striped with a shared left-turn/through lane and an exclusive right-turn lane. The Old Haleakala Highway eastbound approach is striped with an exclusive left-turn lane and a shared through/right-turn lane.

Figure 3 shows the existing traffic lane configurations at the study intersections.



E. Field Observations

The weekday AM and PM peak hours of traffic were determined to occur from 7:00 AM to 8:00 AM and 3:30 PM to 4:30 PM, respectively. The traffic count data is provided in Appendix A.

The State of Hawaii Department of Transportation (SDOT) implements a contraflow operation on Haleakala Highway from the Haleakala Highway/Old Haleakala Highway (western intersection) to the Haleakala Highway/Hana Highway intersection during the weekday AM peak period of traffic. An eastbound lane is used for westbound travel on Haleakala Highway during the AM peak period of traffic. All eastbound traffic on Haleakala Highway originating downstream of Old Haleakala Highway is diverted onto Old Haleakala Highway during the contraflow operation. Access to eastbound Haleakala Highway from the Haleakala Highway/Old Haleakala Highway (western intersection) to the Five Trees junction is limited to traffic from Makani Road and Makawao Avenue only.

Just south of the Five Trees junction, it was observed that northbound through vehicles on Kula Highway frequently yield to southbound vehicles turning left into the King Kekaulike High School (KKHS) driveway during the 20-minute period before the start of the KKHS school day (8:00 AM). This results in additional delays for northbound traffic on Kula Highway as a long queue of northbound vehicles extending well past the A'Apueo Parkway intersection was observed. After 8:00 AM, traffic volumes tapered off quickly and the queue of northbound vehicles dissipated.

D. Traffic Operations

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow, ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual – HCM 2000 methodology for calculating levels of service was used in this study. LOS definitions for unsignalized and signalized intersections are provided in Appendix B. LOS calculations are provided in Appendix C. It should be noted that overall LOS for unsignalized intersections is no longer calculated in the HCM 2000 procedure; LOS is only calculated for the stop-controlled (minor) approaches and for left-turn traffic from the major roadway.

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The LOS analysis results for existing traffic conditions at the study intersections are described below. Table 1 summarizes the existing LOS at the study intersections. Figure 4 shows the existing traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic. The traffic volumes shown on Figure 4 include traffic associated with current construction activity for the Kamehameha Schools Maui Campus expansion that was observed at the west end of A'Apueo Parkway, which is located south of the Five Trees junction.

Haleakala Highway/Old Haleakala Highway (western intersection)

All movements at this unsignalized intersection operate at LOS D or better during the PM peak hour of traffic except for the northbound left-turn traffic on Old Haleakala Highway which operates at LOS F during the PM peak hour of traffic. A review of 24-hour traffic count data collected in 2001 by SDOT indicates that traffic volumes at this intersection meet the 4-hour warrant for the installation of a traffic signal system as described in the Manual on Uniform Traffic Control Devices - Millennium Edition (MUTCD-2000).

Haleakala Highway/Makani Road

All movements at this unsignalized intersection operate at LOS D or better during the AM and PM peak hours of traffic except for the following. Traffic in the Makani Road northbound shared left-turn/through lane operates at LOS E during the AM peak hour of traffic and LOS F during the PM peak hour of traffic. Traffic in the Makani Road southbound shared left-turn/through lane operates at LOS F during the AM and PM peak hours of traffic. Southbound right-turn traffic operates at LOS F during the AM peak hour of traffic. A review of 24-hour traffic count data collected in 2001 by SDOT indicates that traffic volumes at this intersection meet the 8-hour and 4-hour warrants for the installation of a traffic signal system as described in the MUTCD-2000.

Haleakala Highway/Makawao Avenue

This signalized intersection operates overall at LOS C during the AM and PM peak hours of traffic. All movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. Queuing was observed on the Makawao Avenue southbound approach during the AM peak hour of traffic. The

southbound queue averaged over ten vehicles, extends beyond the exclusive right-turn lane on Makawao Avenue blocking vehicles from making a right-turn to westbound Haleakala Highway. As a result, southbound vehicles coming from Makawao also utilize Makani Road to turn right onto westbound Haleakala Highway.

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees junction)

This signalized intersection operates overall at LOS C during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. Traffic queues averaging eight to ten vehicles were observed on the northbound Kula Highway approach and on the westbound Haleakala Highway approach during the AM peak period of traffic. During the AM peak hour of traffic, 420 vehicles turned right from eastbound Old Haleakala Highway to southbound Kula Highway. This heavy right-turn volume is in part due to the contraflow operation on Haleakala Highway west of the study area. During the PM peak period of traffic, the average queue length was observed to be about three to four vehicles on the westbound Haleakala Highway approach.

Old Haleakala Highway/Pukalani Street

This signalized intersection operates overall at LOS C during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. During the AM peak hour of traffic, 551 vehicles turned left from Pukalani Street to westbound Old Haleakala Highway. Most of these vehicles appear to be headed to work in other areas of Maui via Haleakala Highway.

Old Haleakala Highway/Makawao Avenue/Loha Street

This signalized intersection operates overall at LOS B during the AM and PM peak hours of traffic. All movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. Vehicle queues at this intersection were minimal and able to clear with every cycle.

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Table 1
LOS at Study Intersections
Existing Conditions

	Existing	
	AM Peak Hour	PM Peak Hour
Haleakala Highway/Old Haleakala Highway (western intersection)		
NB LT	--	F
NB RT	--	B
Haleakala Highway/Makani Road		
NB LT/TH	E	F
NB RT	A	B
SB LT/TH	F	F
SB RT	F	B
WB LT	A	A
EB LT	A	A
Haleakala Highway/Makawao Avenue		
NB LT	B	B
NB TH	B	C
NB RT	B	A
SB LT	D	D
SB TH	B	B
SB RT	B	A
WB LT	C	C
WB TH	C	C
WB RT	B	C
EB LT	D	C
EB TH	B	B
EB RT	B	B
Overall	C	C
Kula Highway/Haleakala Highway/Old Haleakala Highway (Five Trees junction)		
NB LT	C	C
NB TH	C	B
SB LT	C	C
SB TH	B	B
SB RT	B	B
WB LT/TH	C	C
EB LT/TH	C	C
Overall	C	B

Table 1 (continued)
LOS at Study Intersections
Existing Conditions

	Existing	
	AM Peak Hour	PM Peak Hour
Old Haleakala Highway/Pukalani Street		
NB LT	C	B
NB RT	A	B
WB LT	C	B
WB TH	B	A
EB TH	C	B
EB RT	A	A
Overall	C	B
Old Haleakala Highway/Makawao Avenue/Loha Street		
NB LT/TH/RT	B	B
SB LT/TH	B	B
SB RT	C	C
WB LT/TH/RT	B	B
EB LT	A	A
EB TH/RT	A	A
Overall	B	B

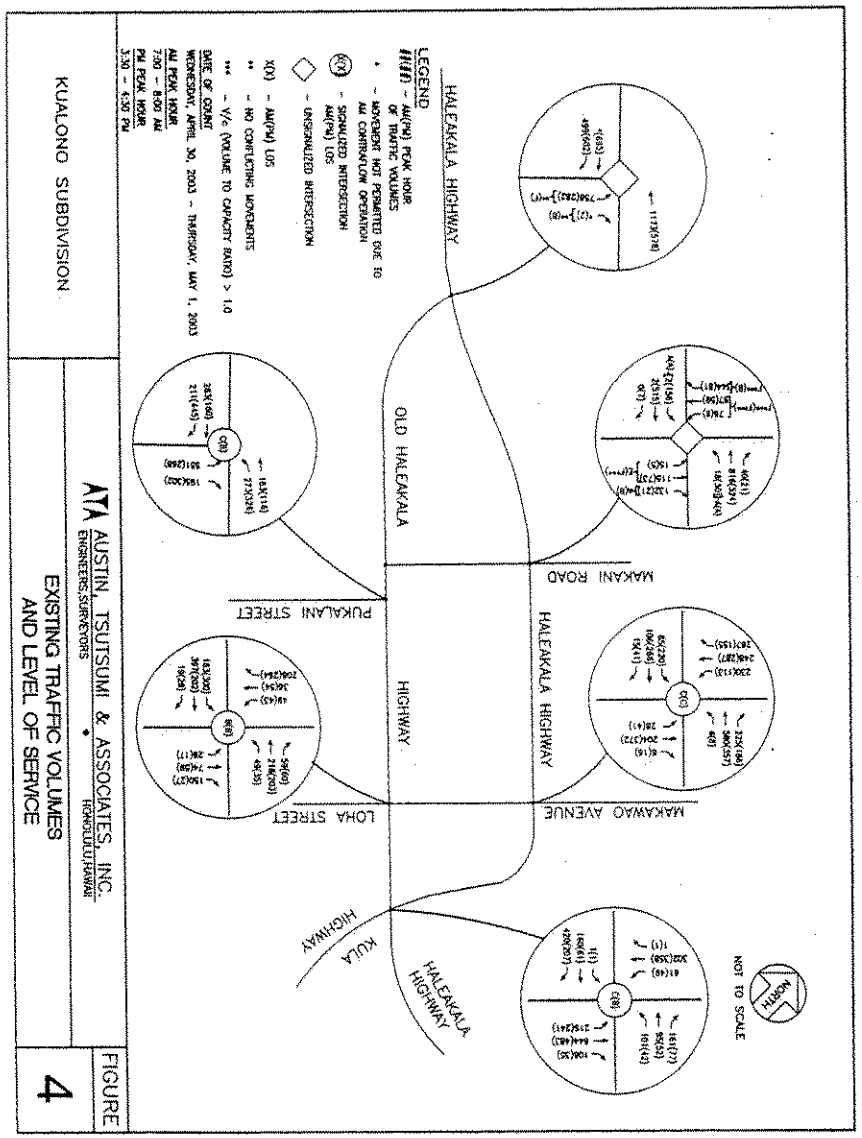
* - V/c (volume to capacity ratio)>1.0

III. BASE YEAR TRAFFIC CONDITIONS WITHOUT PROJECT

A. Base Year 2005 Projected Traffic Volumes

Construction of the roadways and infrastructure for the Project is anticipated to be completed by the first quarter of 2005. Therefore, 2005 was chosen to represent base year conditions without Project-generated traffic.

Traffic believed to be associated with current construction activity for the Kamehameha Schools Maui Campus expansion was estimated based on the number of construction workers given by the contractor. Construction trips were subtracted from existing traffic counts because they are will no longer generated by the construction project after the Kamehameha Schools Maui Campus expansion is complete. The resulting volumes were increased by applying an annual vehicular growth rate of 1.3 percent per year, which is the approximate annual vehicular growth rate projected for the major roadways in the Pukalani area based on information contained in the Maui Long-Range Land Transportation Plan (MLRLTP), dated February 1997.



B. Other Known Developments

The following are descriptions of new/future developments that are expected to generate significant traffic demand within the study area. Those projects that are anticipated to be completed by 2005 are included in base year traffic projections for this study.

1. Kulamalu Development

At the time of writing this study, various known projects were anticipated to be completed within the 2005 timeframe as part of the planned Kulamalu development. These projects include a county park of approximately 9.3-acres, the 12-dwelling unit single-family Kulamalu Hilltop Subdivision and the Kulamalu Mauka Subdivision which will consist of office and commercial uses. Peak hour vehicular trips generated by these projects were estimated by applying appropriate trip generation rates in Trip Generation, 6th Edition, published by the Institute of Transportation Engineers (ITE). It is unknown at this time exactly what type of developments will be constructed on these sites. A mix of 25 percent office gross floor area and 75 percent retail gross floor area was assumed for the purpose of estimating background traffic for this study.

Also, the University of Hawaii Institute for Astronomy (IFA) Advanced Technology Center (Phase 1) will be relocated to the Kulamalu development. Vehicular trips generated by the University of Hawaii IFA during the AM and PM peak hours of traffic were obtained from the Traffic Impact Report for the University of Hawaii Institute for Astronomy Advanced Technology Center and Advanced Technology Research Center, by Austin, Tsutsumi & Associates, dated June 2003. Although the traffic report for the IFA estimated the Advanced Technology Research Center (Phase 2) to be completed in 2005, the project has since been delayed and it is unknown at this time when Phase 2 will be completed. Therefore, only traffic generated by Phase 1 of the IFA is included in base year traffic projections for this study.

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According to the Kamehameha Schools Maui Campus website, the Maui campus, which is also a part of the Kulamalu commercial development, had an enrollment of about 600 students in grades K through 9 at the time the traffic count survey was conducted. Addition of one grade level every year is planned, which will expand the campus to a full enrollment of about 1,100 students in grades K through 12 by the 2005 school year. Vehicular trips generated by the expansion of the Kamehameha Schools Maui Campus during the AM peak hour of traffic were obtained from the Draft Traffic Impact Analysis for Kamehameha Schools Maui Campus by Phillip Rowell and Associates, dated June 2002. Vehicular trips generated by the expansion of the Kamehameha Schools Maui Campus during the PM peak hour of traffic were estimated by applying trip generation rates for the peak hour of adjacent street traffic contained in ITE, Trip Generation, 6th Edition since the school peak hour of traffic is not likely to coincide with the 3:30 PM to 4:30 PM commuter peak hour of traffic on Kula Highway.

2. Kula Residence Unit 1

In addition, the Department of Hawaiian Home Lands (DHHL) has constructed 321 lots known as Kula Residence Unit 1, a single-family residential subdivision located south of the Project site off of Kula Highway in Waiohuli. Owners of these lots are responsible for construction of their own homes. As of March 2003, 102 lots were occupied. Peak hour trips generated by the development of the remaining vacant lots in Kula Residence Unit 1 were estimated based on the existing number of occupied lots and existing traffic volumes entering and exiting the subdivision.

3. Upcountry Town Center

Maui Land and Pineapple Company has proposed to develop the Upcountry Town Center, which will consist of a mix of retail, office, industrial and residential uses, on the triangular parcel of land bordered by Haleakala Highway, Old Haleakala Highway and Makawao Avenue. The Upcountry Town Center was originally expected to be completed in 2004. However, the Upcountry Town Center project has since been

delayed. The Upcountry Town Center is currently anticipated to be completed in 2006 based on available information. Therefore, traffic generated by the Upcountry Town Center is not included in base year traffic projections for this study.

C. Planned Roadway Improvements

Installation of a traffic signal system at the Haleakala Highway/Makani Road intersection is planned by SDOT and for the purposes of this study assumed to be operational by the base year.

At the time of writing this study, the widening of Haleakala Highway to four lanes from Hana Highway to Old Haleakala Highway (western intersection) by SDOT is anticipated to be completed within the 2005-2006 timeframe. SDOT has indicated that once Haleakala Highway is widened, the AM contraflow operation will be discontinued and vehicles on the Haleakala Highway eastbound approach to Old Haleakala Highway (western intersection) will no longer be forced to turn right onto Old Haleakala Highway during the AM peak period of traffic. Projected traffic volumes for the Base Year 2005 AM peak hour of traffic were assigned to the roadway network assuming the discontinuation of the AM contraflow operation on Haleakala Highway. Projected traffic volumes for the Base Year 2005 PM peak hour of traffic were assigned to the roadway network based on existing traffic volumes.

D. Base Year 2005 Traffic Operations Without Project-Generated Traffic

The Base Year 2005 traffic conditions without traffic generated by the Kualono Subdivision are described below. Analysis of base year traffic conditions without the Project indicates traffic at the study intersections will operate at LOS D or better except at the following locations. Table 2 summarizes the Base Year 2005 LOS at the study intersections. Figure 5 shows the Base Year 2005 traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic.

Haleakala Highway/Old Haleakala Highway (western intersection)

According to the current roadway design from SDOT, the additional westbound lane on Haleakala Highway provided by the widening will originate as the receiving lane for northbound left-turn traffic from Old Haleakala Highway at

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its western intersection with Haleakala Highway. As an unsignalized intersection, the northbound left-turn will operate at LOS F during the AM peak hour of traffic and will continue to operate at LOS F during the PM peak hour of traffic.

Haleakala Highway/Makawao Avenue

This signalized intersection will operate overall at LOS D during the AM peak hour of traffic and will continue to operate at LOS C during the PM peak hour of traffic. The southbound left-turn lane and eastbound left-turn lane will operate at LOS E during the AM peak hour of traffic.

Haleakala Highway/Makani Road

With the installation of a traffic signal system, this intersection will operate overall at LOS D during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All individual movements will operate at LOS D or better.

E. Base Year 2005 Traffic Mitigation Measures

The following traffic mitigation measures are proposed to accommodate Base Year 2005 projected traffic volumes without Project-generated traffic.

Haleakala Highway/Old Haleakala Highway (western intersection)

Install a traffic signal system at this intersection. Interconnect and synchronize this traffic signal system with the planned traffic signal system at the Haleakala Highway/Makani Road intersection, and existing traffic signal systems along Haleakala Highway at Makawao Avenue and the Five Trees junction. Table 3 summarizes the Base Year 2005 LOS analysis at the Haleakala Highway/Old Haleakala Highway (western intersection) as a signalized intersection. With the installation of a traffic signal system, the intersection will operate overall at LOS F with a volume to capacity ratio greater than 1.0 during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All movements will operate at LOS D or better except for northbound left-turn and westbound through traffic which will operate at LOS F with a volume to capacity ratio greater than 1.0 during the AM peak hour of traffic.

Table 2
LOS at Study Intersections
Base Year 2005 Without Project

	Existing		Base Year 2005	
	AM Peak	PM Peak	AM Peak	PM Peak
Haleakala Highway/Old Haleakala Highway (western intersection)				
NB LT	--	F	F*	F*
NB RT	--	B	A	B
Haleakala Highway/Makani Road				
NB LT/TH	E	F	--	--
NB RT	A	B	--	--
SB LT/TH	F	F	--	--
SB RT	F	B	--	--
WB LT	A	A	--	--
EB LT	A	A	--	--
Haleakala Highway/ Makani Road (signalized)				
NB LT/TH	--	--	C	C
NB RT	--	--	C	C
SB LT/TH	--	--	C	C
SB RT	--	--	D	C
WB LT	--	--	A	A
WB TH/RT	--	--	D	A
EB LT	--	--	B	A
EB TH/RT	--	--	B	A
Overall	--	--	D	B
Haleakala Highway/Makawao Avenue				
NB LT	B	B	C	B
NB TH	B	C	C	C
NB RT	B	A	B	A
SB LT	D	D	E	D
SB TH	B	B	C	B
SB RT	B	A	B	A
WB LT	C	C	D	C
WB TH	C	C	D	D
WB RT	B	C	C	C
EB LT	D	C	E	D
EB TH	B	B	B	B
EB RT	B	B	B	B
Overall	C	C	D	C

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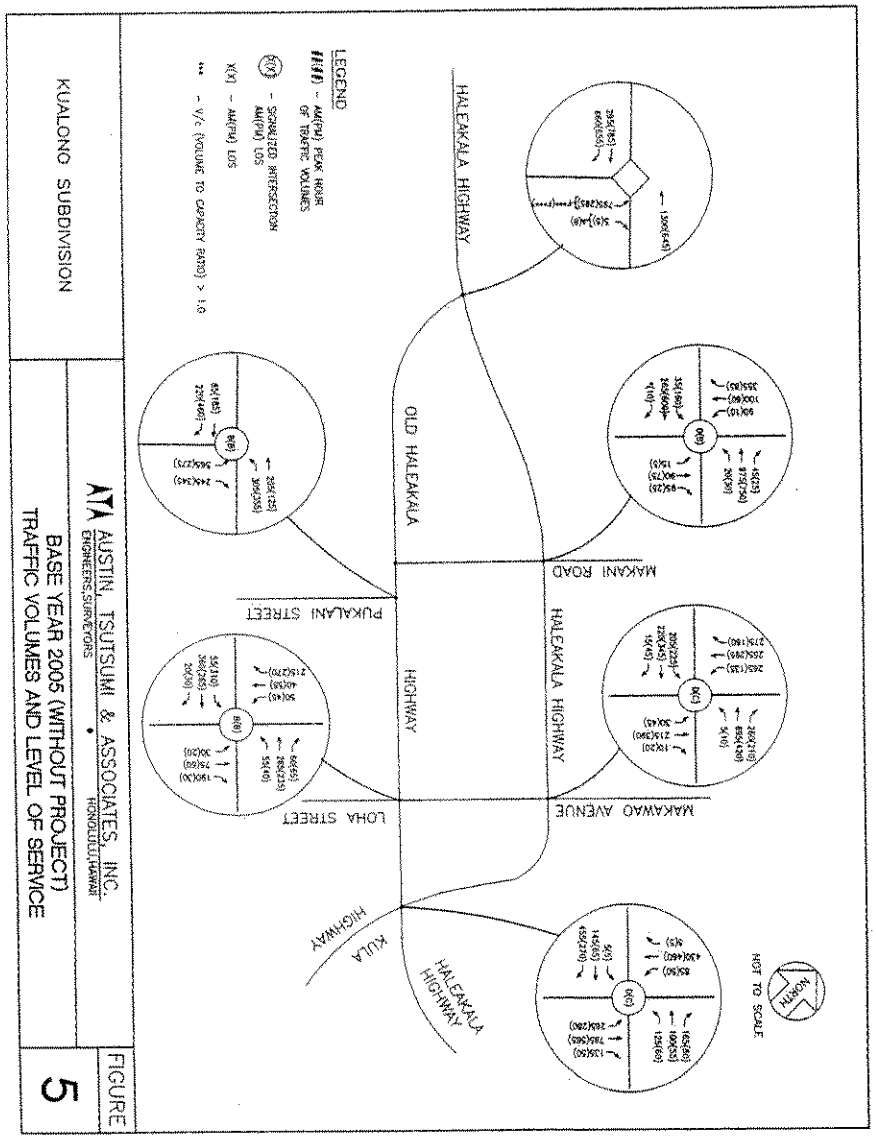
Table 2 (continued)
LOS at Study Intersections
Base Year 2005 Without Project

	Existing		Base Year 2005	
	AM Peak	PM Peak	AM Peak	PM Peak
NB LT	C	C	D	C
NB TH	C	B	D	B
SB LT	C	C	D	C
SB TH	B	B	C	B
SB RT	B	B	B	B
WB LT/TH	C	C	D	C
EB LT/TH	C	C	C	C
Overall	C	B	D	C
Old Haleakala Highway/Pukalani Street				
NB LT	C	B	B	B
NB RT	A	B	A	B
WB LT	C	B	C	B
WB TH	B	A	B	A
EB TH	C	B	C	B
EB RT	A	A	A	A
Overall	C	B	B	B
Old Haleakala Highway/Makawao Avenue/Loha Street				
NB LT/TH/RT	B	B	C	B
SB LT/TH	B	B	B	B
SB RT	C	C	C	C
WB LT/TH/RT	B	B	B	B
EB LT	A	A	A	A
EB TH/RT	A	A	A	A
Overall	B	B	B	B

* - V/c (volume to capacity ratio)>1.0



The results shown in Table 3 assumed a traffic signal system phasing such that the westbound through traffic on Haleakala Highway and northbound left-turn traffic on Old Haleakala Highway are served by separate traffic signal phases. It may be possible to allow these two movements to proceed through the intersection simultaneously, since the additional westbound lane on Haleakala Highway resulting from roadway widening would originate by providing a receiving lane for northbound left-turn traffic from Old Haleakala Highway if accommodated in the design for this intersection. In this case, the westbound through vehicles would not be controlled by the traffic signal and would be allowed to proceed continuously. This alternate signal phasing would result in the intersection operating overall at LOS A during the AM and PM peak hours of traffic with all individual movements operating at LOS D or better.

Table 3

LOS with Traffic Mitigative Measures

Base Year 2005

	Base Year 2005		Base Year 2005 with mitigative measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Old Haleakala Highway (western intersection)				
NB LT	F*	F*	--	--
WB TH	A	B	--	--
Haleakala Highway/Old Haleakala Highway (western intersection, signalized)				
NB LT	--	--	F*	C
WB TH	--	--	F*	B
EB TH	--	--	B	A
Overall	--	--	F*	B

* - V/c (volume to capacity ratio)>1.0

IV. YEAR 2005 WITH PROJECT-GENERATED TRAFFIC

A. Trip Generation

Peak hour trips generated by the Kualono Subdivision were obtained by applying trip generation rates for single-family detached housing and a county

park in ITE, Trip Generation, 6th Edition. Trips generated by the Project were estimated to be 14 vehicles entering and 34 vehicles exiting during the AM peak hour of traffic, and 38 vehicles entering and 24 vehicles exiting during the PM peak hour of traffic. Table 4 shows the trip rates used and Table 5 summarizes the total trips generated by the Project.

Table 4

Trip Generation Rates

	Average Weekday Daily Trip Rate	AM Peak Hour of Traffic		PM Peak Hour of Traffic	
		Trip Rate	% Enter	Trip Rate	% Enter
Single-Family Detached Housing (ITE Code 210) per dwelling unit	10.98[a]	0.90[b]	25	1.14[c]	64
County Park (ITE Code 412) per acre	2.28	0.52	80	0.59	35

[a] derived from fitted curve equation: Ln(T)= 0.920 Ln(X) + 2.707

[b] derived from fitted curve equation: T= 0.700(X) + 9.477

[c] derived from fitted curve equation: Ln(T)= 0.901 Ln(X) + 0.527

Table 5

Peak Hour Trip Generation

	Average Weekday (vpd)	AM Peak Hour of Traffic (vph)		PM Peak Hour of Traffic (vph)	
		Enter	Exit	Enter	Exit
Kualono Subdivision (49 dwelling units)	538	11	33	36	20
Park (9.232 acres)	21	3	1	2	4
Total	559	14	34	38	24

B. Traffic Distribution and Assignment

Trips generated by the Project during the AM peak hour of traffic were assigned to the roadway network based on traffic projections for conditions without the contraflow operation on Haleakala Highway. Trips generated by the Project were assigned to the roadway network based on existing traffic patterns.

Then, Project-generated trips were added to the Base Year 2005 projected traffic volumes to obtain traffic volumes for Year 2005 with the Project. Figure 6 shows the traffic assignment for the Project.

C. Project and Roadway Access

Road A, a new Project roadway that will provide access to/from the Kualono Subdivision, will intersect Old Haleakala Highway between the Five Trees junction and the Old Haleakala Highway/Makawao Avenue/Loha Street intersection. Road A will have separate lanes for left-turn and right-turn traffic on the (northbound) approach to Old Haleakala Highway, and a single lane for southbound traffic.

D. Year 2005 Traffic Operations With Project-Generated Traffic

With Project-generated traffic, the study intersections will operate similar to Base Year 2005 conditions. With the installation of traffic signal systems at Haleakala Highway/Old Haleakala Highway (western intersection) and Haleakala Highway/Makani Road, analysis of Year 2005 traffic conditions with the Project indicates traffic at the study intersections will operate at LOS D or better except at the following locations. Table 6 summarizes the Year 2005 with Project LOS analysis at the study intersections. Figure 7 shows the Year 2005 with Project traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic.

Haleakala Highway/Old Haleakala Highway (western intersection)

This intersection will operate overall at LOS F with a volume to capacity ratio greater than 1.0 during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All movements will operate at LOS D or better except for northbound left-turn and westbound through traffic which will operate at LOS F with a volume to capacity ratio greater than 1.0 during the AM peak hour of traffic. As previously discussed, incorporating traffic signal phasing such that the westbound through traffic on Haleakala Highway and northbound left-turn traffic on Old Haleakala Highway are allowed to proceed simultaneously, would result in improved traffic operations. This alternate signal phasing would result in the intersection operating overall at LOS A during the AM and PM peak hours of traffic with all individual movements operating at LOS D or better.

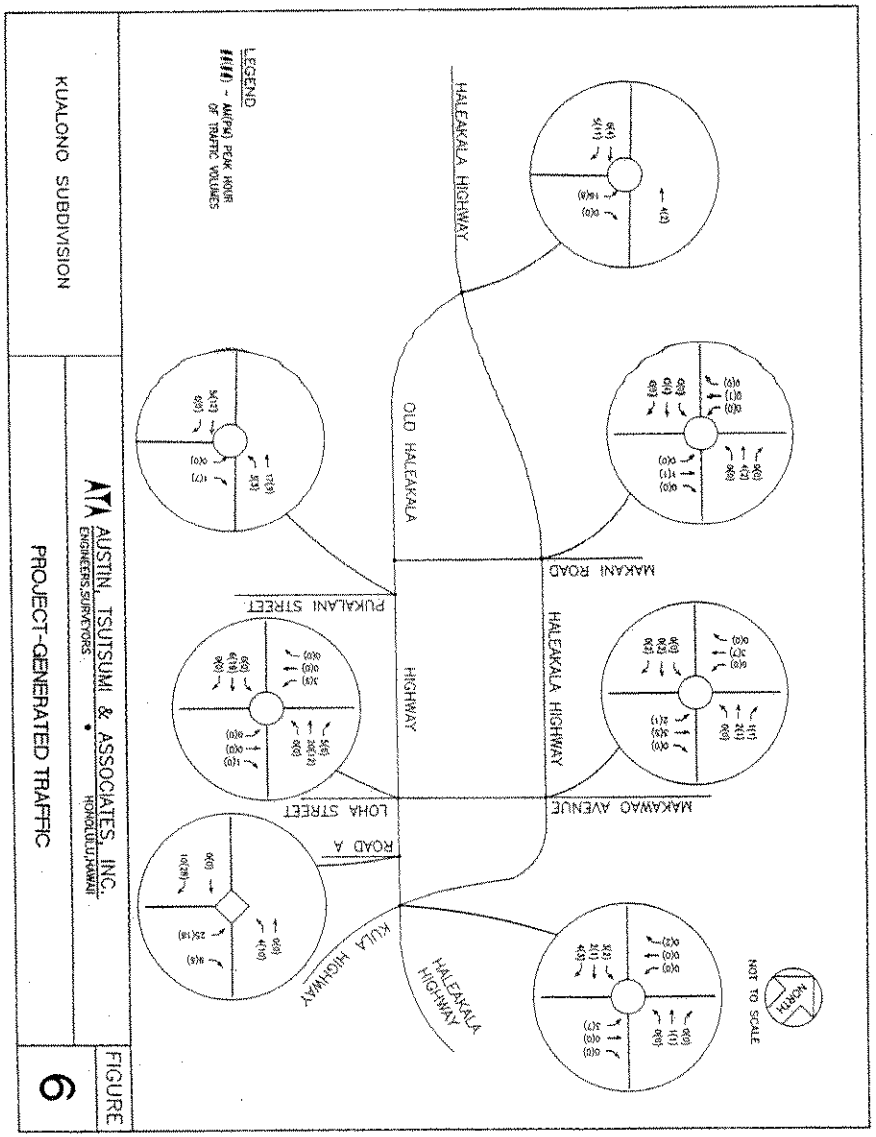


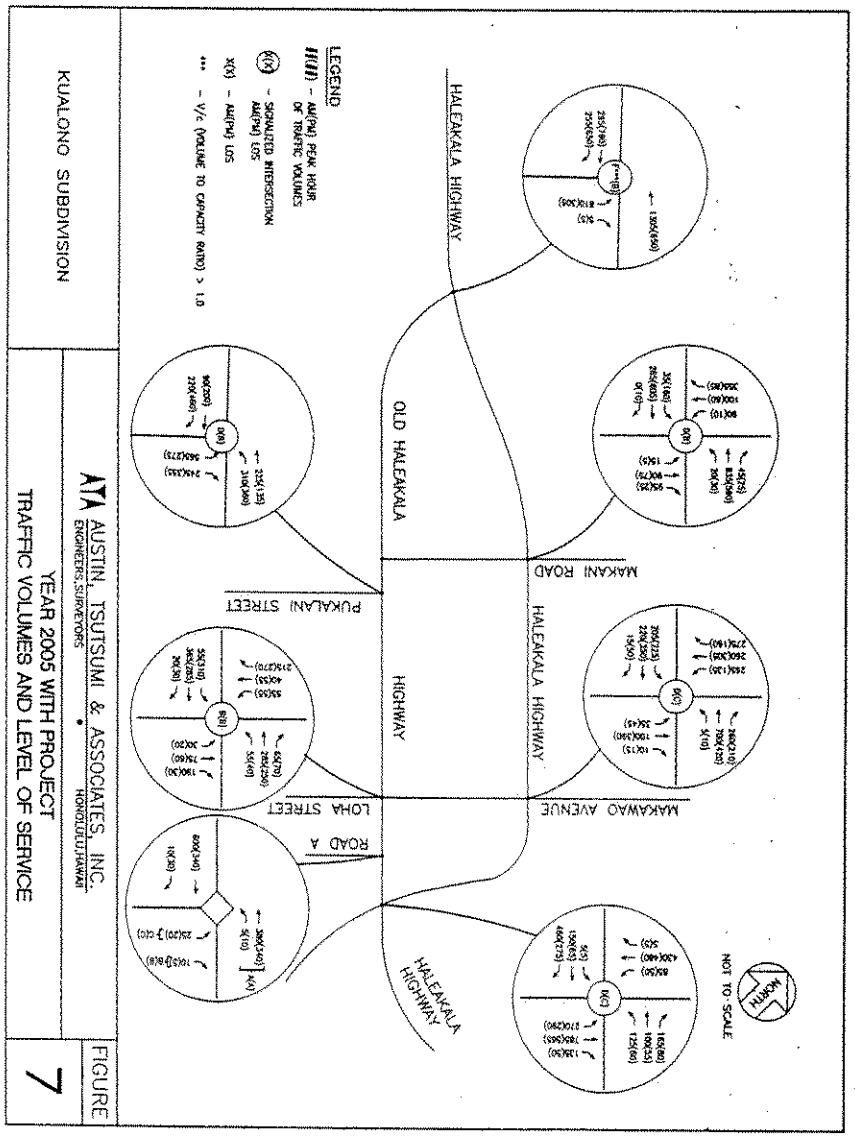
Table 6
LOS at Study Intersections
Year 2005 With Project

	Existing		Base Year 2005		Year 2005 with	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Haleakala Highway/Old Haleakala Highway (western intersection)						
NB LT	--	F	F*	F*	--	--
NB RT	--	B	A	B	--	--
Haleakala Highway/Old Haleakala Highway (western intersection, signalized)						
NB LT	--	--	F*	C	F*	C
WB TH	--	--	F*	B	F*	B
EB TH	--	--	B	A	B	A
Overall	--	--	F*	B	F*	B
Haleakala Highway/Makani Road						
NB LT/TH	E	F	--	--	--	--
NB RT	A	B	--	--	--	--
SB LT/TH	F	F	--	--	--	--
SB RT	F	B	--	--	--	--
WB LT	A	A	--	--	--	--
EB LT	A	A	--	--	--	--
Haleakala Highway/Makani Road (signalized)						
NB LT/TH	--	--	C	C	C	C
NB RT	--	--	C	C	C	C
SB LT/TH	--	--	C	C	C	C
SB RT	--	--	D	C	D	C
WB LT	--	--	A	A	A	A
WB TH/RT	--	--	D	A	D	A
EB LT	--	--	B	A	B	A
EB TH/RT	--	--	B	A	B	A
Overall	--	--	D	B	D	B
Haleakala Highway/Makawao Avenue						
NB LT	B	B	C	B	C	B
NB TH	B	C	C	C	C	C
NB RT	B	A	B	A	B	A
SB LT	D	D	E	D	E	D
SB TH	B	B	C	B	C	B
SB RT	B	A	B	A	B	A
WB LT	C	C	D	C	D	C
WB TH	C	C	D	D	D	D
WB RT	B	C	C	C	C	C
EB LT	D	C	E	D	E	D
EB TH	B	B	B	B	B	B
EB RT	B	B	B	B	B	B
Overall	C	C	D	C	D	C

Table 6 (continued)
LOS at Study Intersections
Year 2005 With Project

	Existing		Base Year 2005		Year 2005 with	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
NB LT	C	C	D	C	D	C
NB TH	C	B	D	B	D	B
SB LT	C	C	D	C	D	C
SB TH	B	B	C	B	C	B
SB RT	B	B	B	B	B	B
WB LT/TH	C	C	D	C	D	C
EB LT/TH	C	C	C	C	C	C
Overall	C	B	D	C	D	C
Old Haleakala Highway/Pukalani Street						
NB LT	C	B	B	B	B	B
NB RT	A	B	A	B	A	B
WB LT	C	B	C	B	C	B
WB TH	B	A	B	A	B	A
EB TH	C	B	C	B	C	B
EB RT	A	A	A	A	A	A
Overall	C	B	B	B	B	B
Old Haleakala Highway/Makawao Avenue/Loha Street						
NB	B	B	C	B	C	B
SB LT/TH	B	B	B	B	B	B
SB RT	C	C	C	C	C	C
WB	B	B	B	B	B	B
EB LT	A	A	A	A	A	A
EB TH/RT	A	A	A	A	A	A
Overall	B	B	B	B	B	B
Old Haleakala Highway/Road A						
NB LT	--	--	--	--	C	C
NB RT	--	--	--	--	B	B
WB LT/TH	--	--	--	--	A	A

* - V/c (volume to capacity ratio)>1.0



Haleakala Highway/Makawao Avenue

This intersection will operate overall at LOS D during the AM peak hour of traffic and LOS C during the PM peak hour of traffic. The southbound, westbound and eastbound left-turn lanes, and westbound through traffic will operate at LOS E during the AM and PM peak hours of traffic.

Haleakala Highway/Road A

All individual turning movements at the Old Haleakala Highway/Road A intersection will operate at LOS D or better with the following intersection geometry.

- Separate lanes for left-turns and right-turns on the Road A northbound approach.
- Shared left-turn/through lane on the Old Haleakala Highway westbound approach.
- Shared through/right turn lane on the Old Haleakala Highway eastbound approach.

E. Traffic Mitigation Measures

Traffic generated by the Kualono Subdivision will not require any Project-specific traffic mitigation measures.

Old Haleakala Highway/Road A

Provide separate left-turn and right-turn lanes on the Road A (northbound) approach to Old Haleakala Highway as planned. Although a westbound left-turn pocket on Old Haleakala Highway is not required according to guidelines presented in the Transportation Research Board, Intersection Channelization Design Guide, consider providing a westbound left-turn pocket at this location. A left-turn pocket would allow westbound vehicles to access the Project without impeding westbound through traffic on Old Haleakala Highway. Guidelines presented in the Transportation Research Board, Intersection Channelization Design Guide recommend a taper to facilitate eastbound right-turn vehicles entering the Project. Projected traffic volumes for Year 2005 with the Project do not warrant an exclusive eastbound right-turn lane.

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V. CONCLUSIONS

A. Existing

- The northbound left-turn at Old Haleakala Highway (western intersection) currently operates at LOS F during the PM peak hour of traffic. Review of 24-hour traffic volumes collected in 2001 by SDOT at this intersection indicate the installation of a traffic signal system is warranted.
- Some movements at the Haleakala Highway/Makani Road intersection currently operate at LOS E or LOS F during the AM and PM peak hours of traffic. Review of 24-hour traffic volumes collected in 2001 by SDOT at this location indicate the installation of a traffic signal system is warranted. A traffic signal system at the Haleakala Highway/Makani Road intersection is planned for construction by SDOT and for the purposes of this study assumed to be operational by Year 2005.

B. Without Project-Generated Traffic

The following are the conclusions of the traffic study for conditions without traffic generated by the proposed Project:

- Without installation of a traffic signal system at Haleakala Highway/Old Haleakala Highway (western intersection), the northbound left-turn will operate at LOS F during the Base Year 2005 AM and PM peak hours of traffic.
- With the installation of a traffic signal system at Haleakala Highway/Old Haleakala Highway (western intersection), the northbound left-turn and westbound through traffic will operate at LOS F with a volume to capacity ratio greater than 1.0 during the Base Year 2005 AM peak hour of traffic. A traffic signal phasing such that the westbound through traffic on Haleakala Highway and northbound left-turn traffic on Old Haleakala Highway are not given a green signal at the same time was assumed. It may possible to use an alternate traffic signal phasing that allows these two movements to proceed through the intersection simultaneously, which would result in all individual movements operating at LOS D or better.

- With the installation of a traffic signal system at the Haleakala Highway/Makani Road intersection , all individual movements will operate at LOS D or better during Base Year 2005.
- During Base Year 2005, Haleakala Highway will be approaching capacity within the study area with some movements at the Makawao Avenue intersection operating at LOS E.

C. With Project

The following are the conclusions of the traffic study for conditions with Project-generated traffic:

- Development of the Kualono Subdivision will not have a significant impact on the roadways and intersections within the study area, as the Project will only generate approximately 48 and 62 total vehicular trips during the AM and PM peak hours of traffic, respectively. The Project is expected to generate fewer than 550 daily trips.
- Traffic demands at the Old Haleakala Highway/Road A (Project) intersection can be served as an unsignalized intersection. All individual turning movements at this unsignalized intersection will operate at LOS D or better with separate lanes for left-turns and right-turns on the Road A northbound approach.
- Although projected traffic volumes at the Old Haleakala Highway/Road A intersection do not require an exclusive westbound left-turn lane, consider installing a left-turn pocket on Old Haleakala Highway to allow westbound vehicles to access the Project without impeding westbound through traffic.
- Projected traffic volumes at the Old Haleakala Highway/Road A intersection warrant a taper to facilitate eastbound right-turn vehicles entering the Project. An exclusive eastbound right-turn lane on Old Haleakala Highway is not warranted.

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VI. RECOMMENDATIONS

The following are the recommendations of the traffic study without Project-generated traffic:

- Install traffic signal systems at the Haleakala Highway/Old Haleakala Highway (western intersection) and Haleakala Highway/Makani Road intersection. Interconnect and synchronize these traffic signal systems with existing traffic signals along Haleakala Highway at Makawao Avenue and the Five Trees junction.

The following are the recommendations of the traffic study with the Project:

- Provide separate lanes for left-turns and right-turns on the Road A northbound approach to Old Haleakala Highway.
- Consider constructing a left-turn pocket on the Old Haleakala Highway westbound approach to Road A.
- Incorporate in the design of the Old Haleakala Highway/Road A intersection a taper to facilitate eastbound traffic turning right into the Project.

REFERENCES

1. Austin, Tsutsumi & Associates, Inc., Kulamalu Traffic Study, March 1997, revised October 1997.

2. Austin, Tsutsumi & Associates, Inc., Traffic Impact Analysis Report for the Kulamalu Assisted Living/Skilled Nursing Facility, Draft Report, July 2003.

3. Austin, Tsutsumi & Associates, Inc., Traffic Impact Report for the University of Hawaii Institute for Astronomy Advance Technology Center and Advance Research Technology Center, June 2003.

4. Institute of Transportation Engineers, Trip Generation, 6th Edition, 1997.

5. Kaku Associates and Munekiyo & Arakawa, Inc., Final Report, Maui Long-Range Land Transportation Plan, February 1997.

6. Kamehameha Schools Maui Campus Website, http://maui.ksbe.edu.

7. Phillip Rowell and Associates, Traffic Impact Analysis for Kamehameha Schools Maui Campus, Draft Report, June 2002.

8. State of Hawaii, Department of Transportation, Highways Division, Traffic Survey Data (Individual Stations), Island of Maui, 2001.

9. Transportation Research Board, Highway Capacity Manual – HCM 2000, Special Report 209, 2000.

10. Transportation Research Board, Intersection Channelization Design Guide, National Cooperative Highway Research Program Report 279, 1985.

11. U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices – MUTCD 2000 – Millennium Edition, December 2000, as amended.

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APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
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APPENDIX A
TRAFFIC COUNT DATA

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haloldam
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

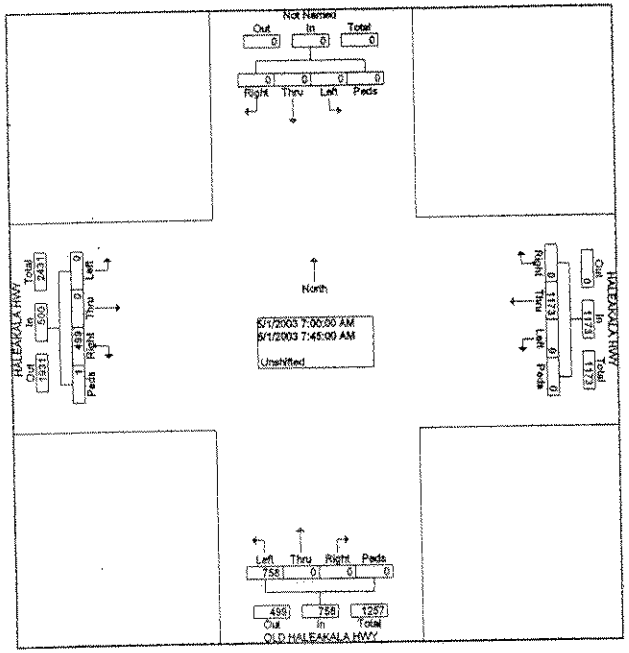
	Southbound					HALEAKALA HWY Westbound					OLD HALEAKALA HWY Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	0	0	0	0	0	0	303	0	0	303	196	0	0	0	196	0	0	98	0	98	597
06:45 AM	0	0	0	0	0	0	301	0	0	301	205	0	0	0	205	0	0	101	0	101	607
Total	0	0	0	0	0	0	604	0	0	604	401	0	0	0	401	0	0	199	0	199	1204
07:00 AM	0	0	0	0	0	0	300	0	0	300	250	0	0	0	250	0	0	134	0	134	684
07:15 AM	0	0	0	0	0	0	320	0	0	320	195	0	0	0	195	0	0	147	0	147	662
07:30 AM	0	0	0	0	0	0	292	0	0	292	158	0	0	0	158	0	0	112	1	113	563
07:45 AM	0	0	0	0	0	0	261	0	0	261	155	0	0	0	155	0	0	106	0	106	522
Total	0	0	0	0	0	0	1173	0	0	1173	758	0	0	0	758	0	0	499	1	500	2431
08:00 AM	0	0	0	0	0	0	198	0	0	198	144	0	0	0	144	0	0	118	0	118	460
08:15 AM	0	0	0	0	0	0	167	0	0	167	105	0	0	0	105	0	0	99	0	99	371
Grand Total	0	0	0	0	0	0	2142	0	0	2142	1408	0	0	0	1408	0	0	915	1	916	4466
Apprch %	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		100.0	0.0	0.0	0.0		0.0	0.0	99.9	0.1		
Total %	0.0	0.0	0.0	0.0	0.0	0.0	48.0	0.0	0.0	48.0	31.5	0.0	0.0	0.0	31.5	0.0	0.0	20.5	0.0	20.5	

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halokdam
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	Southbound					HALEAKALA HWY Westbound					OLD HALEAKALA HWY Northbound					HALEAKALA HWY Eastbound					Int.
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Total
Peak Hour From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	0	0	0	0	0	0	1173	0	0	1173	758	0	0	0	758	0	0	499	1	500	2431
Percent	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		100.0	0.0	0.0	0.0		0.0	0.0	99.8	0.2		
07:00 Volume	0	0	0	0	0	0	300	0	0	300	250	0	0	0	250	0	0	134	0	134	684
Peak Factor																					0.889
High Int.						07:15 AM					07:00 AM					07:15 AM					
Volume	0	0	0	0	0	0	320	0	0	320	250	0	0	0	250	0	0	147	0	147	
Peak Factor										0.916					0.768					0.850	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makani Rd
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halmakai
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

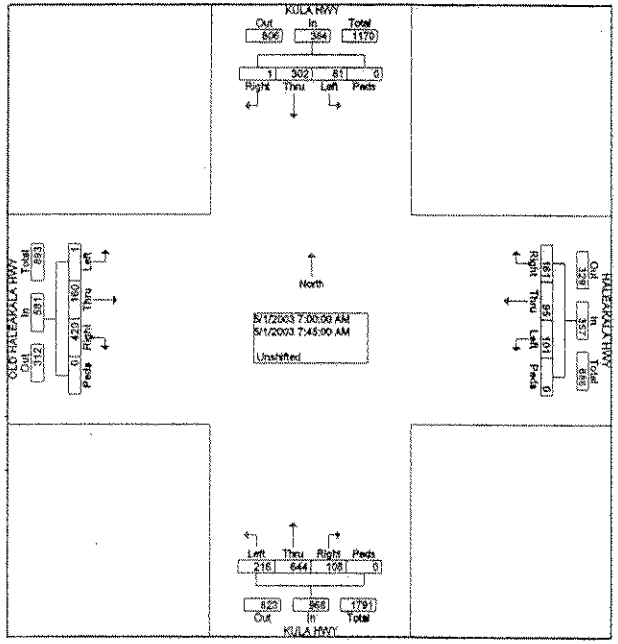
	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					Int.
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	5	6	76	0	90	1	224	1	0	226	10	20	8	0	38	0	0	0	0	0	354
06:45 AM	2	10	60	0	72	9	214	0	0	223	5	28	18	0	51	0	0	0	0	0	346
Total	7	16	139	0	162	10	438	1	0	449	15	48	26	0	89	0	0	0	0	0	700
07:00 AM	10	21	102	1	134	1	211	4	0	216	2	20	31	0	53	0	0	0	0	0	403
07:15 AM	18	20	89	0	127	2	228	15	0	243	3	36	45	0	84	0	0	0	0	0	454
07:30 AM	36	38	101	0	176	5	177	15	0	197	3	34	37	0	74	1	2	0	0	3	450
07:45 AM	12	17	52	0	81	10	202	6	0	218	7	25	19	0	51	1	0	0	0	1	351
Total	76	97	344	1	518	18	818	40	0	874	15	115	132	0	262	2	2	0	0	4	1658
08:00 AM	3	15	42	0	60	2	141	1	0	144	3	13	13	0	29	0	0	0	0	0	233
08:15 AM	6	11	29	0	46	4	125	3	0	132	6	12	11	0	29	0	0	1	0	1	206
Grand Total	92	139	554	1	786	34	1520	45	0	1599	39	188	182	0	409	2	2	1	0	5	2799
Apprch %	11.7	17.7	70.5	0.1		2.1	95.1	2.8	0.0		9.5	46.0	44.6	0.0		40.0	40.0	20.0	0.0		
Total %	3.3	5.0	19.8	0.0	28.1	1.2	54.3	1.6	0.0	57.1	1.4	6.7	6.5	0.0	14.6	0.1	0.1	0.0	0.0	0.2	

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Kula Hwy
Minor Street: Haleakala Hwy/Old Haleakal
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haikulam
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	61	302	1	0	364	101	95	161	0	357	216	644	108	0	968	1	160	420	0	581	2270
Percent	16.8	83.0	0.3	0.0		28.3	26.6	45.1	0.0		22.3	66.5	11.2	0.0		0.2	27.5	72.3	0.0		
07:30 Volume	25	99	1	0	125	31	29	40	0	100	69	166	46	0	281	0	43	138	0	181	687
Peak Factor																					0.826
High Int.	07:30 AM					07:30 AM					07:30 AM					07:30 AM					
Volume	25	99	1	0	125	31	29	40	0	100	69	166	46	0	281	0	43	138	0	181	
Peak Factor					0.728					0.893					0.861					0.802	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Pukalani St
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldpukam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 1

Groups Printed- Unshifted

	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
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		1.0	1.0	1.0	1.0		
06:30 AM	0	0	0	0	0	22	47	0	1	70	117	0	28	0	145	0	71	18	0	89	304
06:45 AM	0	0	0	0	0	40	37	0	0	77	151	0	29	0	180	0	67	29	0	96	353
Total	0	0	0	0	0	62	84	0	1	147	268	0	57	0	325	0	138	47	0	185	657
07:00 AM	0	0	0	0	0	46	55	0	0	101	169	0	36	0	205	0	63	49	0	112	418
07:15 AM	0	0	0	0	0	63	51	0	0	114	134	0	51	0	185	0	74	56	1	131	430
07:30 AM	0	0	0	0	0	74	36	0	1	111	134	0	62	0	196	0	86	57	1	144	451
07:45 AM	0	0	0	0	0	91	40	0	0	131	114	0	46	5	165	0	60	49	0	109	405
Total	0	0	0	0	0	273	183	0	1	457	551	0	195	5	751	0	283	211	2	496	1704
08:00 AM	0	0	0	0	0	55	51	0	2	108	73	0	33	0	106	0	83	31	0	114	328
08:15 AM	0	0	0	0	0	65	31	0	0	96	68	0	34	0	122	0	49	54	0	103	321
Grand Total	0	0	0	0	0	455	348	0	4	808	980	0	319	5	1304	0	553	343	2	898	3010
Apprch %	0.0	0.0	0.0	0.0		56.3	43.2	0.0	0.5		75.2	0.0	24.5	0.4		0.0	61.6	38.2	0.2		
Total %	0.0	0.0	0.0	0.0	0.0	15.1	11.6	0.0	0.1	26.8	32.6	0.0	10.6	0.2	43.3	0.0	18.4	11.4	0.1	29.8	

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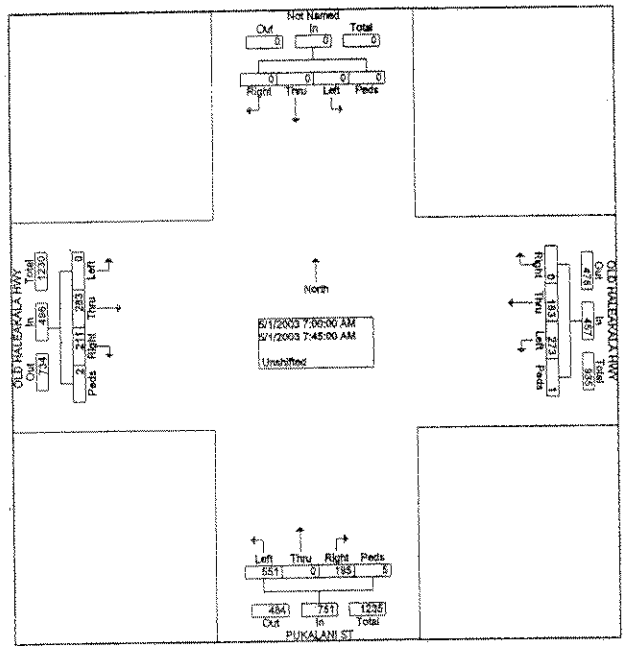
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Pukalani St
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldpukam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 2

	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	0	0	0	0	0	273	183	0	1	457	551	0	195	5	751	0	283	211	2	496	1704
Percent	0.0	0.0	0.0	0.0		59.7	40.0	0.0	0.2		73.4	0.0	26.0	0.7		0.0	57.1	42.5	0.4		
07:30 Volume	0	0	0	0	0	74	36	0	1	111	134	0	62	0	196	0	86	57	1	144	451
Peak Factor																					0.945
High Int.	6:15:00 AM					07:45 AM					07:00 AM					07:30 AM					
Volume	0	0	0	0	0	91	40	0	0	131	169	0	36	0	205	0	86	57	1	144	
Peak Factor										0.872					0.916					0.861	



Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Makawao Ave/Loha St
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldmwoa
Site Code : 00000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

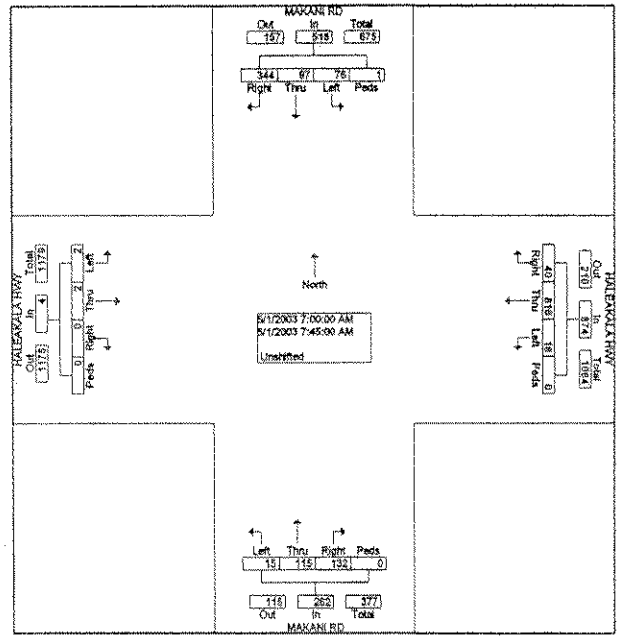
	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	12	2	25	0	39	3	17	8	0	28	10	15	4	0	29	28	70	4	0	102	198
06:45 AM	11	6	33	0	50	7	30	6	0	42	7	8	8	0	24	30	80	2	1	113	229
Total	23	8	58	0	89	10	47	13	0	70	17	23	12	0	53	58	150	6	1	215	427
07:00 AM	15	4	64	0	83	12	42	18	0	72	9	14	32	1	56	25	92	3	0	120	331
07:15 AM	10	7	41	0	58	7	46	10	0	63	6	27	53	0	86	47	102	3	0	152	359
07:30 AM	16	13	46	0	75	15	59	6	0	80	5	21	42	0	68	38	124	5	0	167	390
07:45 AM	8	12	57	0	77	15	71	25	0	111	8	12	23	1	44	53	76	8	2	142	374
Total	49	36	208	0	293	49	218	59	0	326	28	74	150	2	254	163	397	19	2	581	1454
08:00 AM	11	8	56	0	75	4	43	11	0	58	7	17	12	0	36	47	62	6	3	118	287
08:15 AM	8	7	67	0	82	8	38	14	0	60	3	12	10	0	25	66	47	6	0	119	284
Grand Total	91	59	389	0	539	69	346	97	0	512	55	126	185	2	368	334	656	37	6	1033	2462
Approch %	16.9	10.9	72.2	0.0		13.5	67.6	18.9	0.0		14.9	34.2	50.3	0.5		32.3	63.5	3.6	0.6		
Total %	3.7	2.4	15.9	0.0	22.0	2.8	14.1	4.0	0.0	20.9	2.2	5.1	7.5	0.1	15.0	13.6	26.8	1.5	0.2	42.1	

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makani Rd
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halmaka
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	76	97	344	1	518	18	816	40	0	874	15	115	132	0	262	2	2	0	0	4	1658
Percent	14.7	18.7	66.4	0.2		2.1	93.4	4.6	0.0		5.7	43.9	50.4	0.0		50.0	50.0	0.0	0.0		
07:15 Volume	18	20	89	0	127	2	226	15	0	243	3	36	45	0	84	0	0	0	0	0	454
Peak Factor																					0.913
High Int.	07:30 AM					07:15 AM					07:15 AM					07:30 AM					
Volume	36	39	101	0	176	2	226	15	0	243	3	36	45	0	84	1	2	0	0	3	
Peak Factor					0.736					0.899					0.780					0.333	



Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makawao Ave
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halmwoa
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
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		1.0	1.0	1.0	1.0		
06:30 AM	36	34	88	0	160	0	129	20	0	149	11	34	0	0	45	6	11	1	0	17	371
06:45 AM	49	44	106	0	199	1	111	20	0	132	4	36	1	0	41	8	7	1	0	17	389
Total	87	78	194	0	359	1	240	40	0	281	15	70	1	0	86	14	18	2	0	34	760
07:00 AM	62	67	87	1	217	0	124	46	0	170	6	38	2	0	46	16	15	2	1	34	467
07:15 AM	46	48	64	0	158	3	172	50	0	225	8	63	1	0	72	31	30	3	0	64	519
07:30 AM	73	59	57	0	189	2	144	65	0	211	7	47	4	0	58	23	46	6	0	75	533
07:45 AM	49	74	59	0	182	1	140	64	1	206	7	56	1	0	64	15	15	4	0	34	486
Total	230	248	267	1	746	6	580	225	1	812	28	204	8	0	240	85	106	15	1	207	2005
08:00 AM	66	74	58	0	198	4	72	34	0	110	11	58	3	0	72	8	5	0	1	14	384
08:15 AM	38	87	47	1	173	1	67	27	1	96	18	59	2	0	79	8	5	3	0	16	364
Grand Total	411	487	566	2	1466	12	959	326	2	1299	72	391	14	0	477	115	134	20	2	271	3513
Apprch %	28.0	33.2	38.6	0.1		0.9	73.8	25.1	0.2		15.1	82.0	2.9	0.0		42.4	49.4	7.4	0.7		
Total %	11.7	13.9	16.1	0.1	41.7	0.3	27.3	9.3	0.1	37.0	2.0	11.1	0.4	0.0	13.6	3.3	3.8	0.6	0.1	7.7	

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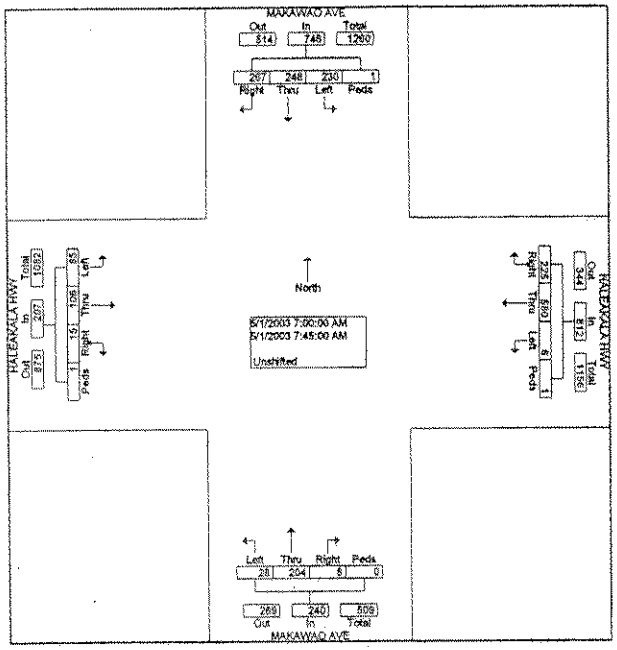
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makawao Ave
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haimwoa
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					, HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	230	248	267	1	746	6	580	225	1	812	28	204	8	0	240	85	106	15	1	207	2005
Percent	30.8	33.2	35.8	0.1		0.7	71.4	27.7	0.1		11.7	85.0	3.3	0.0		41.1	51.2	7.2	0.5		
07:30	73	59	57	0	189	2	144	65	0	211	7	47	4	0	58	23	46	6	0	75	533
Volume																					0.940
Peak Factor																					
High Int.	07:00 AM				-	07:15 AM					07:15 AM					07:30 AM					
Volume	62	67	87	1	217	3	172	50	0	225	8	63	1	0	72	23	46	5	0	75	
Peak Factor					0.859					0.902					0.833					0.690	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Kula Hwy
Minor Street: Haleakala Hwy/Old Haleakal
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haikulam
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

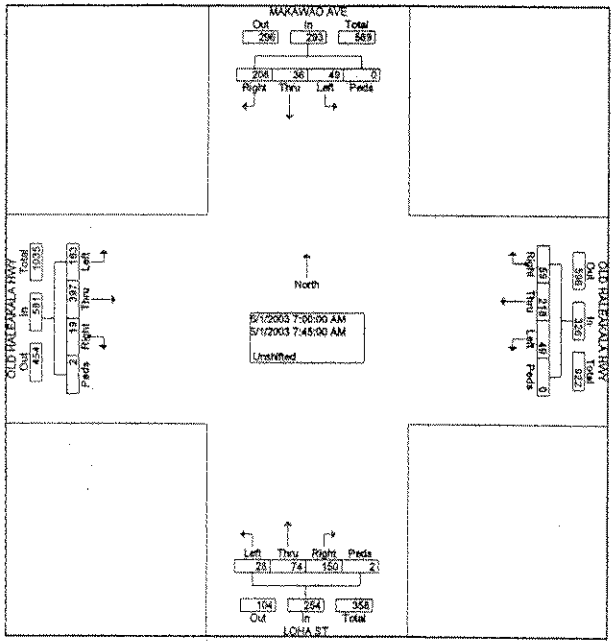
	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	4	45	0	0	49	1	7	25	1	34	20	120	3	0	143	1	9	75	0	85	311
06:45 AM	8	49	0	0	57	9	12	30	0	51	28	102	4	0	134	0	14	90	0	104	346
Total	12	94	0	0	106	10	19	55	1	85	48	222	7	0	277	1	23	165	0	189	657
07:00 AM	18	58	0	0	76	9	26	44	0	79	39	136	11	0	186	0	40	86	0	126	467
07:15 AM	8	81	0	0	89	31	20	45	0	96	36	173	24	0	233	0	49	118	0	167	585
07:30 AM	25	99	1	0	125	31	29	40	0	100	69	166	46	0	281	0	45	136	0	181	687
07:45 AM	10	64	0	0	74	30	20	32	0	82	72	169	27	0	268	1	26	76	0	107	531
Total	61	302	1	0	364	101	95	161	0	357	216	644	108	0	968	1	160	420	0	581	2270
08:00 AM	3	64	0	0	67	6	12	17	0	35	41	91	4	0	136	2	9	74	0	85	323
08:15 AM	2	43	1	0	46	14	5	14	0	33	49	84	6	0	138	0	16	57	0	73	290
Grand Total	78	503	2	0	583	131	131	247	1	510	354	1041	124	0	1519	4	208	716	0	929	3540
Apprch %	13.4	86.3	0.3	0.0		25.7	25.7	48.4	0.2		23.3	68.5	8.2	0.0		0.4	22.4	77.2	0.0		
Total %	2.2	14.2	0.1	0.0	16.5	3.7	3.7	7.0	0.0	14.4	10.0	29.4	3.5	0.0	42.9	0.1	5.9	20.2	0.0	26.2	

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Makawao Ave/Loha St
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldmwoe
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	49	36	208	0	293	49	218	59	0	326	28	74	150	2	254	183	397	19	2	581	1454
Percent	16.7	12.3	71.0	0.0		15.0	66.9	18.1	0.0		11.0	29.1	59.1	0.8		28.1	68.3	3.3	0.3		
07:30 Volume	18	13	46	0	75	15	59	6	0	80	5	21	42	0	68	38	124	5	0	167	390
Peak Factor																					0.932
High Int.	07:00 AM					07:45 AM					07:15 AM					07:30 AM					
Volume	15	4	64	0	83	15	71	25	0	111	6	27	53	0	86	38	124	5	0	167	
Peak Factor					0.883					0.734					0.738					0.870	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : haloldpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

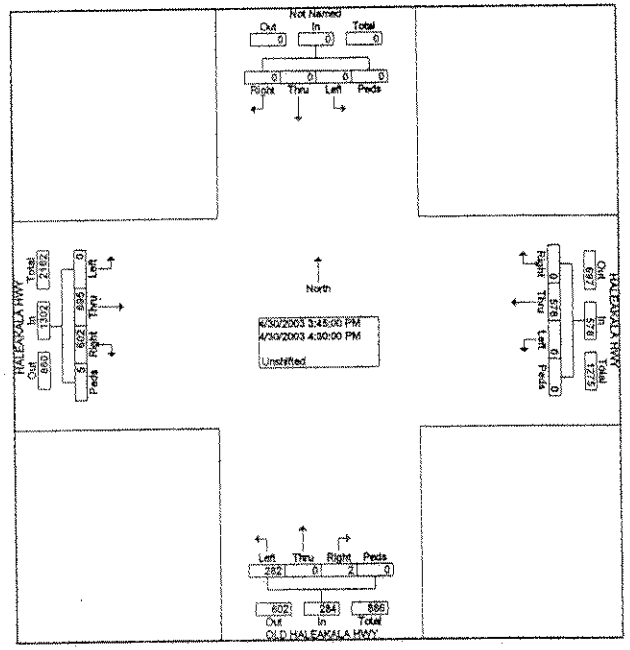
	Southbound					HALEAKALA HWY Westbound					OLD HALEAKALA HWY Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	0	0	0	0	0	0	109	0	0	109	74	0	0	0	74	0	129	99	0	228	411
Total	0	0	0	0	0	0	109	0	0	109	74	0	0	0	74	0	129	99	0	228	411
03:00 PM	0	0	0	0	0	0	139	0	0	139	58	0	0	0	58	0	111	102	0	213	410
03:15 PM	0	0	0	0	0	0	140	0	0	140	58	0	0	0	58	0	143	118	0	261	459
03:30 PM	0	0	0	0	0	0	172	0	0	172	85	0	1	0	86	0	161	143	0	304	562
03:45 PM	0	0	0	0	0	0	166	0	0	166	65	0	1	0	66	0	167	132	0	299	531
Total	0	0	0	0	0	0	617	0	0	617	266	0	2	0	268	0	582	495	0	1077	1962
04:00 PM	0	0	0	0	0	0	133	0	0	133	75	0	1	0	76	0	178	145	0	323	532
04:15 PM	0	0	0	0	0	0	142	0	0	142	66	0	0	0	66	0	178	145	0	321	529
04:30 PM	0	0	0	0	0	0	137	0	0	137	76	0	0	0	76	0	174	160	5	339	572
Grand Total	0	0	0	0	0	0	1138	0	0	1138	557	0	3	0	560	0	1239	1064	5	2308	4006
Approch %	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		99.5	0.0	0.5	0.0		0.0	53.7	46.1	0.2		
Total %	0.0	0.0	0.0	0.0	0.0	0.0	28.4	0.0	0.0	28.4	13.9	0.0	0.1	0.0	14.0	0.0	30.9	26.6	0.1	57.6	

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : haloldpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	Southbound					HALEAKALA HWY Westbound					OLD HALEAKALA HWY Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	03:45 PM																				
Volume	0	0	0	0	0	0	578	0	0	578	282	0	2	0	284	0	696	602	5	1302	2164
Percent	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		99.3	0.0	0.7	0.0		0.0	53.4	46.2	0.4		
04:30 Volume	0	0	0	0	0	0	137	0	0	137	76	0	0	0	76	0	174	180	5	359	572
Peak Factor																					0.946
High Int.						03:45 PM					04:00 PM					04:30 PM					
Volume	0	0	0	0	0	0	166	0	0	166	75	0	1	0	76	0	174	180	5	359	
Peak Factor										0.870					0.934					0.907	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makani Rd
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : haimakpr
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
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		1.0	1.0	1.0	1.0		
02:45 PM	4	25	25	0	54	7	98	5	0	110	0	12	3	0	15	22	108	2	0	132	311
Total	4	25	25	0	54	7	98	5	0	110	0	12	3	0	15	22	108	2	0	132	311
03:00 PM	0	16	26	0	42	5	113	4	0	122	1	13	2	0	16	24	91	2	0	117	297
03:15 PM	4	24	21	0	49	5	109	2	0	116	1	23	2	0	26	24	98	1	0	123	314
03:30 PM	2	18	24	0	44	7	154	3	1	165	1	16	3	0	20	37	129	1	1	168	397
03:45 PM	2	11	20	0	33	8	143	5	0	156	1	22	5	0	28	33	133	1	0	167	384
Total	8	69	91	0	168	25	519	14	1	559	4	74	12	0	90	118	451	5	1	575	1392
04:00 PM	1	18	15	0	34	12	117	7	0	136	1	16	5	0	22	50	133	3	0	186	378
04:15 PM	3	12	22	0	37	3	110	6	0	119	2	19	8	0	29	36	120	2	0	158	343
04:30 PM	2	8	26	0	36	6	104	4	1	115	3	23	4	1	31	40	148	1	0	189	371
Grand Total	18	132	179	0	329	53	948	36	2	1039	10	144	32	1	187	266	960	13	1	1240	2795
Apprch %	5.5	40.1	54.4	0.0		5.1	91.2	3.5	0.2		5.3	77.0	17.1	0.5		21.5	77.4	1.0	0.1		
Total %	0.6	4.7	6.4	0.0	11.8	1.9	33.9	1.3	0.1	37.2	0.4	5.2	1.1	0.0	6.7	9.5	34.3	0.5	0.0	44.4	

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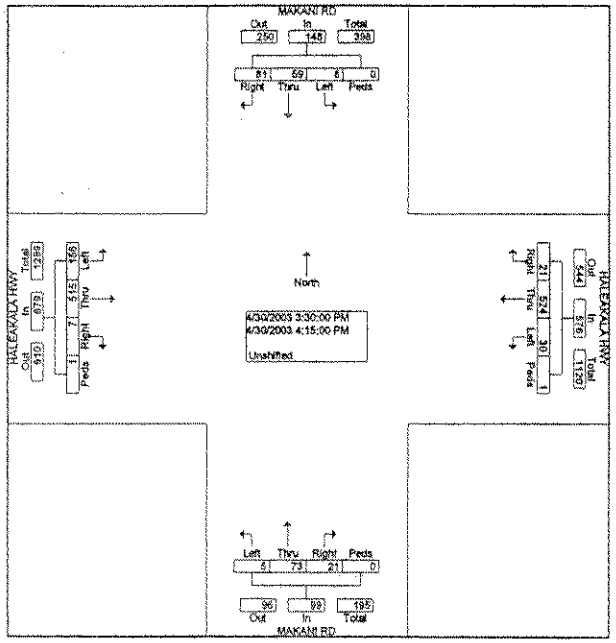
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makani Rd
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : halmakp
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					Int.
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection 03:30 PM																					
Volume	8	59	81	0	148	30	524	21	1	576	5	73	21	0	99	156	515	7	1	679	1502
Percent	5.4	39.9	54.7	0.0		5.2	91.0	3.6	0.2		5.1	73.7	21.2	0.0		23.0	75.8	1.0	0.1		
03:30 Volume	2	18	24	0	44	7	154	3	1	165	1	16	3	0	20	37	129	1	1	168	397
Peak Factor																					0.946
High Int. 03:30 PM						03:30 PM					04:15 PM					04:00 PM					
Volume	2	18	24	0	44	7	154	3	1	165	2	19	8	0	29	50	133	3	0	186	
Peak Factor					0.841					0.873					0.853					0.913	



Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makawao Ave
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : halmwop
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					HALEAKALA HWY Eastbound					Int.
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Total
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		1.0	1.0	1.0	1.0		
02:45 PM	26	70	26	0	122	5	80	38	1	124	5	85	3	0	93	54	48	14	0	116	455
Total	26	70	26	0	122	5	80	38	1	124	5	85	3	0	93	54	48	14	0	116	455
03:00 PM	32	72	31	0	135	2	80	33	0	115	6	61	4	0	71	39	44	9	0	92	413
03:15 PM	32	66	32	0	130	1	80	58	0	139	12	63	3	0	78	41	61	10	0	112	459
03:30 PM	22	68	48	0	138	1	92	51	0	144	15	90	3	0	108	60	64	10	0	134	544
03:45 PM	28	64	40	0	132	3	99	48	0	150	10	101	5	1	117	53	70	10	0	133	532
Total	114	290	151	0	555	7	351	190	0	548	43	315	15	1	374	193	239	39	0	471	1948
04:00 PM	34	61	38	0	133	1	92	51	0	144	9	91	2	0	102	49	76	9	0	134	515
04:15 PM	29	74	29	0	132	3	74	36	0	113	7	90	6	0	103	56	54	12	0	124	472
04:30 PM	25	53	28	0	106	3	79	39	1	122	9	69	1	0	90	72	63	9	1	145	463
Grand Total	229	547	272	0	1048	19	676	354	2	1051	73	661	27	1	762	426	482	83	1	992	3863
Apprch %	21.9	52.2	26.0	0.0		1.8	64.3	33.7	0.2		9.6	86.7	3.5	0.1		42.9	48.6	8.4	0.1		
Total %	5.9	14.2	7.1	0.0	27.2	0.5	17.5	9.2	0.1	27.3	1.9	17.2	0.7	0.0	19.8	11.1	12.5	2.2	0.0	25.7	

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Honolulu, Hawaii 96817
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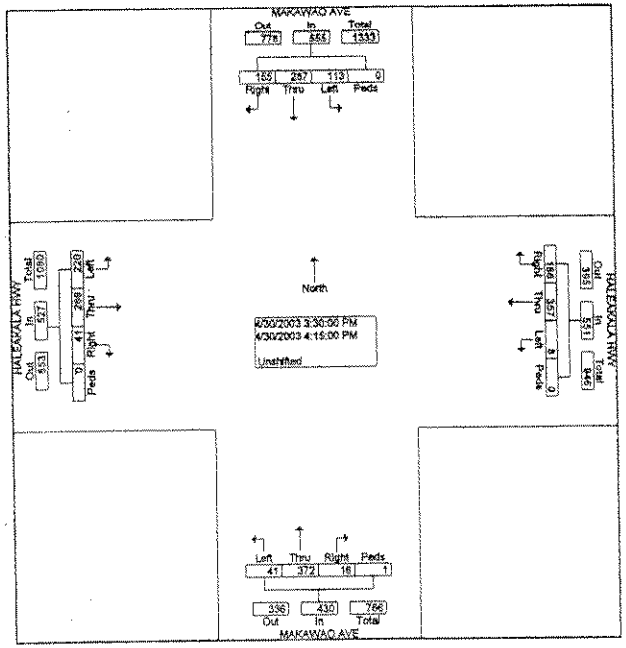
Major Street: Haleakala Hwy
Minor Street: Makawao Ave
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : haimwop
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					HALEAKALA HWY Eastbound					Int.
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection 03:30 PM																					
Volume	113	287	155	0	555	8	357	186	0	551	41	372	16	1	430	220	266	41	0	527	2063
Percent	20.4	51.7	27.9	0.0		1.5	64.8	33.8	0.0		9.5	86.5	3.7	0.2		41.7	50.5	7.8	0.0		
03:30 Volume	22	68	48	0	158	1	92	51	0	144	15	90	3	0	108	60	64	10	0	134	544
Peak Factor																					0.948
High Int. 03:30 PM						03:45 PM					03:45 PM					04:00 PM					
Volume	22	68	48	0	158	3	99	48	0	150	10	101	3	1	117	49	79	8	0	136	
Peak Factor					0.875					0.918					0.919					0.969	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Kula Hwy
Minor Street: Haleakala Hwy/Old Haleakal
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : haikulpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					Int.
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Total
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		1.0	1.0	1.0	1.0		
02:45 PM	12	78	1	0	91	11	13	16	0	40	58	108	17	0	183	0	10	65	0	75	389
Total	12	78	1	0	91	11	13	16	0	40	58	108	17	0	183	0	10	65	0	75	389
03:00 PM	13	63	1	0	77	10	27	23	0	60	37	85	13	0	135	1	13	56	0	70	342
03:15 PM	10	80	0	0	90	9	12	30	0	51	59	108	7	0	174	0	19	61	0	80	395
03:30 PM	10	68	1	0	99	17	13	13	0	43	67	147	11	0	225	1	18	44	0	81	428
03:45 PM	12	85	0	0	97	7	11	25	0	43	61	120	7	0	188	0	15	61	0	77	405
Total	45	316	2	0	363	43	63	91	0	197	224	480	38	0	722	2	64	222	0	288	1570
04:00 PM	12	105	0	0	117	11	17	20	0	48	55	116	8	0	179	0	13	49	0	62	406
04:15 PM	15	80	0	0	95	7	11	19	0	37	58	100	9	0	167	0	16	53	0	69	368
04:30 PM	20	61	1	0	82	5	15	27	0	47	42	93	9	0	144	1	11	46	0	58	331
Grand Total	104	640	4	0	749	77	119	173	0	369	437	877	81	0	1395	3	114	435	0	552	3064
Apprch %	13.9	85.6	0.5	0.0		20.9	32.2	46.9	0.0		31.3	62.9	5.8	0.0		0.5	20.7	78.8	0.0		
Total %	3.4	20.9	0.1	0.0	24.4	2.5	3.9	5.6	0.0	12.0	14.3	28.6	2.6	0.0	45.5	0.1	3.7	14.2	0.0	18.0	

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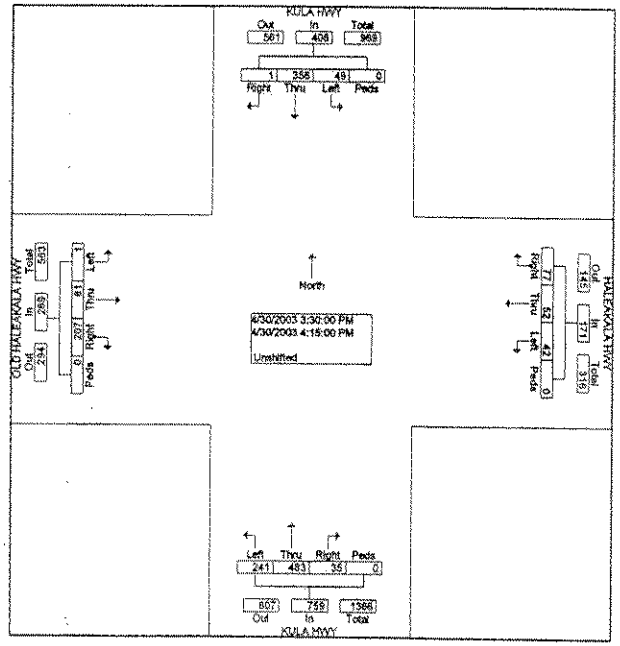
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Kula Hwy
Minor Street: Haleakala Hwy/Old Haleakal
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : halkulpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 03:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	49	358	1	0	408	42	52	77	0	171	241	483	35	0	759	1	61	207	0	269	1607
Percent	12.0	87.7	0.2	0.0		24.6	30.4	45.0	0.0		31.8	63.6	4.6	0.0		0.4	22.7	77.0	0.0		
03:30	10	88	1	0	99	17	13	13	0	43	67	147	11	0	225	1	16	44	0	61	428
Peak Factor																					0.939
High Int.	04:00 PM					04:00 PM					03:30 PM					03:45 PM					
Volume	12	105	0	0	117	11	17	20	0	48	67	147	11	0	225	0	16	61	0	77	
Peak Factor					0.872					0.891					0.843					0.873	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Pukalani St
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldpukpm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 1

Groups Printed- Unshifted

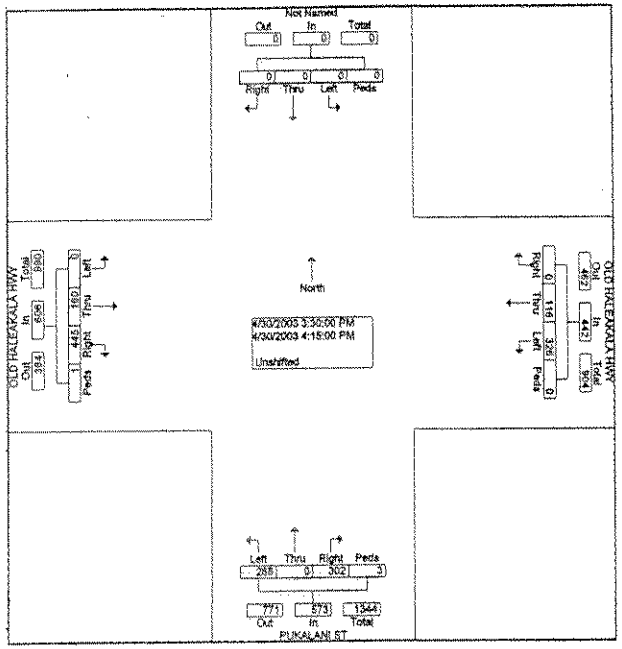
	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	0	0	0	0	0	80	29	0	0	109	56	0	72	0	128	0	30	81	0	111	348
Total	0	0	0	0	0	80	29	0	0	109	56	0	72	0	128	0	30	81	0	111	348
03:00 PM	0	0	0	0	0	77	18	0	0	95	55	0	66	0	121	0	31	82	0	113	329
03:15 PM	0	0	0	0	0	88	24	0	0	112	68	0	76	0	144	0	38	73	0	111	367
03:30 PM	0	0	0	0	0	95	27	0	0	122	66	0	65	0	131	0	45	108	1	154	407
03:45 PM	0	0	0	0	0	95	20	0	0	115	73	0	85	0	158	0	39	116	0	155	428
Total	0	0	0	0	0	355	89	0	0	444	262	0	292	0	554	0	153	379	1	533	1531
04:00 PM	0	0	0	0	0	67	44	0	0	111	75	0	84	0	159	0	33	114	0	147	417
04:15 PM	0	0	0	0	0	69	25	0	0	94	54	0	68	3	125	0	43	107	0	150	369
04:30 PM	0	0	0	0	0	70	28	0	0	98	75	0	76	1	153	0	32	120	0	152	403
Grand Total	0	0	0	0	0	641	215	0	0	856	523	0	592	4	1119	0	291	801	1	1093	3066
Apprch %	0.0	0.0	0.0	0.0		74.9	25.1	0.0	0.0		46.7	0.0	52.9	0.4		0.0	26.6	73.3	0.1		
Total %	0.0	0.0	0.0	0.0	0.0	20.9	7.0	0.0	0.0	27.9	17.0	0.0	19.3	0.1	36.5	0.0	9.5	26.1	0.0	35.6	

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Pukalani St
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldpukpm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 2

	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	0	0	0	0	0	326	116	0	0	442	266	0	302	3	573	0	100	445	1	606	1621
Percent	0.0	0.0	0.0	0.0		73.8	26.2	0.0	0.0		46.8	0.0	52.7	0.5		0.0	26.4	73.4	0.2		
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
Volume																					0.947
Peak Factor																					
High Int.	2:30:00 PM					03:30 PM					04:00 PM					03:45 PM					
Volume	0	0	0	0	0	95	27	0	0	122	75	0	84	0	159	0	39	116	0	155	
Peak Factor										0.906					0.901					0.977	



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501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Makawao Ave/Loha St
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldmwoc
Site Code : 00000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

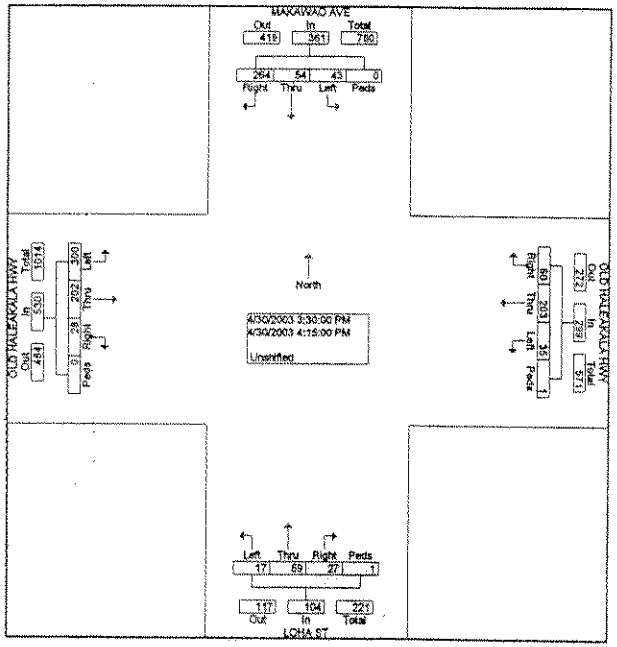
	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	8	12	58	0	78	14	58	12	0	84	2	12	9	0	23	73	56	3	2	134	319
Total	8	12	58	0	78	14	58	12	0	84	2	12	9	0	23	73	56	3	2	134	319
03:00 PM	13	9	63	0	85	4	52	9	0	65	4	9	9	0	22	57	47	6	2	112	284
03:15 PM	26	13	55	0	94	11	42	12	0	65	2	12	13	0	28	76	48	1	0	125	312
03:30 PM	11	14	75	0	100	10	59	21	0	90	2	18	7	0	27	74	42	2	0	118	335
03:45 PM	17	12	65	0	94	7	61	13	0	81	4	17	6	1	28	79	54	6	0	139	332
Total	67	48	258	0	373	32	204	55	0	291	12	57	35	1	105	286	191	15	2	494	1263
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
[illegible]																					
04:00 PM	6	9	61	0	76	6	48	15	6	75	6	8	8	0	22	73	55	15	0	143	320
04:15 PM	9	19	63	0	91	13	45	13	1	72	5	11	5	0	19	80	45	4	1	119	301
04:30 PM	13	14	48	0	76	8	53	5	0	66	3	11	5	0	19	96	39	4	1	140	301
Grand Total	103	102	489	0	694	72	408	96	1	579	28	104	63	1	196	596	396	42	5	1011	2480
Apprch %	14.8	14.7	70.5	0.0		12.4	70.5	16.6	0.2		14.3	53.1	32.1	0.5		58.9	39.4	4.2	0.5		
Total %	4.2	4.1	19.7	0.0	28.0	2.9	16.5	4.0	0.0	23.3	1.1	4.2	2.5	0.0	7.9	22.8	16.0	1.7	0.2	40.8	

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Makawao Ave/Loha St
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldmwop
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	43	54	264	0	361	35	203	60	1	299	17	59	27	1	104	300	202	28	0	530	1294
Percent	11.9	15.0	73.1	0.0		11.7	67.9	20.1	0.3		16.3	56.7	26.0	1.0		56.6	38.1	5.3	0.0		
03:30 Volume	11	14	75	0	100	10	59	21	0	90	2	18	7	0	27	74	42	2	0	118	335
Peak Factor																					0.966
High Int.	03:30 PM					03:30 PM					03:45 PM					04:15 PM					
Volume	11	14	75	0	100	10	59	21	0	90	4	17	6	1	28	73	55	15	0	143	
Peak Factor					0.903					0.831					0.929					0.927	



AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS / SURVEYORS

APPENDIX B

LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 2000)

The level of service criteria for unsignalized intersections is defined as the average total delay, in seconds per vehicle. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position.

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 Total Delay (sec/veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

LEVEL OF SERVICE OF SIGNALIZED INTERSECTIONS (HCM 2000)

Level of service for signalized intersections is defined in terms of **delay**, which is a measure of driver discomfort, frustration, fuel consumption and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The criteria are given in Table A-1.

Table A-1. Level-of Service Criteria for Signalized Intersections

Level of Service	Stopped Delay per Vehicle (sec.)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	>55 and ≤ 80
F	>80

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.

Using the HCM calculation procedure, LOS is determined for each individual approach, as well as for the intersection as a whole.

Level-of-service A describes operations with very low delay, up to 10.0 seconds per vehicle. This level of service occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level-of-service B describes operations with delay greater than 10.0 and up to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level-of-service C describes operations with delay greater than 20.0 and up to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level-of-service D describes operations with delay greater than 35.0 and up to 55.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level-of-service E describes operations with delay greater than 55.0 and up to 80.0 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.

Level-of-service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

APPENDIX C
LEVEL OF SERVICE CALCULATIONS

- Existing

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL	Jurisdiction/Date	KULA, MAUI 7/2/2003
Agency or Company	ATA	Major Street	HALEAKALA HWY
Analysis Period/Year	PM PEAK 2003	Minor Street	OLD HALEAKALA HWY
Comment	EXISTING		

Site information

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		T			T			R				
Lane 2		T						L				
Lane 3												
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		695			0		282		2			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		772			0		313		2			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	2	609	.003	<1	10.9	B	70.2
	2	L	313	334	.938	10	70.6	F	F
	3								
SB	1								
	2								
	3								
		①							
		④							

1 of 1

HICAP 2000 ™

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL
Agency or Company	ATA
Analysis Period/Year	AM PEAK 2003
Comment	EXISTING

Site Information

Jurisdiction/Date	KULA, MAUI 6/27/2003
Major Street	HALEAKALA HIGHWAY
Minor Street	MAKANI ROAD

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)	TR			TR			R			R		
Lane 2	T			L			LT			LT		
Lane 3	L											
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	2	2	0	18	816	40	15	115	132	76	97	344
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	2	2	2	2	2	2	2	2	2	2	2	2
Flow rate	2	2	0	20	907	44	17	128	147	84	108	382
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	147	1083	.136	<1	8.8	A	24.8
	2	LT	145	239	.608	4	41	E	
	3								C
SB	1	R	382	269	1.418	21	244.4	F	249.5
	2	LT	192	141	1.359	12	259.9	F	
	3								F
		①	2	718	.003	<1	10	A	
		④	20	1619	.012	<1	7.3	A	

HiCAP 2000 ™

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	EV
Agency or Company	ATA
Analysis Period/Year	PM PEAK 2003
Comment	EXISTING

Site Information

Jurisdiction/Date	KULA, MAUI 6/27/2003
Major Street	HALEAKALA HIGHWAY
Minor Street	MAKANI ROAD

Input Data

Lane Configuration												
Lane 1 (curb)	TR			TR			R			R		
Lane 2	T			L			LT			LT		
Lane 3	L											
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	156	515	7	30	524	21	5	73	21	8	59	81
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	2	2	2	2	2	2	2	2	2	2	2	2
Flow rate	173	572	8	33	582	23	6	81	23	9	66	90
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
	1	R	23	707	.033	<1	10.3	B	255.9
	2	LT	87	66	1.31	7	320.9	F	
	3								F
	1	R	90	448	.201	1	15	B	220.1
	2	LT	75	48	1.557	7	466.1	F	
	3								F
		①	173	968	.179	1	9.5	A	
		④	33	990	.034	<1	8.8	A	

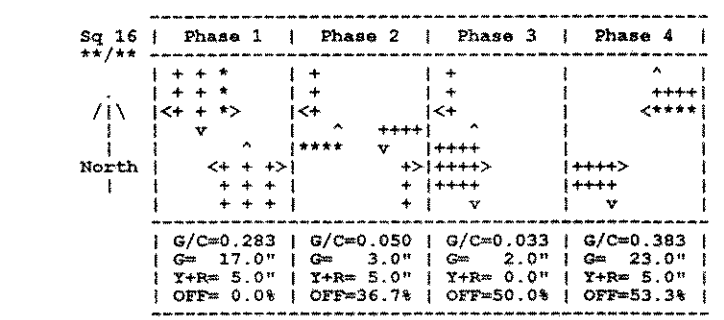
HICAP 2000 ™

Kualono Subdivision
AM Peak Hour of Traffic
Existing

10/31/03
10:29:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.60 Vehicle Delay 24.9 Level of Service C+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								23.3	C+	
RT	12/1	0.243	0.450	659	713	297	0.417	13.0	B+	168 ft
TH	12/1	0.187	0.283	460	528	276	0.523	19.0	B	186 ft
LT	12/1	0.294	0.283	245	302	256	0.848	39.9	*D+	226 ft
NB Approach								17.6	B	
RT	12/1	0.034	0.417	600	660	9	0.014	10.3	B+	5 ft
TH	12/1	0.160	0.283	460	528	227	0.430	18.1	B	148 ft
LT	12/1	0.000	0.283	206	260	31	0.119	16.2	B	19 ft
WB Approach								29.5	C	
RT	12/1	0.216	0.383	529	607	250	0.412	17.3	B	170 ft
TH	12/1	0.381	0.383	648	714	644	0.902	34.3	*C	544 ft
LT	12/1	0.014	0.050	49	76	7	0.080	27.6	C	6 ft
EB Approach								20.9	C+	
RT	12/1	0.046	0.417	600	660	17	0.026	10.4	B+	9 ft
TH	24/2	0.052	0.417	1439	1475	118	0.080	10.6	B+	30 ft
LT	12/1	0.084	0.083	93	137	94	0.639	35.6	*D+	81 ft

Kualono Subdivision
AM Peak Hour of Traffic
Existing

10/31/03
10:29:54

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90 25 40			

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

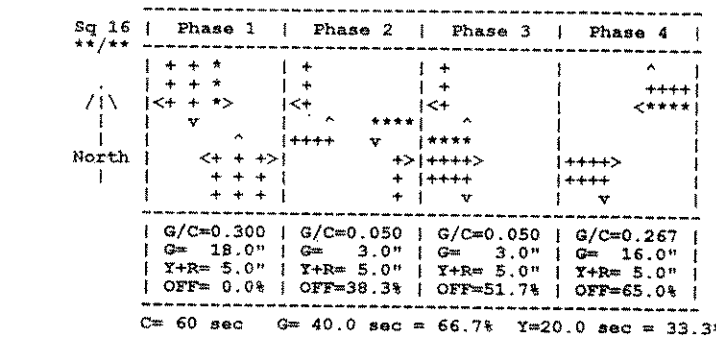
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	267	248	230	225	580	6	8	204	28	15	106	85
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1068	1583	1863	1770	1583	1863	919	1583	3539	1770

Phasing Parameters

SEQUENCES	16	16					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	120	10		PEDTIME	0.0	0
GREENTIMES	17.00	3.00	2.00	23.00			
YELLOWTIMES	5.00	5.00	0.00	5.00			
CRITICALS	3	12	0	5			
EXCESS	0						

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.56 Vehicle Delay 22.6 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								19.0	B	
RT	12/1	0.168	0.567	866	897	172	0.192	6.8	A	75 ft
TH	12/1	0.210	0.300	492	559	319	0.571	19.1	B	216 ft
LT	12/1	0.300	0.300	126	164	126	0.746	35.4	*D+	106 ft
NB Approach								22.7	C+	
RT	12/1	0.047	0.433	629	686	18	0.026	9.8	A	10 ft
TH	12/1	0.260	0.300	492	559	413	0.739	24.1	C+	306 ft
LT	12/1	0.000	0.300	195	246	46	0.187	15.9	B	28 ft
WB Approach								28.0	C	
RT	12/1	0.190	0.267	332	422	207	0.491	23.4	C+	157 ft
TH	12/1	0.253	0.267	423	497	397	0.799	30.4	*C	323 ft
LT	12/1	0.017	0.050	49	76	9	0.102	27.7	*C	7 ft
EB Approach								20.5	C+	
RT	12/1	0.077	0.400	570	633	46	0.073	11.3	B+	26 ft
TH	24/2	0.109	0.400	1375	1416	296	0.209	11.9	B+	81 ft
LT	12/1	0.178	0.183	253	324	244	0.753	32.8	*C	201 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

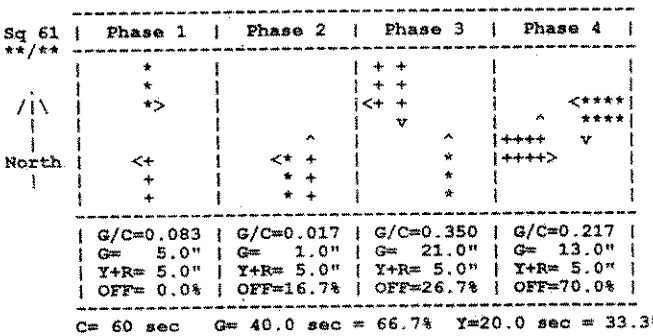
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	155	287	113	186	357	8	16	372	41	41	266	220
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	565	1583	1863	1770	1583	1863	819	1583	3539	1770

Phasing Parameters

SEQUENCES	16	16				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	120	10		PEDTIME	0.0 0
GREENTIMES	18.00	3.00	3.00	16.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	6	12	5		
EXCESS	0					

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.70 Vehicle Delay 24.0 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								17.5	B	
RT	12/1	0.012	0.350	487	554	1	0.002	12.0	B+	1 ft
TH	12/1	0.219	0.350	596	652	336	0.515	15.3	B	190 ft
LT	12/1	0.065	0.083	93	137	68	0.463	28.5	*C	54 ft
NB Approach								25.5	C+	
TH	12/1	0.412	0.450	793	838	716	0.854	23.4	*C+	534 ft
LT	12/1	0.175	0.183	253	324	240	0.741	31.9	*C	196 ft
WB Approach								31.6	C	
TH+LT	12/1	0.207	0.217	230	294	218	0.741	31.6	*C	178 ft
EB Approach								21.2	C+	
TH+LT	12/1	0.133	0.217	331	403	179	0.444	21.2	C+	125 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25	40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	1	302	61	161	95	101	108	644	216	420	160	1
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	4	4	4	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1359	0	0	1863	1770	0	1859	0

Phasing Parameters

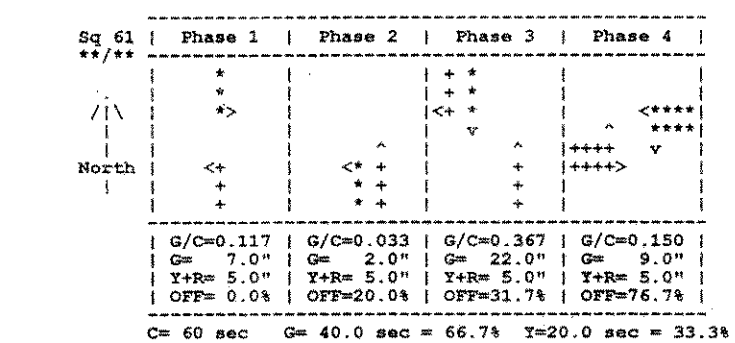
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	10		PEDTIME	0.0 0
GREENTIMES	5.00	1.00	21.00	13.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	8	5		
EXCESS	0					

Kualono Subdivision
PM Peak Hour of Traffic
Existing

10/31/03
10:45:39

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.56 Vehicle Delay 17.3 Level of Service B



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								16.6	B	
RT	12/1	0.012	0.367	518	581	1	0.002	11.2	B+	0 ft
TH	12/1	0.252	0.367	630	683	398	0.583	15.5	*B	230 ft
LT	12/1	0.055	0.117	143	200	54	0.262	24.8	*C+	39 ft
NB Approach								16.3	B	
TH	12/1	0.323	0.483	861	900	537	0.597	12.3	B+	307 ft
LT	12/1	0.192	0.233	343	413	268	0.649	24.3	*C+	200 ft
WB Approach								24.7	C+	
TH+LT	12/1	0.105	0.150	167	227	105	0.457	24.7	*C+	80 ft
EB Approach								23.0	C+	
TH+LT	12/1	0.063	0.150	208	278	69	0.248	23.0	C+	49 ft

Kualono Subdivision
PM Peak Hour of Traffic
Existing

10/31/03
10:45:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	1	358	49	77	52	42	35	483	241	207	61	1
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	4	4	4	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1533	0	0	1863	1770	0	1854	0

Phasing Parameters

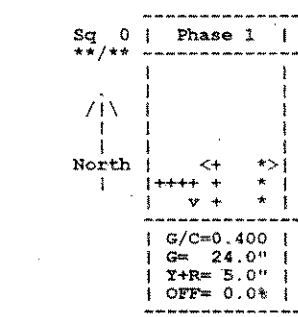
SEQUENCES	61	61					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	10		PEDTIME	0.0	0
GREENTIMES	7.00	2.00	22.00	9.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	2	5			
EXCESS	0						

Kualono Subdivision
AM Peak Hour of Traffic
Existing

07/23/03
09:18:47

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.60 Vehicle Delay 20.2 Level of Service C+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								22.1	C+	
RT	12/1	0.195	0.567	866	897	217	0.242	7.2	*A	96 ft
LT	12/1	0.378	0.400	655	708	612	0.864	27.4	C+	480 ft
WB Approach								24.3	C+	
TH	12/1	0.147	0.433	759	807	203	0.252	11.0	B+	103 ft
LT	12/1	0.081	0.083	308	354	303	0.856	33.2	*C	256 ft
EB Approach								13.7	B+	
RT	12/1	0.206	0.750	1188	1188	234	0.197	2.6	A	66 ft
TH	12/1	0.207	0.267	427	497	314	0.632	22.0	C+	225 ft

Kualono Subdivision
AM Peak Hour of Traffic
Existing

07/23/03
09:18:58

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	0	0	0	0	183	273	195	0	551	211	283	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Kualono Subdivision
AM Peak Hour of Traffic
Existing

07/23/03
09:18:58

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

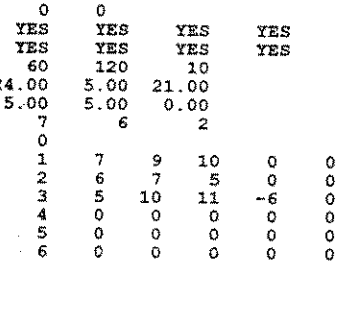
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	24.00	5.00	21.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Kualono Subdivision
PM Peak Hour of Traffic
Existing

07/23/03
09:22:36

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.45 Vehicle Delay 10.7 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								13.8	B+	
RT	12/1	0.266	0.500	748	792	336	0.424	11.2	*B+	178 ft
LT	12/1	0.209	0.333	528	590	298	0.505	16.7	B	191 ft
WB Approach								12.1	B+	
TH	12/1	0.103	0.500	895	931	129	0.139	8.1	A	56 ft
LT	12/1	0.003	0.083	517	560	362	0.646	13.5	*B+	222 ft
EB Approach								6.8	A	
RT	12/1	0.357	0.750	1188	1188	494	0.416	3.8	A	162 ft
TH	12/1	0.132	0.333	558	621	178	0.287	15.0	B+	104 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25	40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	116	326	302	0	268	445	160	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Kualono Subdivision
PM Peak Hour of Traffic
Existing

07/23/03
09:23:22

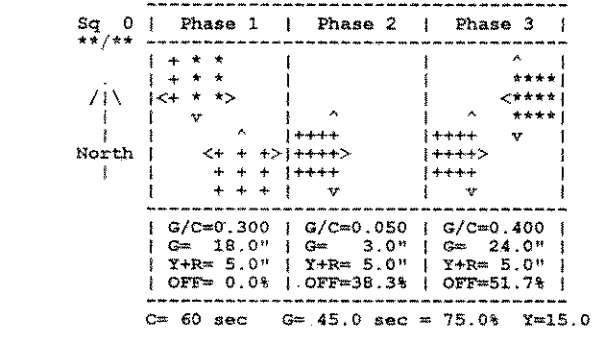
SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	120	10					PEDTIME	0.0	0
GREENTIMES	20.00	5.00	25.00							
YELLOWTIMES	5.00	5.00	0.00							
CRITICALS	7	6	2							
EXCESS	0									
PHASEMOVEMENTS	1	7	9	10	0	0	0			
PHASEMOVEMENTS	2	6	7	5	0	0	0			
PHASEMOVEMENTS	3	5	10	11	-6	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.46 Vehicle Delay 14.1 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								19.4	B	
RT	12/1	0.204	0.300	395	475	231	0.486	20.7	C+	160 ft
TH+LT	12/1	0.105	0.300	355	417	94	0.225	16.0	*B	57 ft
NB Approach								19.2	B	
RT+TH+LT	12/1	0.212	0.300	429	494	280	0.567	19.2	B	191 ft
WB Approach								15.1	B	
RT+TH+LT	12/1	0.268	0.400	588	642	362	0.564	15.1	*B	225 ft
EB Approach								8.6	A	
RT+TH	12/1	0.287	0.533	957	987	462	0.468	9.1	A	227 ft
LT	12/1	0.140	0.533	913	944	181	0.192	7.4	A	76 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	208	36	49	59	218	49	150	74	28	19	397	163
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1391	0	0	1605	0	0	1646	0	0	1850	1770

Kualono Subdivision
AM Peak Hour of Traffic
Existing

07/23/03
09:17:28

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

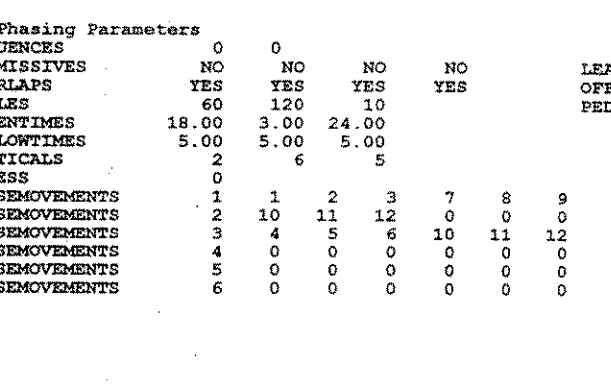
Phasing Parameters										
SEQUENCES	0	0								
PERMISSIVES	NO	NO		NO		NO		LEADLAGS	NONE	NONE
OVERLAPS	YES	YES		YES		YES		OFFSET	0.00	1
CYCLES	60	120		10				PEDTIME	0.0	0
GREENTIMES	18.00	3.00		24.00						
YELLOWTIMES	5.00	5.00		5.00						
CRITICALS	2	6		5						
EXCESS	0									
PHASEMOVEMENTS	1	1	2	3	7	8	9			
PHASEMOVEMENTS	2	10	11	12	0	0	0			
PHASEMOVEMENTS	3	4	5	6	10	11	12			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Kualono Subdivision
PM Peak Hour of Traffic
Existing

11/06/03
13:19:51

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.40 Vehicle Delay 13.9 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								**21.8**	**C+**	
RT	12/1	0.241	0.300	395	475	293	0.617	23.9	C+	213 ft
TH+LT	12/1	0.105	0.300	406	470	108	0.230	16.0	*B	65 ft
NB Approach								**16.0**	**B**	
RT+TH+LT	12/1	0.102	0.300	447	512	115	0.225	16.0	B	69 ft
WB Approach								**14.0**	**B+**	
RT+TH+LT	12/1	0.236	0.400	628	682	332	0.487	14.0	*B+	197 ft
EB Approach								**8.0**	**A**	
RT+TH	12/1	0.179	0.533	945	975	255	0.262	7.7	A	111 ft
LT	12/1	0.229	0.533	913	944	333	0.353	8.3	A	153 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25	40	

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	264	54	43	60	203	35	27	59	17	28	202	300
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1566	0	0	1705	0	0	1706	0	0	1829	1770

Kualono Subdivision
PM Peak Hour of Traffic
Existing

11/06/03
13:20:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	NO	NO	NO	NO			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

APPENDIX C
LEVEL OF SERVICE CALCULATIONS

- Base Year 2005

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	TL		Jurisdiction/Date	KULA, MAUI	11/14/200
Agency or Company	ATA		Major Street	HALEAKALA HWY	
Analysis Period/Year	AM PEAK	2003	Minor Street	OLD HALEAKALA HWY	
Comment	BASE YEAR 2005				

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	T	T	R	
Lane 2	T		L	
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		295			0		795		5			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		328			0		883		6			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	6	849	.007	<1	9.3	A	200
	2	L	883	639	1.383	39	201.3	F	F
	3								
SB	1								
	2								
	3								
		①							
		④							

1 of 1

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL	Jurisdiction/Date	KULA, MAUI 11/14/200
Agency or Company	ATA	Major Street	HALEAKALA HWY
Analysis Period/Year	PM PEAK 2003	Minor Street	OLD HALEAKALA HWY
Comment	BASE YEAR 2005		

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		T			T			R				
Lane 2		T						L				
Lane 3												

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		785			0		295		5			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		872			0		328		6			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	6	565	.011	<1	11.4	B	132.6
	2	L	328	288	1.139	14	134.8	F	
	3								F
SB	1								
	2								
	3								
		①							
		④							

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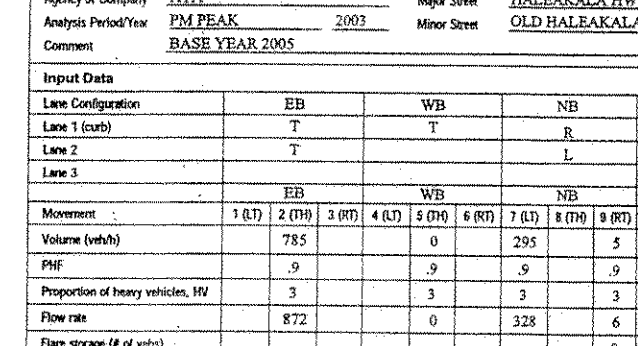
1 of 1

Kualono Subdivision 11/14/03
AM Peak Hour of Traffic 08:34:09
Base Year 2005 with traffic signal

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.71 Vehicle Delay 37.0 Level of Service D+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								**41.6**	**D+**	
RT	12/1	0.338	0.289	297	457	394	0.862	49.2	*D	481 ft
TH+LT	12/1	0.228	0.289	311	426	211	0.495	27.5	C+	207 ft
NB Approach								**25.1**	**C+**	
RT	12/1	0.189	0.289	297	457	106	0.232	25.6	C+	102 ft
TH+LT	12/1	0.160	0.289	381	509	117	0.230	24.6	C+	105 ft
WB Approach								**44.7**	**D+**	
RT+TH	12/1	0.628	0.600	1025	1110	1083	0.976	45.5	*D	1304 ft
LT	12/1	0.134	0.600	585	635	22	0.035	7.4	A	11 ft
EB Approach								**11.4**	**B+**	
RT+TH	24/2	0.166	0.600	2029	2117	300	0.142	11.0	B+	117 ft
LT	12/1	0.225	0.600	58	75	39	0.470	14.2	B+	31 ft

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005 with traffic signal

11/14/03
08:34:26

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD		
SIMULATION PERIOD	15		
LEVELOFSERVICE	C	S	
NODELOCATION	0	0	
QUEUEMODELS	1 90 25 40		

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	355	100	90	45	930	20	95	90	15	5	265	35
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	2	3	3	3	3	3	2	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1473	0	0	1850	1059	1583	1762	0	0	3529	138

Phasing Parameters

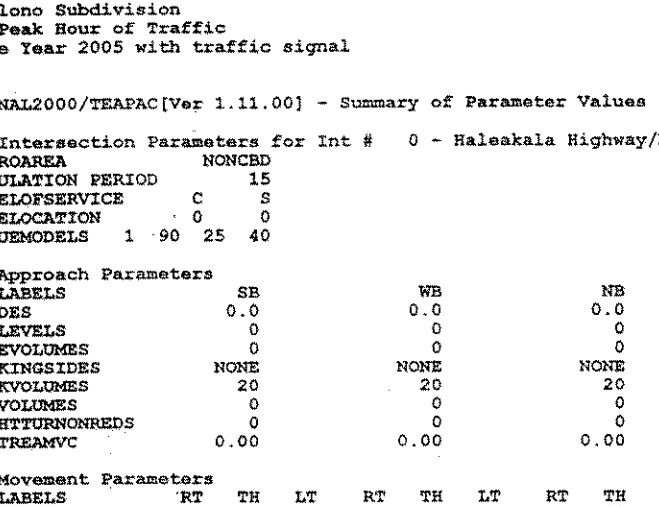
SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	180	10		PEDTIME	0.0 0
GREENTIMES	26.00	54.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	1	5				
EXCESS	0					

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005 with traffic signal

11/14/03
09:58:35

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.41 Vehicle Delay 10.2 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								22.9	C+	
RT	12/1	0.115	0.183	198	290	94	0.324	24.2	*C+	72 ft
TH+LT	12/1	0.072	0.183	255	326	78	0.239	21.3	C+	54 ft
NB Approach								21.4	C+	
RT	12/1	0.059	0.183	198	290	28	0.097	21.0	C+	21 ft
TH+LT	12/1	0.078	0.183	263	335	89	0.266	21.5	C+	62 ft
WB Approach								9.1	A	
RT+TH	12/1	0.401	0.650	1172	1203	678	0.564	9.3	A	386 ft
LT	12/1	0.000	0.650	411	443	33	0.074	3.9	A	10 ft
EB Approach								6.9	A	
RT+TH	24/2	0.217	0.650	2295	2295	678	0.295	6.9	A	180 ft
LT	12/1	0.422	0.650	307	340	178	0.524	7.1	*A	84 ft

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005 with traffic signal

11/14/03
09:58:43

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	85	60	10	25	585	30	25	75	5	10	600	160
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	2	3	3	3	3	3	2	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1777	0	0	1851	682	1583	1826	0	0	3531	523

Phasing Parameters

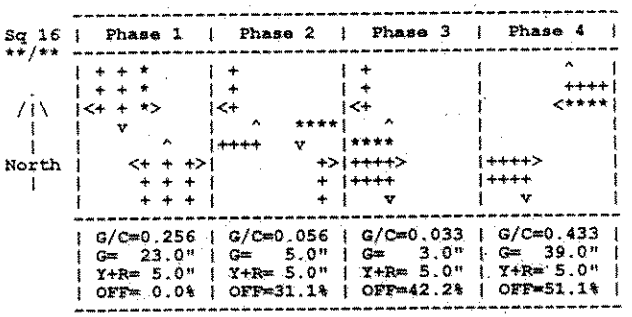
SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	10		PEDTIME	0.0 0
GREENTIMES	11.00	39.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	1	12				
EXCESS	0					

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
08:29:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.65 Vehicle Delay 38.7 Level of Service D+



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Modal 1
SB Approach								**35.7**	**D+**	
RT	12/1	0.293	0.456	623	721	306	0.424	18.4	B	244 ft
TH	12/1	0.231	0.256	335	476	283	0.595	31.4	C	292 ft
LT	12/1	0.310	0.256	218	325	294	0.896	58.0	*E+	383 ft
NB Approach								**26.0**	**C+**	
RT	12/1	0.128	0.367	451	581	11	0.019	18.2	B	10 ft
TH	12/1	0.154	0.256	335	476	106	0.223	26.7	C+	99 ft
LT	12/1	0.156	0.256	114	176	33	0.176	26.6	C+	31 ft
WB Approach								**42.9**	**D+**	
RT	12/1	0.295	0.433	546	686	289	0.421	22.5	C+	268 ft
TH	12/1	0.476	0.433	684	807	772	0.957	50.5	*D	949 ft
LT	12/1	0.120	0.056	1	80	6	0.061	40.5	*D+	7 ft
EB Approach								**38.9**	**D+**	
RT	12/1	0.132	0.522	712	827	17	0.021	13.2	B+	15 ft
TH	24/2	0.156	0.522	1729	1848	244	0.132	14.0	B+	102 ft
LT	12/1	0.214	0.144	74	243	228	0.891	67.4	*E+	310 ft

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
08:30:00

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	275	255	265	260	695	5	10	95	30	15	220	205
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1283	1583	1863	1770	1583	1863	736	1583	3539	1770

Phasing Parameters

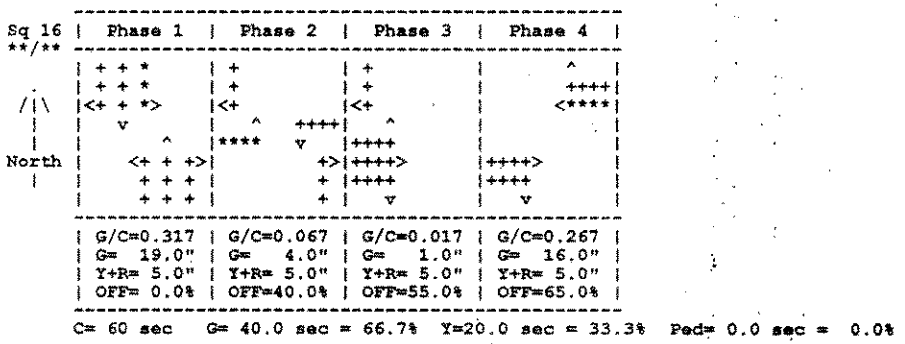
SEQUENCES	16	16					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	10		PEDTIME	0.0	0
GREENTIMES	23.00	5.00	3.00	39.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	6	12	5			
EXCESS	0						

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
09:53:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.61 Vehicle Delay 27.7 Level of Service C



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								**21.7**	**C+**	
RT	12/1	0.171	0.567	866	897	178	0.198	6.8	A	77 ft
TH	12/1	0.215	0.317	525	590	328	0.556	18.2	B	217 ft
LT	12/1	0.345	0.317	136	175	150	0.838	47.1	*D	138 ft
NB Approach								**21.4**	**C+**	
RT	12/1	0.046	0.467	688	739	17	0.023	8.7	A	8 ft
TH	12/1	0.268	0.317	525	590	428	0.725	22.6	C+	311 ft
LT	12/1	0.000	0.317	209	260	50	0.192	15.3	B	30 ft
WB Approach								**40.4**	**D+**	
RT	12/1	0.206	0.267	332	422	233	0.552	24.9	C+	179 ft
TH	12/1	0.290	0.267	423	497	467	0.940	48.5	*D	444 ft
LT	12/1	0.018	0.067	70	106	11	0.093	26.6	C+	9 ft
EB Approach								**24.8**	**C+**	
RT	12/1	0.081	0.367	512	581	50	0.086	12.7	B+	30 ft
TH	24/2	0.134	0.367	1247	1298	383	0.295	13.6	B+	114 ft
LT	12/1	0.181	0.167	225	295	250	0.847	44.3	*D+	226 ft

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
09:53:25

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	160	295	135	210	420	10	15	385	45	45	345	225
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	564	1583	1863	1770	1583	1863	820	1583	3539	1770

Phasing Parameters

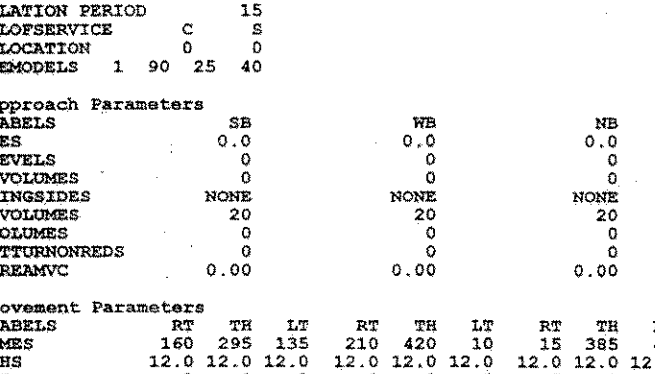
SEQUENCES	16	16					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	10		PEDTIME	0.0	0
GREENTIMES	19.00	4.00	1.00	16.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	12	0	5			
EXCESS	0						

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
08:31:25

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.79 Vehicle Delay 36.7 Level of Service D+



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Modal 1
SB Approach								28.8	C	
RT	12/1	0.123	0.378	490	598	6	0.010	16.1	B	4 ft
TH	12/1	0.320	0.378	612	704	478	0.679	24.1	C+	421 ft
LT	12/1	0.152	0.078	1	119	94	0.681	53.3	*D	119 ft
NB Approach								40.6	D+	
TH	12/1	0.507	0.500	858	931	872	0.937	37.5	*D+	995 ft
LT	12/1	0.245	0.200	206	350	294	0.831	49.8	*D	360 ft
WB Approach								42.2	D+	
TH+LT	12/1	0.282	0.256	214	320	250	0.774	42.2	*D+	293 ft
EB Approach								27.9	C	
TH+LT	12/1	0.176	0.256	330	470	167	0.355	27.9	C	160 ft

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
08:32:02

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	430	85	165	100	125	135	785	265	455	145	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	4	4	4	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1265	0	0	1863	1770	0	1840	0

Phasing Parameters

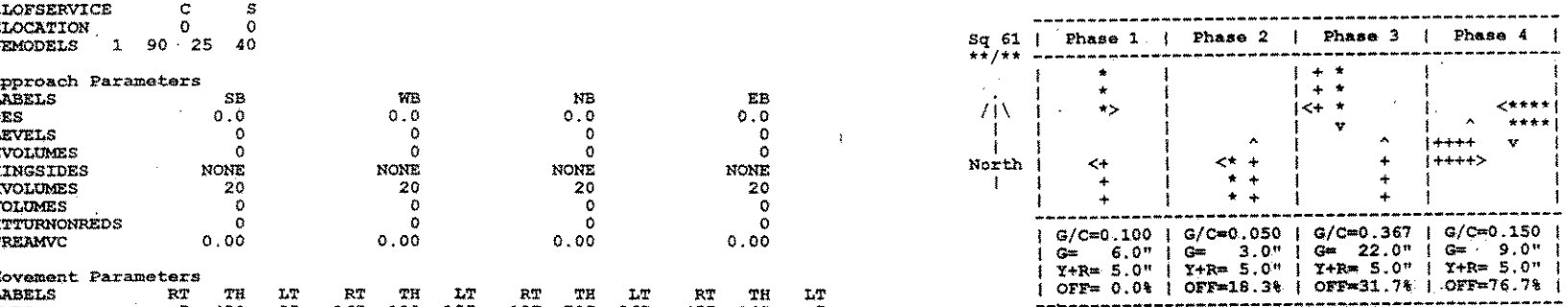
SEQUENCES	61	61					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	10		PEDTIME	0.0	0
GREENTIMES	7.00	6.00	34.00	23.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	8	5			
EXCESS	0						

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
08:46:06

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.67 Vehicle Delay 20.0 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								20.5	C+	
RT	12/1	0.027	0.367	518	581	6	0.010	11.2	B+	3 ft
TH	12/1	0.309	0.367	630	683	511	0.748	20.0	*B	341 ft
LT	12/1	0.056	0.100	118	169	56	0.316	26.1	*C+	42 ft
NB Approach								18.5	B	
TH	12/1	0.369	0.500	895	931	628	0.675	13.3	B+	375 ft
LT	12/1	0.216	0.233	343	413	311	0.753	29.0	*C	246 ft
WB Approach								27.4	C+	
TH+LT	12/1	0.126	0.150	160	218	128	0.577	27.4	*C+	101 ft
EB Approach								23.2	C+	
TH+LT	12/1	0.071	0.150	202	271	78	0.288	23.2	C+	56 ft

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
08:46:15

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	460	50	80	55	60	50	565	280	270	65	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	4	4	4	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1483	0	0	1863	1770	0	1805	0

Phasing Parameters

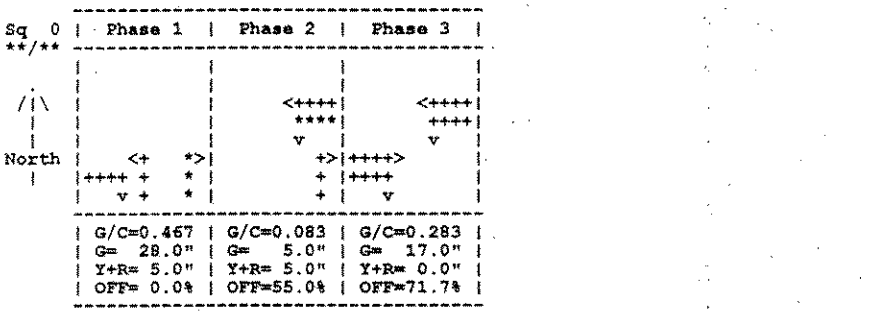
SEQUENCES	61	61					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	10		PEDTIME	0.0	0
GREENTIMES	6.00	3.00	22.00	9.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	2	5			
EXCESS	0						

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
13:42:17

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.53 Vehicle Delay 14.3 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								13.8	B+	
RT	12/1	0.228	0.633	985	1003	272	0.271	5.5	*A	107 ft
LT	12/1	0.386	0.467	783	826	628	0.760	17.4	B	419 ft
WB Approach								19.2	B	
TH	12/1	0.161	0.367	625	683	228	0.334	14.0	B+	131 ft
LT	12/1	0.050	0.083	402	457	339	0.742	22.7	*C+	251 ft
EB Approach								7.6	A	
RT	12/1	0.212	0.750	1188	1188	244	0.205	2.6	A	69 ft
TH	12/1	0.080	0.200	301	373	94	0.252	20.6	C+	64 ft

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
13:42:35

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25	40	

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	205	305	245	0	565	220	85	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
13:42:35

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

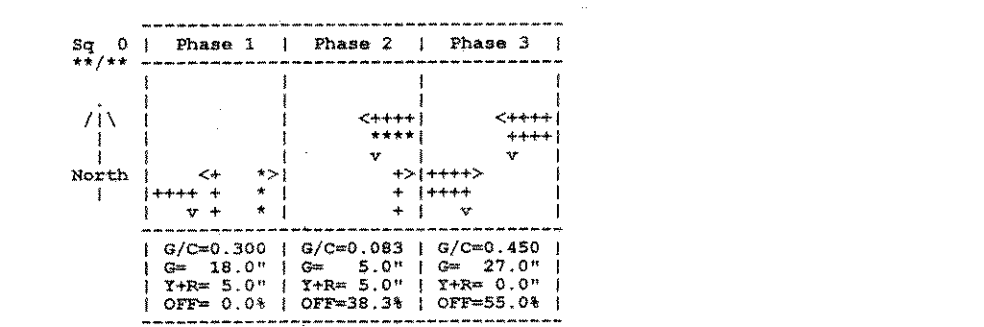
SEQUENCES	0	0						LEADLAGS	NONE	NONE
PERMISSIVES	YES	YES	YES	YES				OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0	0
CYCLES	60	120	10							
GREENTIMES	28.00	5.00	17.00							
YELLOWTIMES	5.00	5.00	0.00							
CRITICALS	7	6	2							
EXCESS	0									
PHASEMOVEMENTS	1	7	9	10	0	0	0			
PHASEMOVEMENTS	2	6	7	5	0	0	0			
PHASEMOVEMENTS	3	5	10	11	-6	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
13:50:52

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.49 Vehicle Delay 11.5 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								16.3	B	
RT	12/1	0.293	0.467	688	739	383	0.518	13.8	*B+	222 ft
LT	12/1	0.213	0.300	465	531	306	0.576	19.3	B	209 ft
WB Approach								11.8	B+	
TH	12/1	0.109	0.533	963	993	139	0.140	7.1	A	56 ft
LT	12/1	0.009	0.083	538	578	394	0.682	13.5	*B+	242 ft
EB Approach								6.7	A	
RT	12/1	0.367	0.750	1188	1188	511	0.430	3.9	A	169 ft
TH	12/1	0.148	0.367	625	683	206	0.302	13.8	B+	116 ft

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
13:51:00

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	125	355	345	0	275	460	185	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
13:51:00

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

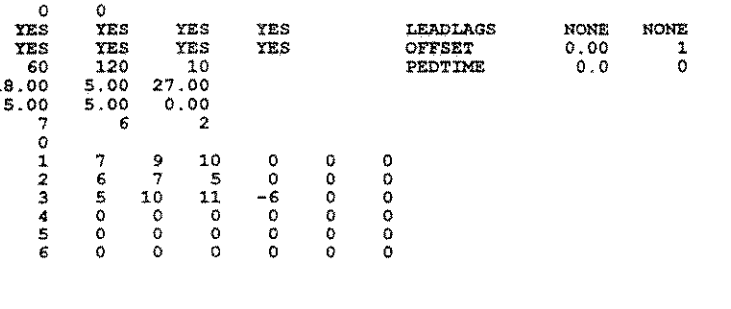
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	18.00	5.00	27.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
13:30:34

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.52 Vehicle Delay 15.9 Level of Service B



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								**19.7**	**B**	
RT	12/1	0.209	0.300	395	475	239	0.503	21.1	C+	166 ft
TH+LT	12/1	0.117	0.300	329	390	100	0.256	16.3	*B	61 ft
NB Approach								**21.8**	**C+**	
RT+TH+LT	12/1	0.241	0.300	426	491	327	0.666	21.8	C+	235 ft
WB Approach								**16.9**	**B**	
RT+TH+LT	12/1	0.301	0.400	594	648	422	0.651	16.9	*B	276 ft
EB Approach								**8.5**	**A**	
RT+TH	12/1	0.266	0.533	956	986	422	0.428	8.8	A	202 ft
LT	12/1	0.060	0.533	913	944	61	0.065	6.8	A	24 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE		C	S	
NODELOCATION		0	0	
QUEUEMODELS	1 90	25	40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	215	40	50	60	265	55	190	75	30	20	360	55
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1301	0	0	1621	0	0	1638	0	0	1848	1770

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005

11/14/03
13:32:17

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

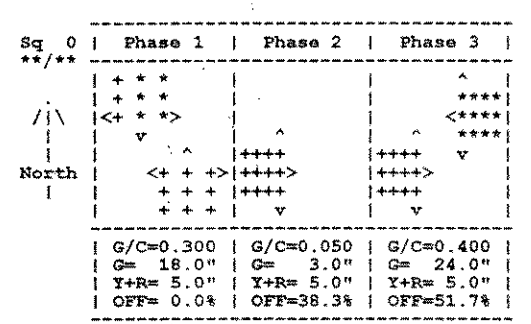
SEQUENCES	0	0							
PERMISSIVES	NO	NO	NO	NO				LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00 1
CYCLES	60	120	10					PEDTIME	0.0 0
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
13:35:53

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.44 Vehicle Delay 14.1 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								22.2	C+	
RT	12/1	0.245	0.300	395	475	300	0.632	24.4	C+	219 ft
TH+LT	12/1	0.108	0.300	402	466	111	0.238	16.1	*B	67 ft
NB Approach								16.1	B	
RT+TH+LT	12/1	0.107	0.300	442	507	122	0.241	16.1	B	74 ft
WB Approach								15.0	B+	
RT+TH+LT	12/1	0.264	0.400	621	675	377	0.559	15.0	*B+	232 ft
EB Approach								8.3	A	
RT+TH	12/1	0.218	0.533	948	978	327	0.334	8.2	A	148 ft
LT	12/1	0.234	0.533	913	944	344	0.364	8.3	A	159 ft

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
13:36:02

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	270	55	45	65	235	40	30	60	20	30	265	310
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1554	0	0	1687	0	0	1691	0	0	1835	1770

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005

11/14/03
13:36:02

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0								
PERMISSIVES	NO	NO	NO	NO				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	120	10					PEDTIME	0.0	0
GREENTIMES	18.00	3.00	24.00							
YELLOWTIMES	5.00	5.00	5.00							
CRITICALS	2	6	5							
EXCESS	0									
PHASEMOVEMENTS	1	1	2	3	7	8	9			
PHASEMOVEMENTS	2	10	11	12	0	0	0			
PHASEMOVEMENTS	3	4	5	6	10	11	12			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

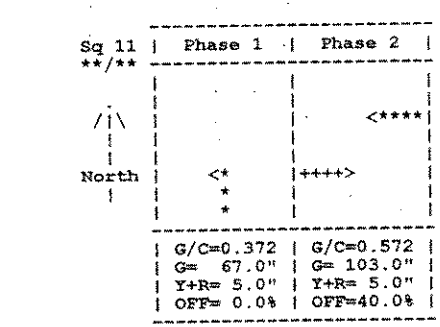
- Base Year 2005 with Mitigative Measures

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005 with traffic signal 2

11/17/03
08:14:49

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 1.20 Vehicle Delay 186.4 Level of Service F



C=180 sec G=170.0 sec = 94.4% Y=10.0 sec = 5.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								219.6	F	
LT	12/1	0.598	0.372	1	631	883	1.340	219.6	*F	2676 ft
WB Approach								204.3	F	
TH	12/1	0.794	0.572	856	1066	1444	1.355	204.3	*F	4370 ft
EB Approach								18.2	B	
TH	24/2	0.407	0.572	1700	2025	328	0.162	18.2	B	187 ft

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005 with traffic signal 2

11/17/03
08:22:48

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1300	0	5	0	795	250	295	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

SEQUENCES	11	11					
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	90		PEDTIME	0.0	0
GREENTIMES	67.00	103.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:39:27

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25 40		

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	275	260	265	260	700	5	10	100	35	15	220	205
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1277	1583	1863	1770	1583	1863	717	1583	3539	1770

Phasing Parameters

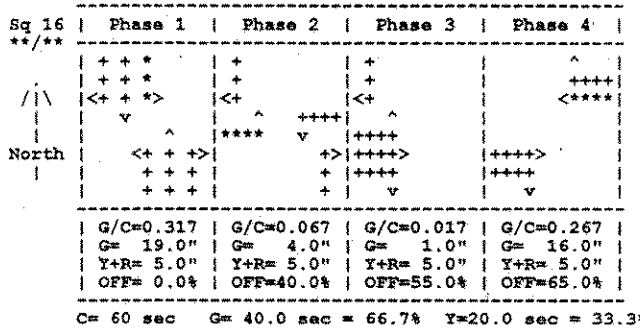
SEQUENCES	16	16					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	10		PEDTIME	0.0	0
GREENTIMES	23.00	5.00	3.00	39.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	6	12	5			
EXCESS	0						

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:40:25

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.62 Vehicle Delay 27.9 Level of Service C



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Modal 1
SB Approach								**22.8**	**C+**	
RT	12/1	0.171	0.567	866	897	178	0.198	6.8	A	77 ft
TH	12/1	0.221	0.317	525	590	339	0.575	18.5	B	227 ft
LT	12/1	0.351	0.317	132	171	150	0.857	51.2	*D	142 ft
NB Approach								**21.7**	**C+**	
RT	12/1	0.046	0.467	688	739	17	0.023	8.7	A	8 ft
TH	12/1	0.270	0.317	525	590	433	0.734	23.0	C+	316 ft
LT	12/1	0.000	0.317	200	250	50	0.200	15.4	B	30 ft
WB Approach								**40.4**	**D+**	
RT	12/1	0.206	0.267	332	422	233	0.552	24.9	C+	179 ft
TH	12/1	0.290	0.267	423	497	467	0.940	48.5	*D	444 ft
LT	12/1	0.018	0.067	70	106	11	0.093	26.6	C+	9 ft
EB Approach								**24.6**	**C+**	
RT	12/1	0.086	0.367	512	581	56	0.096	12.8	B+	33 ft
TH	24/2	0.136	0.367	1247	1298	389	0.300	13.6	B+	116 ft
LT	12/1	0.181	0.167	225	295	250	0.847	44.3	*D+	226 ft

```
Kualono Subdivision                                           11/17/03
PM Peak Hour of Traffic                                       09:40:41
Year 2005 with project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

   Intersection Parameters for Int #   0 - Haleakala Highway/Makawao Aven
METROAREA                NONCBD
SIMULATION PERIOD            15
LEVELOFSERVICE          C     S
NODELOCATION            0     0
QUEUEMODELS     1   90   25   40

   Approach Parameters
APPLABELS                 SB                 WB                NB                EB
GRADES                   0.0                0.0               0.0               0.0
PEDLEVELS                  0                  0                 0                 0
BIKEVOLUMES                0                  0                 0                 0
PARKINGSIDES            NONE               NONE              NONE              NONE
PARKVOLUMES               20                 20                20                20
BUSVOLUMES                 0                  0                 0                 0
RIGHTTURNONREDS            0                  0                 0                 0
UPSTREAMVC              0.00               0.00              0.00              0.00

   Movement Parameters
MOVLABELS            RT   TH   LT     RT   TH   LT     RT   TH   LT     RT   TH   LT
VOLUMES             160  305  135    210  420   10     15  390   45     50  350  225
WIDTHS             12.0 12.0 12.0   12.0 12.0 12.0   12.0 12.0 12.0   12.0 24.0 12.0
LANES                 1    1    1      1    1    1      1    1    1      1    2    1
GROUPTYPES         NORM NORM NORM   NORM NORM NORM   NORM NORM NORM   NORM NORM NORM
UTILIZATIONS       0.00 0.00 0.00   0.00 0.00 0.00   0.00 0.00 0.00   0.00 0.00 0.00
TRUCKPERCENTS       2.0  2.0  2.0    2.0  2.0  2.0    2.0  2.0  2.0    2.0  2.0  2.0
PEAKHOURFACTORS    0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
ARRIVALTYPES          3    3    3      2    2    2      3    3    3      3    3    3
ACTUATIONS           NO  YES  YES     NO  YES  YES     NO  YES  YES     NO  YES  YES
REQCLEARANCES       5.0  5.0  5.0    5.0  5.0  5.0    5.0  5.0  5.0    5.0  5.0  5.0
MINIMUMS            5.0  5.0  5.0    5.0  5.0  5.0    5.0  5.0  5.0    5.0  5.0  5.0
STARTUPLOST         2.0  2.0  2.0    2.0  2.0  2.0    2.0  2.0  2.0    2.0  2.0  2.0
ENDGAIN             2.0  2.0  2.0    2.0  2.0  2.0    2.0  2.0  2.0    2.0  2.0  2.0
STORAGE               0    0    0      0    0    0      0    0    0      0    0    0
INITIALQUEUE          0    0    0      0    0    0      0    0    0      0    0    0
IDEALSATFLOWS      1900 1900 1900   1900 1900 1900   1900 1900 1900   1900 1900 1900
FACTORS            1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
DELAYFACTORS       1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
NSTOPFACTORS       1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
SATURATIONFLOWS    1583 1863  551   1583 1863 1770   1583 1863  791   1583 3539 1770

    Phasing Parameters
SEQUENCES            16     16
PERMISSIVES          NO     NO     NO     NO       LEADLAGS      NONE   NONE
OVERLAPS            YES    YES    YES    YES       OFFSET        0.00      1
CYCLES               60    180     10              PEDTIME        0.0      0
GREENTIMES        19.00   4.00   1.00  16.00
YELLOWTIMES        5.00   5.00   5.00   5.00
CRITICALS             3     12      0      5
EXCESS                0
```

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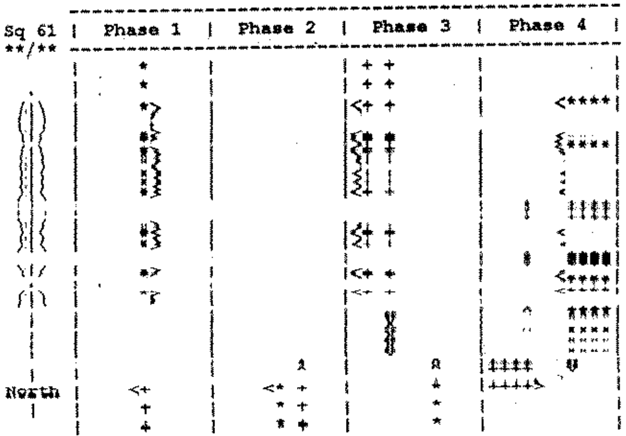
Kualono Subdivision                                              11/17/03
AM Peak Hour of Traffic                                          09:41:32
Year 2005 with project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int #   0 - Kula Highway/Haleakala Highway
      Degree of Saturation (v/c) 0.79  Vehicle Delay  37.1  Level of Service D+
```



```
Sq 61 |  Phase 1   |  Phase 2   |  Phase 3   |  Phase 4   |
**/** 

      | G/C=0.078  | G/C=0.067  | G/C=0.378  | G/C=0.256  |
      | G=    7.0" | G=    6.0" | G=   34.0" | G=   23.0" |
      | Y+R=  5.0" | Y+R=  5.0" | Y+R=  5.0" | Y+R=  5.0" |
      | OFF=  0.0% | OFF=13.3%  | OFF=25.6%  | OFF=68.9%  |
      ------------------------------------------------------
      C= 90 sec   G= 70.0 sec = 77.8%   Y=20.0 sec = 22.2%   Ped= 0.0 sec =  0.0%

-----------------------------------------------------------------------------------
| Lane   |Width/|     g/C      | Service Rate|  Adj  |       |  HCM  | L | Queue  |
|  Group | Lanes| Reqd   Used  | @C (vph) @E |Volume|  v/c  | Delay | S |Model 1|
-----------------------------------------------------------------------------------
SB Approach                                                      28.8   C
===================================================================================
|  RT    | 12/1 |0.123 |0.378 |   490 |  598 |     6 |0.010 |  16.1 | B  |   4 ft|
|  TH    | 12/1 |0.320 |0.378 |   612 |  704 |   478 |0.679 |  24.1 | C+ | 421 ft|
|  LT    | 12/1 |0.152 |0.078 |     1 |  119 |    94 |0.681 |  53.3 |*D  | 119 ft|
-----------------------------------------------------------------------------------
NB Approach                                                      41.2   D+
===================================================================================
|  TH    | 12/1 |0.507 |0.500 |   858 |  931 |   872 |0.937 |  37.5 |*D+ | 995 ft|
|  LT    | 12/1 |0.248 |0.200 |   206 |  350 |   300 |0.847 |  51.9 |*D  | 372 ft|
-----------------------------------------------------------------------------------
WB Approach                                                      43.5   D+
===================================================================================
|  TH+LT | 12/1 |0.285 |0.256 |   210 |  314 |   250 |0.786 |  43.5 |*D+ | 296 ft|
-----------------------------------------------------------------------------------
EB Approach                                                      28.0   C
===================================================================================
|  TH+LT | 12/1 |0.179 |0.256 |   330 |  470 |   173 |0.368 |  28.0 | C  | 167 ft|
-----------------------------------------------------------------------------------
```

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:42:18

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	430	85	165	100	125	135	785	270	460	150	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	4	4	4	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1246	0	0	1863	1770	0	1841	0

Phasing Parameters

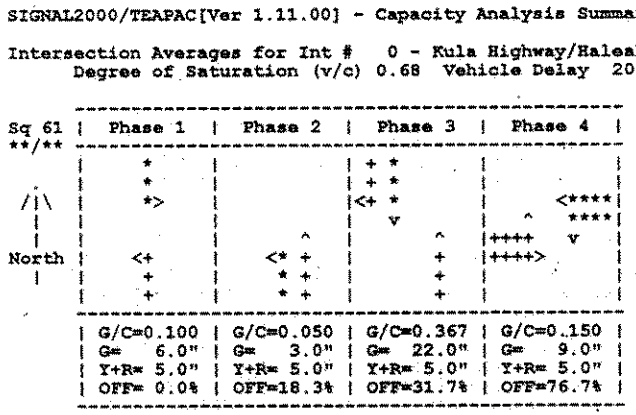
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	180	10		PEDTIME	0.0 0
GREENTIMES	7.00	6.00	34.00	23.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	8	5		
EXCESS	0					

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:00:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.68 Vehicle Delay 20.4 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								**20.5**	**C+**	
RT	12/1	0.027	0.367	518	581	6	0.010	11.2	B+	3 ft
TH	12/1	0.309	0.367	630	683	511	0.748	20.0	*B	341 ft
LT	12/1	0.056	0.100	118	169	56	0.316	26.1	*C+	42 ft
NB Approach								**19.2**	**B**	
TH	12/1	0.369	0.500	895	931	628	0.675	13.3	B+	375 ft
LT	12/1	0.222	0.233	343	413	322	0.780	30.8	*C	260 ft
WB Approach								**27.4**	**C+**	
TH+LT	12/1	0.126	0.150	160	218	128	0.577	27.4	*C+	101 ft
EB Approach								**23.2**	**C+**	
TH+LT	12/1	0.071	0.150	202	271	78	0.288	23.2	C+	56 ft

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:01:07

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE		C	S	
NODELOCATION		0	0	
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	460	50	80	55	60	50	565	290	275	65	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	4	4	4	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1483	0	0	1863	1770	0	1805	0

Phasing Parameters

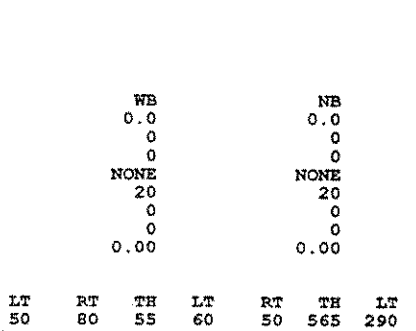
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	10		PEDTIME	0.0 0
GREENTIMES	6.00	3.00	22.00	9.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	2	5		
EXCESS	0					

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:02:09

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.53 Vehicle Delay 14.6 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								13.8	B+	
RT	12/1	0.228	0.633	985	1003	272	0.271	5.5	*A	107 ft
LT	12/1	0.386	0.467	783	826	628	0.760	17.4	B	419 ft
WB Approach								19.8	B	
TH	12/1	0.173	0.367	625	683	250	0.366	14.2	B+	145 ft
LT	12/1	0.055	0.083	397	452	344	0.761	23.9	*C+	259 ft
EB Approach								7.9	A	
RT	12/1	0.212	0.750	1188	1188	244	0.205	2.6	A	69 ft
TH	12/1	0.084	0.200	301	373	100	0.268	20.7	C+	68 ft

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:02:14

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	225	310	245	0	565	220	90	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:02:14

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

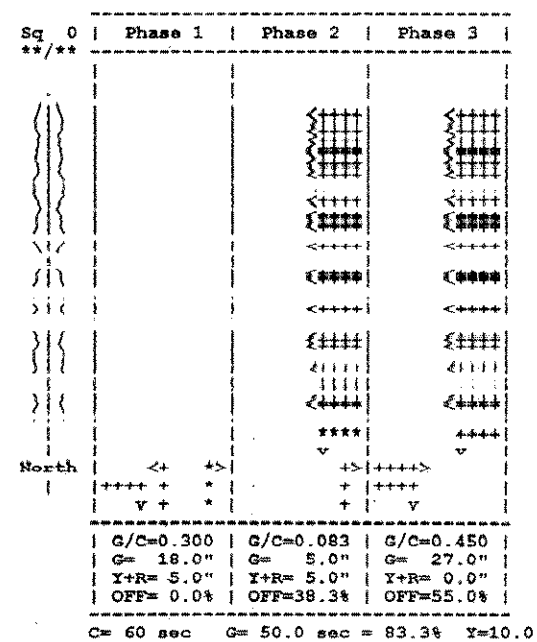
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	28.00	5.00	17.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:02:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.50 Vehicle Delay 11.8 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								16.4	B	
RT	12/1	0.300	0.467	688	739	394	0.533	14.1	*B+	230 ft
LT	12/1	0.213	0.300	465	531	306	0.576	19.3	B	209 ft
WB Approach								12.6	B+	
TH	12/1	0.116	0.533	963	993	150	0.151	7.2	A	61 ft
LT	12/1	0.020	0.083	524	564	400	0.709	14.6	*B+	253 ft
EB Approach								6.9	A	
RT	12/1	0.367	0.750	1188	1188	511	0.430	3.9	A	169 ft
TH	12/1	0.158	0.367	625	683	222	0.325	13.9	B+	127 ft

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:02:55

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	135	360	355	0	275	460	200	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:02:55

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

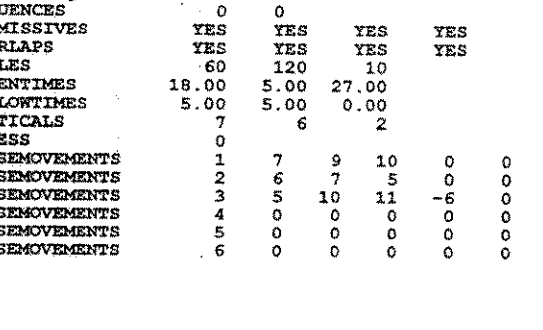
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	18.00	5.00	27.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:56:36

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.54 Vehicle Delay 16.3 Level of Service B



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								19.7	B	
RT	12/1	0.209	0.300	395	475	239	0.503	21.1	C+	166 ft
TH+LT	12/1	0.126	0.300	316	376	105	0.279	16.5	*B	65 ft
NB Approach								21.8	C+	
RT+TH+LT	12/1	0.242	0.300	426	491	327	0.666	21.8	C+	235 ft
WB Approach								18.0	B	
RT+TH+LT	12/1	0.315	0.400	598	652	450	0.690	18.0	*B	303 ft
EB Approach								8.6	A	
RT+TH	12/1	0.269	0.533	956	986	428	0.434	8.8	A	206 ft
LT	12/1	0.060	0.533	913	944	61	0.065	6.8	A	24 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25	40	

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	215	40	55	65	285	55	190	75	30	20	365	55
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1254	0	0	1630	0	0	1637	0	0	1848	1770

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:56:42

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

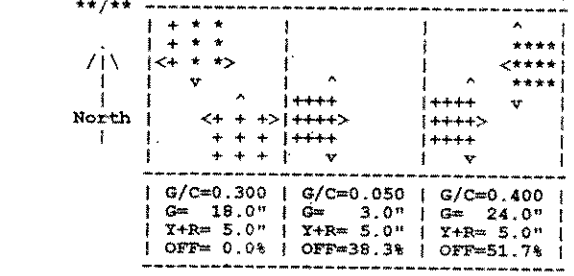
SEQUENCES	0	0						LEADLAGS	NONE NONE
PERMISSIVES	NO	NO	NO	NO				OFFSET	0.00 1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0 0
CYCLES	60	120	10						
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:03:41

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.45 Vehicle Delay 14.2 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								22.1	C+	
RT	12/1	0.245	0.300	395	475	300	0.632	24.4	C+	219 ft
TH+LT	12/1	0.120	0.300	389	452	122	0.270	16.3	*B	75 ft
NB Approach								16.1	B	
RT+TH+LT	12/1	0.108	0.300	441	506	122	0.241	16.1	B	74 ft
WB Approach								15.6	B	
RT+TH+LT	12/1	0.277	0.400	621	675	400	0.593	15.6	*B	252 ft
EB Approach								8.3	A	
RT+TH	12/1	0.230	0.533	949	979	350	0.358	8.3	A	160 ft
LT	12/1	0.234	0.533	913	944	344	0.364	8.3	A	159 ft

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:03:48

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	270	55	55	70	250	40	30	60	20	30	285	310
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1506	0	0	1688	0	0	1688	0	0	1836	1770

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:03:48

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0						LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO				OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0	0
CYCLES	60	120	10							
GREENTIMES	18.00	3.00	24.00							
YELLOWTIMES	5.00	5.00	5.00							
CRITICALS	2	6	5							
EXCESS	0									
PHASEMOVEMENTS	1	1	2	3	7	8	9			
PHASEMOVEMENTS	2	10	11	12	0	0	0			
PHASEMOVEMENTS	3	4	5	6	10	11	12			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: AM PEAK HOUR 2005
Comment: YEAR 2005 WITH PROJECT

Site Information

Jurisdiction/Date: KULA, MAUI 11/19/200
Major Street: OLD HALEAKALA HIGHWAY
Minor Street: ROAD A

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		TR			LT			R				
Lane 2								L				
Lane 3												

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		600	10	5	380		25		10			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		667	11	6	422		28		11			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2: _____ ft Movement 5: _____ ft
Length of study period (h): 25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	11	454	.024	<1	13.1	B	20.1
	2	L	28	230	.122	<1	22.8	C	C
	3								
SB	1								
	2								
	3								
		①							
		④	6	909	.006	<1	9	A	

HICAP 2000 ™

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL
Agency or Company	ATA
Analysis Period/Year	PM PEAK HOUR 2005
Comment	YEAR 2005 WITH PROJECT

Site Information

Jurisdiction/Date	KULA, MAUI 12/1/2003
Major Street	OLD HALEAKALA HIGHWAY
Minor Street	ROAD A

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		340	30	10	340		20		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		378	33	11	378		22		6			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	6	652	.009	<1	10.6	B	14.8
	2	L	22	351	.063	<1	15.9	C	
	3								B
SB	1								
	2								
	3								
		①							
		④	11	1142	.01	<1	8.2	A	

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1 of 1

LAW OFFICES
CROCKETT AND NAKAMURA
38 SOUTH MARKET STREET
POST OFFICE BOX 1431
WAILUKU, MAUI, HAWAII 96793

WILLIAM F. CROCKETT
DAVID H. NAKAMURA

WENDELL F. CROCKETT 1891-1977
TELEPHONE (808) 244-3796
FACSIMILE (808) 242-5720
EMAIL: cne@maui.net

MEMO

TO: Mr. Glenn Tadaki (VIA E-MAIL)

FROM: David H. Nakamura, Esq.

RE: Kualono Subdivision

DATE: 01/12/2004

Thank you for sending me the State Land Use District, community plan and zoning maps for the Kualono subdivision lands and the properties in the immediately surrounding areas.

Unfortunately, I cannot discern from the maps you sent me the boundary lines separating the different land use, community plan and zoning designations. Perhaps it would be easier if you simply told me the following as to the lands adjacent to the Kualono subdivision:

East of Kualono (across highway)

LUC classification: _____

Community plan designation: _____

Zoning designation: _____

Existing uses: _____

West of Kualono

LUC classification: _____

Community plan designation: _____

Zoning designation: _____

Existing uses: _____

North of Kualono

LUC classification: _____

Community plan designation: _____

Zoning designation: _____

Existing uses: _____

South of Kualono

LUC classification: _____

Community plan designation: _____

Zoning designation: _____

Existing uses: _____

Because I would prefer to include the above information in the amended district boundary petition, I ask that you provide this information to me as soon as possible. If you cannot provide this information within the next day or so, please advise me immediately.

I look forward to hearing from you.

DHN:cgp
cc: Mr. Don S. Fujimoto **(VIA E-MAIL)**
Ms. Gwen Hiraga **(VIA E-MAIL)**
(42) 2004-12

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

12/01/03
13:00:08

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD		
SIMULATION PERIOD	15		
LEVELOFSERVICE	C	S	
NODELOCATION	0	0	
QUEUEMODELS	1 90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	355	100	90	45	935	20	95	90	15	5	265	35
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	2	3	3	3	3	3	2	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1473	0	0	1850	1059	1583	1762	0	0	3529	138

Phasing Parameters

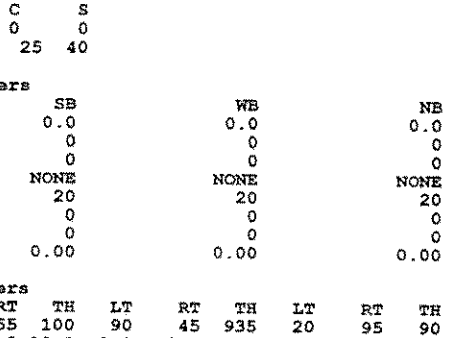
SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	180	10		PEDTIME	0.0 0
GREENTIMES	26.00	54.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	1	5				
EXCESS	0					

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:35:33

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.41 Vehicle Delay 10.2 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								22.9	C+	
RT	12/1	0.115	0.183	198	290	94	0.324	24.2	*C+	72 ft
TH+LT	12/1	0.072	0.183	255	326	78	0.239	21.3	C+	54 ft
NB Approach								21.4	C+	
RT	12/1	0.059	0.183	198	290	28	0.097	21.0	C+	21 ft
TH+LT	12/1	0.078	0.183	263	335	89	0.266	21.5	C+	62 ft
WB Approach								9.2	A	
RT+TH	12/1	0.404	0.650	1172	1203	684	0.569	9.4	A	391 ft
LT	12/1	0.000	0.650	408	440	33	0.075	3.9	A	10 ft
EB Approach								7.0	A	
RT+TH	24/2	0.219	0.650	2295	2295	683	0.298	6.9	A	181 ft
LT	12/1	0.425	0.650	303	336	178	0.530	7.2	*A	85 ft

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:38:04

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	85	60	10	25	590	30	25	75	5	10	605	160
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	2	3	3	3	3	3	2	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1777	0	0	1851	677	1583	1826	0	0	3531	516

Phasing Parameters

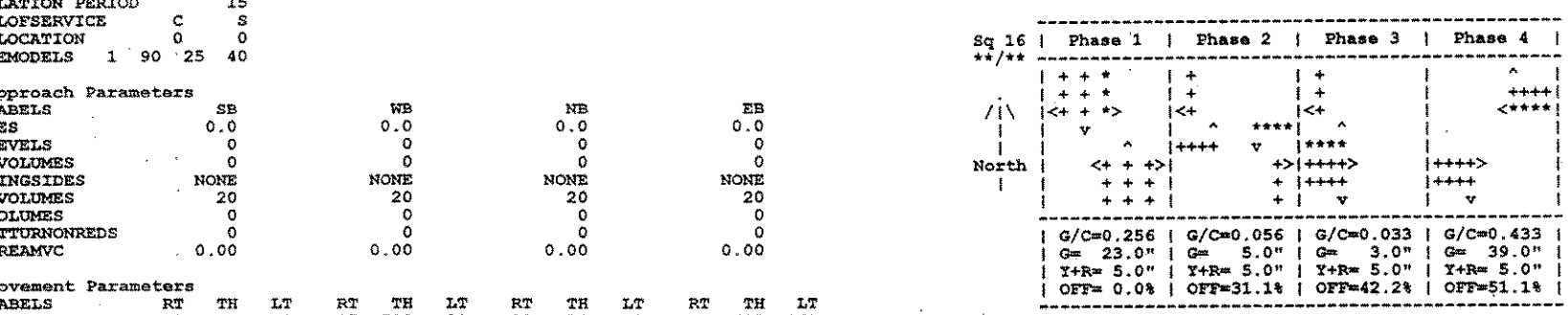
SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	10		PEDTIME	0.0 0
GREENTIMES	11.00	39.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	1	12				
EXCESS	0					

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:39:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.66 Vehicle Delay 39.3 Level of Service D+



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

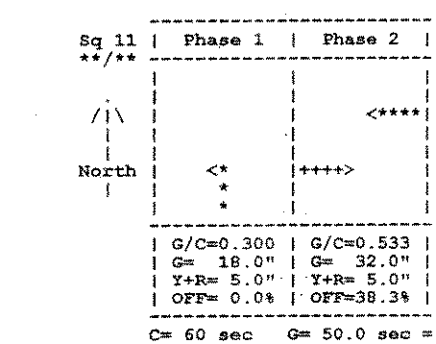
Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								36.2	D+	
RT	12/1	0.293	0.456	623	721	306	0.424	18.4	B	244 ft
TH	12/1	0.234	0.256	335	476	289	0.607	31.8	C	299 ft
LT	12/1	0.311	0.256	217	323	294	0.902	59.2	*E+	386 ft
NB Approach								26.2	C+	
RT	12/1	0.128	0.367	451	581	11	0.019	18.2	B	10 ft
TH	12/1	0.155	0.256	335	476	111	0.233	26.8	C+	104 ft
LT	12/1	0.163	0.256	111	171	39	0.213	27.0	C+	38 ft
WB Approach								44.1	D+	
RT	12/1	0.295	0.433	546	686	289	0.421	22.5	C+	268 ft
TH	12/1	0.479	0.433	684	807	778	0.964	52.2	*D	967 ft
LT	12/1	0.120	0.056	1	80	6	0.061	40.5	*D+	7 ft
EB Approach								38.9	D+	
RT	12/1	0.132	0.522	712	827	17	0.021	13.2	B+	15 ft
TH	24/2	0.156	0.522	1729	1848	244	0.132	14.0	B+	102 ft
LT	12/1	0.214	0.144	74	243	228	0.891	67.4	*E+	310 ft

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005 with traffic signal 2

11/17/03
08:23:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.59 Vehicle Delay 12.4 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								20.2	C+	
LT	12/1	0.226	0.300	465	531	328	0.618	20.2	*C+	228 ft
WB Approach								13.2	B+	
TH	12/1	0.413	0.533	963	993	717	0.722	13.2	*B+	432 ft
EB Approach								8.8	A	
TH	24/2	0.268	0.533	1888	1888	872	0.462	8.8	A	225 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	645	0	5	0	295	640	785	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

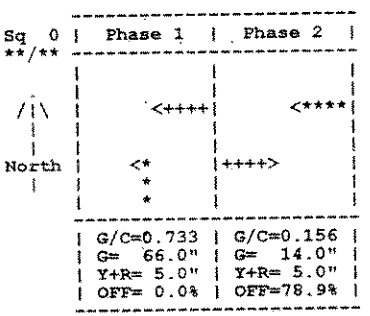
SEQUENCES	11	11					
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	60		PEDTIME	0.0	0
GREENTIMES	18.00	32.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005 with traffic signal

11/14/03
16:21:28

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.72 Vehicle Delay 8.3 Level of Service A



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								7.8	A	
LT	12/1	0.535	0.733	1289	1298	883	0.680	7.8	*A	544 ft
WB Approach								2.1	A	
TH	12/1	0.772	1.000	1863	1863	1444	0.775	2.1	*A	143 ft
EB Approach								37.1	D+	
TH	24/2	0.172	0.156	242	551	328	0.595	37.1	D+	195 ft

Kualono Subdivision
AM Peak Hour of Traffic
Base Year 2005 with traffic signal

11/14/03
16:27:45

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25 40		

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1300	0	5	0	795	250	295	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Kualono Subdivision 11/14/03
AM Peak Hour of Traffic 16:27:45
Base Year 2005 with traffic signal

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

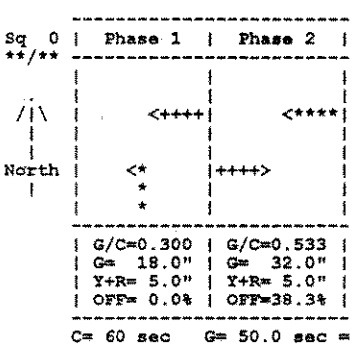
Phasing Parameters

SEQUENCES	0	0								
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	180	10					PEDTIME	0.0	0
GREENTIMES	66.00	14.00								
YELLOWTIMES	5.00	5.00								
CRITICALS	9	5								
EXCESS	0									
PHASEMOVEMENTS	1	9	5	0	0	0	0			
PHASEMOVEMENTS	2	5	11	0	0	0	0			
PHASEMOVEMENTS	3	0	0	0	0	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Kualono Subdivision 11/14/03
PM Peak Hour of Traffic 16:18:25
Base Year 2005 with traffic signal

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.46 Vehicle Delay 7.5 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								20.2	C+	
LT	12/1	0.226	0.300	465	531	328	0.618	20.2	*C+	228 ft
WB Approach								0.1	A	
TH	12/1	0.413	1.000	1863	1863	717	0.385	0.1	*A	22 ft
EB Approach								8.8	A	
TH	24/2	0.268	0.533	1888	1888	872	0.462	8.8	A	225 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	645	0	5	0	295	640	785	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Kualono Subdivision
PM Peak Hour of Traffic
Base Year 2005 with traffic signal

11/14/03
16:18:33

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	180	10					PEDTIME	0.0	0
GREENTIMES	18.00	32.00								
YELLOWTIMES	5.00	5.00								
CRITICALS	9	5								
EXCESS	0									
PHASEMOVEMENTS	1	9	5	0	0	0	0			
PHASEMOVEMENTS	2	5	11	0	0	0	0			
PHASEMOVEMENTS	3	0	0	0	0	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS · SURVEYORS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

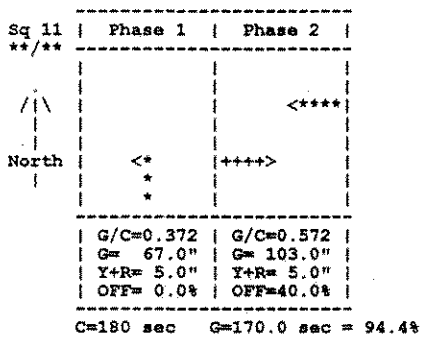
- Base Year 2005 with Project

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project 2

11/17/03
09:45:59

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 1.22 Vehicle Delay 191.7 Level of Service F



C=180 sec G=170.0 sec = 94.4% Y=10.0 sec = 5.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								230.7	F	
LT	12/1	0.604	0.372	1	631	900	1.366	230.7	*F	2776 ft
WB Approach								206.7	F	
TH	12/1	0.796	0.572	856	1066	1450	1.360	206.7	*F	4405 ft
EB Approach								18.2	B	
TH	24/2	0.407	0.572	1700	2025	328	0.162	18.2	B	187 ft

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project 2

11/17/03
09:46:17

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1305	0	5	0	810	255	295	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

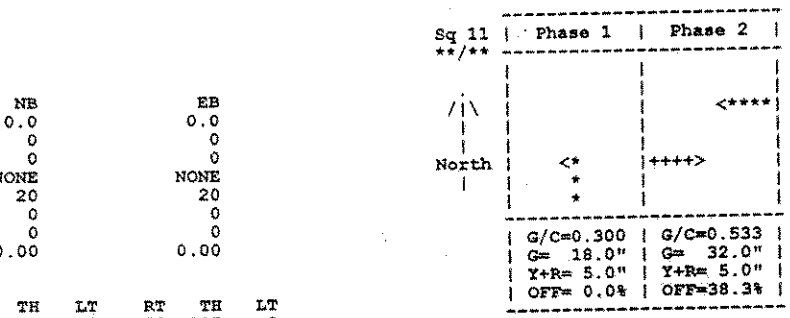
SEQUENCES	11	11				
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	180	90		PEDTIME	0.0 0
GREENTIMES	67.00	103.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	9	5				
EXCESS	0					

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project 2

11/17/03
09:54:34

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Halealkal
Degree of Saturation (v/c) 0.59 Vehicle Delay 12.6 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Modal 1
NB Approach								20.8	C+	
LT	12/1	0.232	0.300	465	531	339	0.638	20.8	*C+	238 ft
WB Approach								13.4	B+	
TH	12/1	0.415	0.533	963	993	722	0.727	13.4	*B+	437 ft
EB Approach								8.9	A	
TH	24/2	0.270	0.533	1888	1888	878	0.465	8.9	A	227 ft

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project 2

11/17/03
09:54:47

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25	40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	650	0	5	0	305	650	790	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

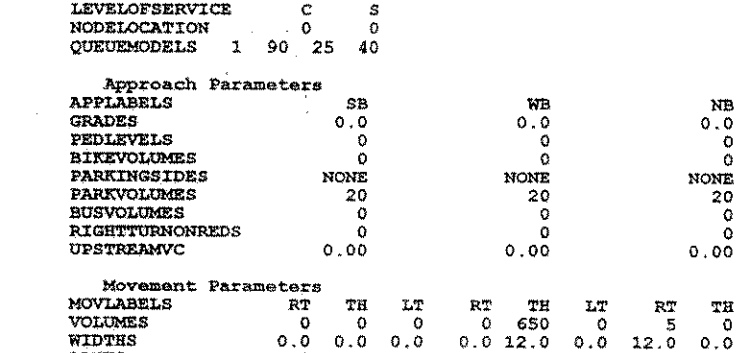
SEQUENCES	11	11					
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	60		PEDTIME	0.0	0
GREENTIMES	18.00	32.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:44:47

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.73 Vehicle Delay 8.5 Level of Service A



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								8.1	A	
LT	12/1	0.543	0.733	1289	1298	900	0.693	8.1	*A	565 ft
WB Approach								2.2	A	
TH	12/1	0.775	1.000	1863	1863	1450	0.778	2.2	*A	145 ft
EB Approach								37.1	D+	
TH	24/2	0.172	0.156	242	551	328	0.595	37.1	D+	195 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25	40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1305	0	5	0	810	255	295	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:44:54

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

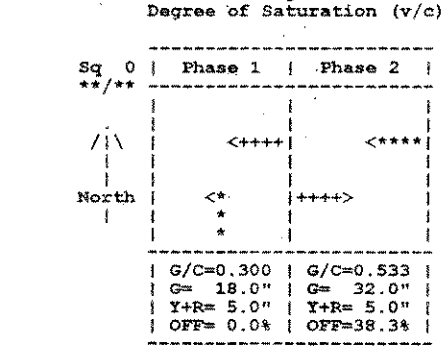
SEQUENCES	0	0						LEADLAGS	NONE NONE
PERMISSIVES	YES	YES	YES	YES				OFFSET	0.00 1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0 0
CYCLES	60	180	10						
GREENTIMES	66.00	14.00							
YELLOWTIMES	5.00	5.00							
CRITICALS	9	5							
EXCESS	0								
PHASEMOVEMENTS	1	9	5	0	0	0	0		
PHASEMOVEMENTS	2	5	11	0	0	0	0		
PHASEMOVEMENTS	3	0	0	0	0	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:47:09

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.47 Vehicle Delay 7.7 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								20.8	C+	
LT	12/1	0.232	0.300	465	531	339	0.638	20.8	*C+	238 ft
WB Approach								0.1	A	
TH	12/1	0.415	1.000	1863	1863	722	0.388	0.1	*A	22 ft
EB Approach								8.9	A	
TH	24/2	0.270	0.533	1888	1888	878	0.465	8.9	A	227 ft

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:47:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	650	0	5	0	305	650	790	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Kualono Subdivision
PM Peak Hour of Traffic
Year 2005 with project

11/17/03
09:47:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

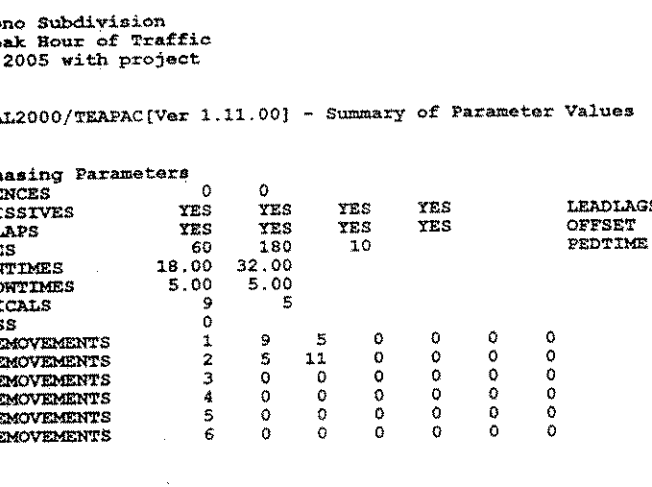
Phasing Parameters										
SEQUENCES	0	0						LEADLAGS	NONE	NONE
PERMISSIVES	YES	YES	YES	YES				OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0	0
CYCLES	60	180	10							
GREENTIMES	18.00	32.00								
YELLOWTIMES	5.00	5.00								
CRITICALS	9	5								
EXCESS	0									
PHASEMOVEMENTS	1	9	5	0	0	0	0			
PHASEMOVEMENTS	2	5	11	0	0	0	0			
PHASEMOVEMENTS	3	0	0	0	0	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Kualono Subdivision
AM Peak Hour of Traffic
Year 2005 with project

12/01/03
12:59:58

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.71 Vehicle Delay 37.7 Level of Service D+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								**41.6**	**D+**	
RT	12/1	0.338	0.289	297	457	394	0.862	49.2	*D	481 ft
TH+LT	12/1	0.228	0.289	311	426	211	0.495	27.5	C+	207 ft
NB Approach								**25.1**	**C+**	
RT	12/1	0.189	0.289	297	457	106	0.232	25.6	C+	102 ft
TH+LT	12/1	0.160	0.289	381	509	117	0.230	24.6	C+	105 ft
WB Approach								**46.1**	**D**	
RT+TH	12/1	0.631	0.600	1025	1110	1089	0.981	46.9	*D	1324 ft
LT	12/1	0.134	0.600	585	635	22	0.035	7.4	A	11 ft
EB Approach								**11.4**	**B+**	
RT+TH	24/2	0.166	0.600	2029	2117	300	0.142	11.0	B+	117 ft
LT	12/1	0.225	0.600	58	75	39	0.470	14.2	B+	31 ft

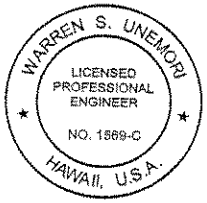
Established 1969

Preliminary Engineering Report for

Kualono Subdivision

Pukalani, Maui, Hawaii
TMK: (2) 2-3-11: Parcels 1 and 2

Prepared For: Hanohano LLC
2005 E. Main
Wailuku, Hawaii 96793



Date: July 2003

WARREN S. UNEMORI ENGINEERING, INC.
Civil and Structural Engineers - Land Surveyors
Wells Street Professional Center - Suite 403
2145 Wells Street
Wailuku, Maui, Hawaii 96793

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Preliminary Engineering Report
for
Kualono Subdivision

I. PROJECT LOCATION

Subject parcels TMK (2) 2-3-11 parcels 1 and 2 are located in Pukalani, on the Island of Maui, in the State of Hawaii on the west side of the Haleakala/Kula Highway intersection. The easterly boundary of the project site fronts on Old Haleakala Highway. (See Figure 1)

The project site consists of approximately 28.7 acres. The land generally slopes from an elevation of 1,735 feet at it's southeast corner to 1,640 feet at it's northwest corner for an average cross slope of around 5.5%. Land to the north and west sides are vacant and undeveloped, the abutting lots to the south for the most part are also vacant. As stated previously, the easterly boundary abuts Old Haleakala Highway.

This report briefly describes the existing infrastructure in the vicinity of the project site. It also summarizes probable infrastructural improvements that may be needed to support the proposed subdivision.

II. PROJECT DESCRIPTION

The proposed plan for the Kualono Subdivision is to develop the project site into a single family residential subdivision consisting of approximately 49 single family house lots with a minimum lot size of 18,000 sq. ft. Proposed improvements include asphalt paved roadways, concrete curb and gutter, concrete sidewalks and landscaping. A park site is proposed along the northwesterly boundary of the project site, portions of which will also serve as a drainage retention basin. Utility

improvements will consist of drainage and water system improvements, underground electrical, telephone and cable-television distribution systems.

III. EXISTING INFRASTRUCTURE

3.1 Water System

There is an existing 12 inch waterline on the easterly side of Kula Highway that was installed by the applicant for their Kulamalu and Kamehameha School projects. They also participated with the State in constructing a 1.0 MG storage tank located 6,000 feet east of the project site at elevation 1,992 feet. The DWS allocated 45% of the storage capacity in this tank to the applicant. To date, they have used 255,000 gallons of this storage allocation for their Kulamalu project and have approximately 195,000 gallons of capacity left.

In November of 2002, the Board of Water Supply approved the applicant's request to purchase an additional 204,000 gallons of storage capacity from the Department of Water Supply. Documents finalizing the transaction are in the County for processing.

The applicant also developed a new well in Kaupakalua to supplement the County's surface source for the Makawao/Pukalani water system. This new well source has a capacity of 1.6 MGD. In exchange for developing this source, the applicant is entitled to 45% of the total capacity equaling 738,000 gallons. Approximately 467,700 gallons of this amount has been allocated leaving about 270,300 gallons to be allocated. Part of this remaining allocation will be used to satisfy the project's average daily water demand of around 39,200 gpd.

DWS has a four (4) inch waterline that terminates at the northeast corner of the project site. This line feeds off the 2.0 MG storage Pookela tank at elevation 1,810 feet to serve the upper areas in Pukalani. The 1.0 MG storage tank in Pukalani at elevation 1,684 feet is situated too low to serve consumers along Makawao Avenue and Loha Street.

3.2 Wastewater Disposal

There is no County owned wastewater collection, treatment and disposal system in upcountry Maui. Wastewater is being handled by individual septic tanks and leach field or seepage pits in accordance with the provisions of Chapter 11-62 of the Rules and Regulations of the State Department of Health.

3.3 Drainage

There is no drainage system in the project area. However, there is a partially paved drainage swale on the east side of the Old Haleakala Highway, now owned and maintained by the County.

The project site is presently vacant and overgrown with weeds and shrubbery. It was previously used to grow pineapple by an independent grower. Current runoff from the 28.7 acre project site is 30.5 cfs for a 50 yr - 1 hr recurrent interval storm. The runoff generally sheet flows across the project site in an easterly to westerly direction into the adjoining downstream properties.

According to the Flood Insurance Rate map prepared by FEMA, the project site is situated in Zone C, an area that is subject to only minimal flooding.

3.4 Electrical, Telephone and CATV Systems

There are overhead electrical and telephone lines on Haleakala Highway. These transmission systems have the capacity to serve the proposed 49 lot subdivision.

3.5 Access Road

The easterly boundary of the project site abuts Old Haleakala Highway. This highway intersects Pukalani Bypass Highway and Kula Highway near the southeast corner of the project site. This intersection often referred to as the "Five Trees" intersection is signalized.

The Pukalani Bypass Highway was constructed by the State Department of Transportation a few years ago to route the Kula-Makawao through traffic along the easterly outskirts of Pukalani's urban core. Therefore, the Old Haleakala Highway through Pukalani now serves as a local collector road only.

IV. PROPOSED IMPROVEMENTS

4.1 Water System

The onsite distribution system will be connected to the existing 12 inch transmission line on Kula Highway. The connection will be made on the south side of the "Five (5) Trees" intersection. The 8 inch distribution system will be looped along the proposed

subdivision road and connected back to the existing 4 inch waterline at the northeast corner of the project site on Haleakala Highway.

Fire hydrants will be installed throughout the subdivision at intervals of 300 and 350 feet in accordance with DWS standards. The distribution system will be designed to satisfy the fire demand of 1,000 gpm for urban residential districts.

The applicant-developed well source, storage and transmission system are all adequate to provide water to the proposed 49 lot subdivision.

4.2 Wastewater System

Septic tanks with seepage pits or leach fields will be used to handle wastewater from each dwelling. These individual wastewater systems will be designed and installed in accordance with provisions of Chapter 11-62 of the Rules and Regulations of the State Department of Health.

4.3 Drainage

The post develop runoff from the project site is expected to be around 52.43 cfs. This is an increase of (52.43 - 30.53) = 21.90 cfs. A storm drain system will be installed to collect the post develop runoff and convey it into a short length of subsurface system to be installed in the park/basin at the northwest corner of the project site. This subsurface system will handle the shorter "low-intensity" runoffs. For rainfalls of longer and higher intensity, such as a 50 year recurrent storm, water would spill out from the subsurface area onto grassed park/basin area which will be designed to retain the 1.3 acre feet of additional

volume generated as a result of the development. (See preliminary drainage report for calculations and details.)

4.4 Electrical, Telephone and CATV Systems

The electrical, telephone and CATV distribution systems within the subdivision will all be placed underground in accordance with Section 18.20.140 of the Maui County Code.

4.5 Access Road and Subdivision Streets

The Old Haleakala Highway will be used to provide access from the Pukalani Bypass Highway by way of the signalized intersections at Makawao Avenue or the closer "Fire Trees" intersection. Curb, gutter and sidewalk will be installed along the frontage of the Old Haleakala Highway.

The entry road to the subdivision will have a right-of-way of 60 feet with 3 lanes to facilitate left turns. The subdivision streets will have a 44 foot right-of-way and a curb to curb travel way of 28 feet. Diameter of cul-de-sacs will be 97 feet with a pavement diameter of 81 feet with a planter island.

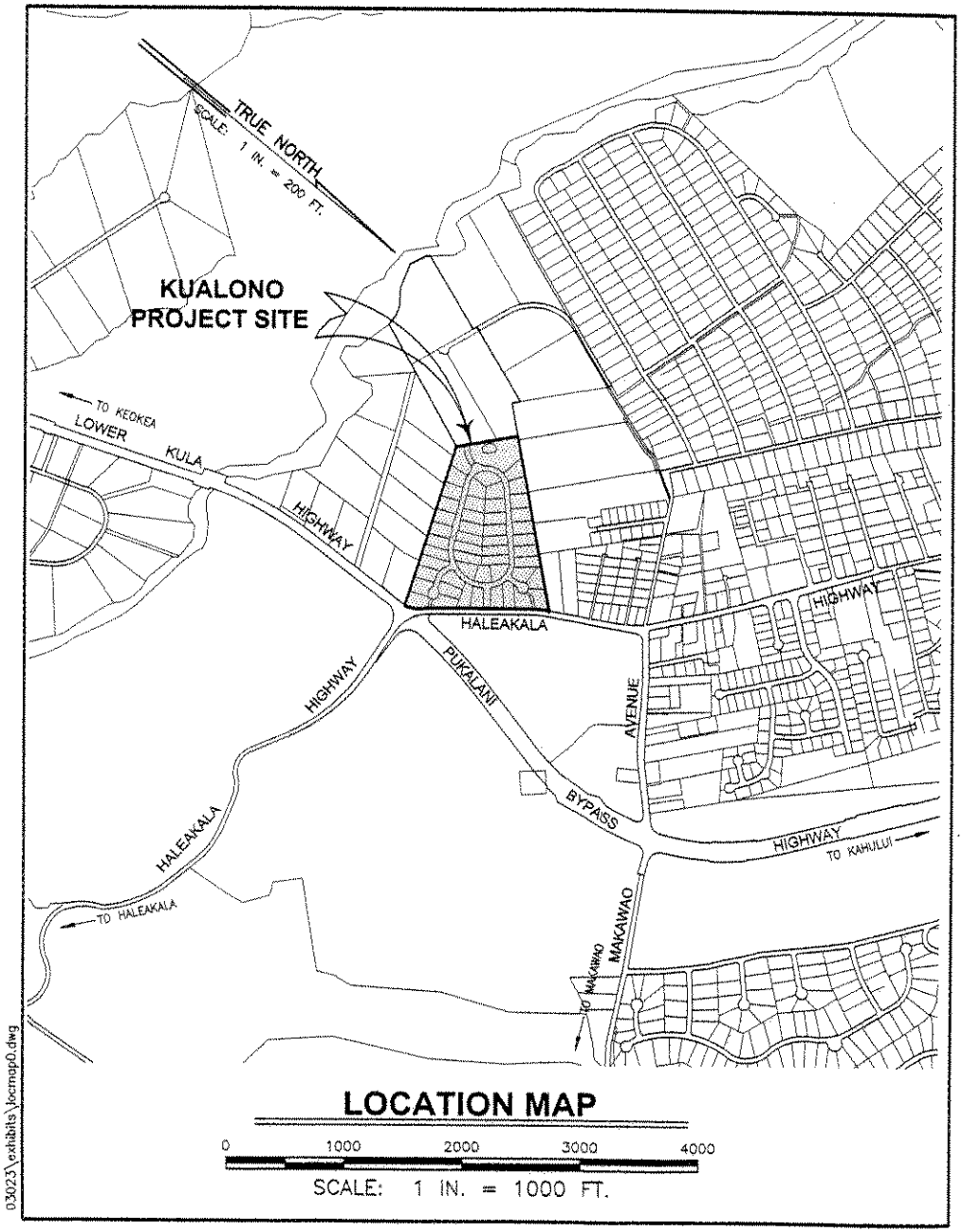
Road improvements will consist of standard curb and gutter and a four foot wide sidewalk on one side. Raised curb island will be provided at two locations to serve as a traffic calming feature. Wheel chair ramps will also be provided at appropriate locations to meet ADA requirements. (See Traffic Impact Analysis report for specifics concerning traffic.)

V. CONCLUSION

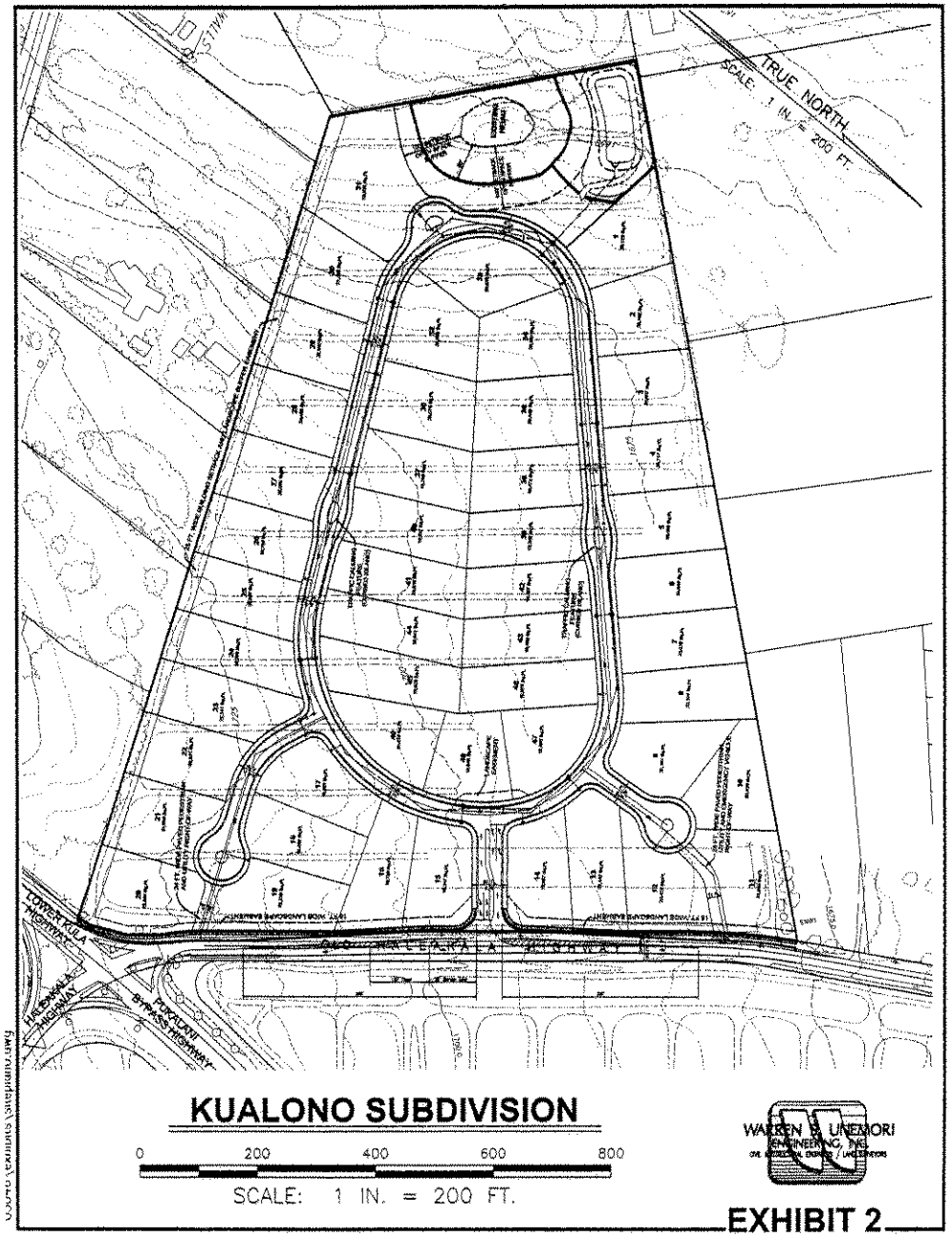
Based on the foregoing, it is our professional opinion that the site can be developed for its intended purpose with no significant adverse impact to the existing infrastructure, environment or adjoining properties.

Exhibits

1. Location Map
2. Site Plan



LOCATION MAP



KUALONO SUBDIVISION

WARREN S. UNEMORI ENGINEERING, INC.

EXHIBIT 2

Appendix

A. Drainage Report

Established 1969

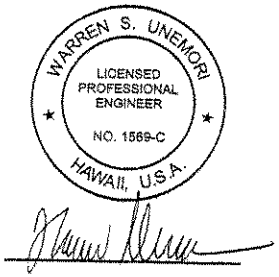
Preliminary Drainage Report for

Kualono Subdivision

Pukalani, Maui, Hawaii
TMK: (2) 2-3-11: Parcels 1 and 2

Prepared For:

Dowling Company Inc.
2005 E. Main
Wailuku, Hawaii 96793



WARREN S. UNEMORI ENGINEERING, INC.
Civil and Structural Engineers - Land Surveyors
Wells Street Professional Center - Suite 403
2145 Wells Street
Wailuku, Maui, Hawaii 96793

Date: July 2003

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Preliminary Drainage Report
for
Kualono Subdivision

I. INTRODUCTION

This report has been prepared to examine both the existing drainage conditions and the proposed drainage plan for the subject development.

II. PROPOSED PROJECT

A. Site Location:

The project site is located in Pukalani, on the island of Maui, in the State of Hawaii. It is on the west side of Haleakala Highway and north of Kula Highway. The southeast corner of the project site borders the Haleakala Highway and Kula Highway intersection. (see Exhibit 1).

The project site occupies an area of approximately 28.7 acres.

B. Project Description:

The proposed plan for the Kualono Subdivision is to develop the project site into a single family residential subdivision consisting of approximately 49 single family house lots with a minimum lot size of 18,000 sq. ft. Proposed improvements include asphalt paved roadways, concrete curb and gutter, concrete sidewalks and landscaping. A park site is proposed along the northwesterly boundary of the project site, portions of which will also serve as a drainage retention basin. Utility improvements will consist of underground

drainage and water distribution systems and underground electrical, telephone and cable-television distribution systems.

III. EXISTING CONDITIONS:

A. Topography and Soil Conditions:

The project site is presently vacant and over grown with weeds and brush. It was previously used to grow pineapple by an independent grower. The project site generally slopes from an elevation of approximately (+) 1735± feet M.S.L. to approximately (+) 1640± feet M.S.L. in a easterly to westerly direction, with an average slope of approximately 5.5%.

According to the *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii* [1], prepared by the United States Department of Agriculture, Soil Conservation Service, the predominant soil classification found on the project site is the Haliimaile silty clay loam, 3 to 7 percent slopes (HgB). The Haliimaile Silty Clay Loam is characterized as having slow runoff with a slight erosion hazard. (See Exhibit 2). The remainder of the project site is comprised of Keahua Cobbly Silty Clay Loam, 15-25 percent slopes (KnaD), and Keahua Silty Clay, 7-15 percent slopes (KncC). The Keahua Cobbly Silty Clay Loam is characterized as having a medium runoff with a moderate erosion hazard while the Keahua Silty Clay is characterized as having a slow to medium runoff with a slight to moderate erosion hazard.

B. Drainage:

According to our calculations, the project site presently generates approximately 30.5 cfs of onsite surface runoff during a 50-year recurrence interval, 1-hr. duration storm. The existing onsite surface runoff generally sheet flows across the project site in a easterly to westerly direction and into the adjoining downstream properties.

Offsite surface runoff generally sheet flow flows across the project site and into the adjoining downstream properties below the project site.

C. Flood and Tsunami Zone:

According to Panel Number 150003 0260b dated June 1, 1981 of the Flood Insurance Rate Map[2], prepared by the United States Federal Emergency Management Agency, the project site is situated within Zone C. Zone C is designated as an area which is subject to minimal flooding. (See Exhibit 3)

IV. DRAINAGE PLAN

A. General:

The drainage criteria that will be used for the proposed development will be to try and maintain the natural drainage pattern of both the onsite and offsite surface runoff.

According to our calculations, the post development peak runoff from the project site is expected to be approximately 52.4 cfs for a 50 year recurrence interval, 1-hour duration storm. This translates to a net increase of approximately 21.9 cfs due to the proposed development. This onsite surface runoff generated by the proposed development will be intercepted by new curb inlet type catch basins and conveyed by

means of a new underground drainage system located within the subdivision roadways. This surface runoff will be directed into a retention basin that will be constructed within the park/open space area set aside at northwesterly portion of the project site The retention basin will be designed to accommodate the additional runoff volume generated by the proposed development. A retention basin with a capacity of 57,123 cubic feet or 1.3 Acre-Feet will be required to handle the additional runoff generated by the project.

B. Hydrologic Calculations:

The onsite hydrologic calculations are based on the "Rules for the Design of Storm Drainage Facilities in the County of Maui", Title MC-15, Chapter 4 and the "Rainfall Frequency Atlas of the Hawaiian Islands", Technical Paper No. 43, U. S. Department of Commerce, Weather Bureau.

Rational Formula used:

$$Q = CIA$$

Where
- Q = Rate of Flow (cfs)
- C = Runoff Coefficient
- I = Rainfall Intensity (inches/hour)
- A = Area (Acres)

The hydrologic calculations for this project may be found in Appendix A.

Retention volume calculations are based on the universal rational hydrograph method and were computed using the HYDROPLUS computer program, , by Plus III Software.

C. Conclusion:

According to our calculations. The proposed development will generate approximately 21.9 cfs of additional surface runoff. This onsite surface runoff will be intercepted by new curb type catch basins within the subdivision streets and conveyed by means of a new underground drainage system to a new park/ retention basin.

The construction of the onsite retention basin will provide the necessary storage to accommodate the increase in onsite surface runoff generated from a 50 year, 1-hour peak storm . The existing surface runoff that currently sheet flows onto the adjacent downstream property will be allowed to continue as it is presently doing in accordance with the provisions of the County's "Rules for the Design of Storm Drainage Facilities in the County of Maui". Since there will be no increase of surface runoff into the downstream properties it is our professional opinion that the proposed development will not have any adverse effect on the downstream properties.

VII. REFERENCES

1. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* August 1972. United States Department of Agriculture, Soil Conservation Service.

2. *Flood Insurance Rate Map, Maui County, Hawaii.* Community-Panel Number 150003 0260 B, June 1, 1981. Federal Emergency Management Agency, Federal Insurance Administration.

3. *Rainfall Frequency Atlas of the Hawaiian Islands, Technical Paper No. 43.* 1962. U.S. Department of Commerce, Weather Bureau.

4. *Rules for the Design of Storm Drainage Facilities in the County of Maui.* July 1995. Department of Public Works and Waste Management, County of Maui.

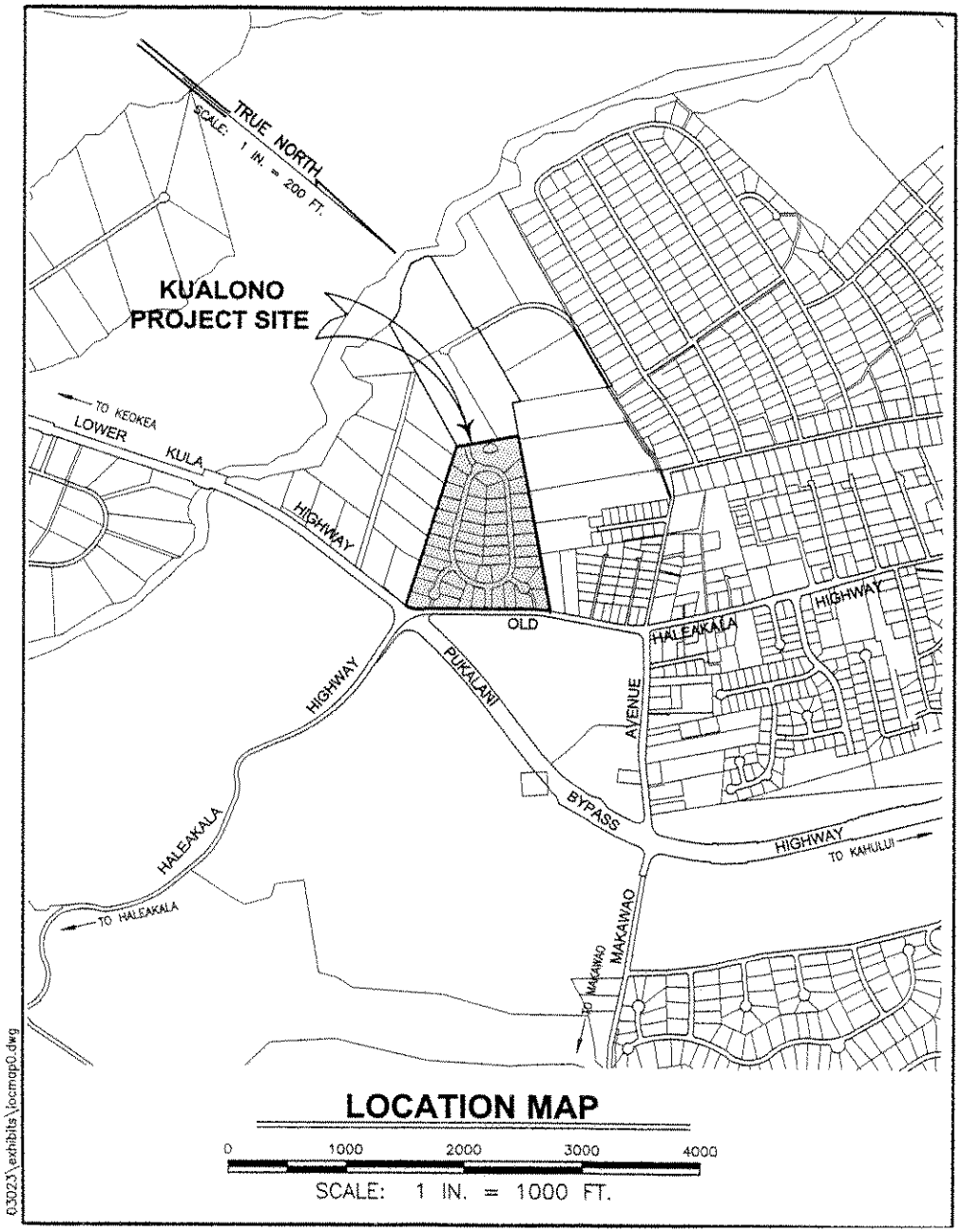
EXHIBITS

1 Location Map

2 Soil Survey Map

3 Flood Insurance Rate Map

4 Kualono Subdivision Drainage Area



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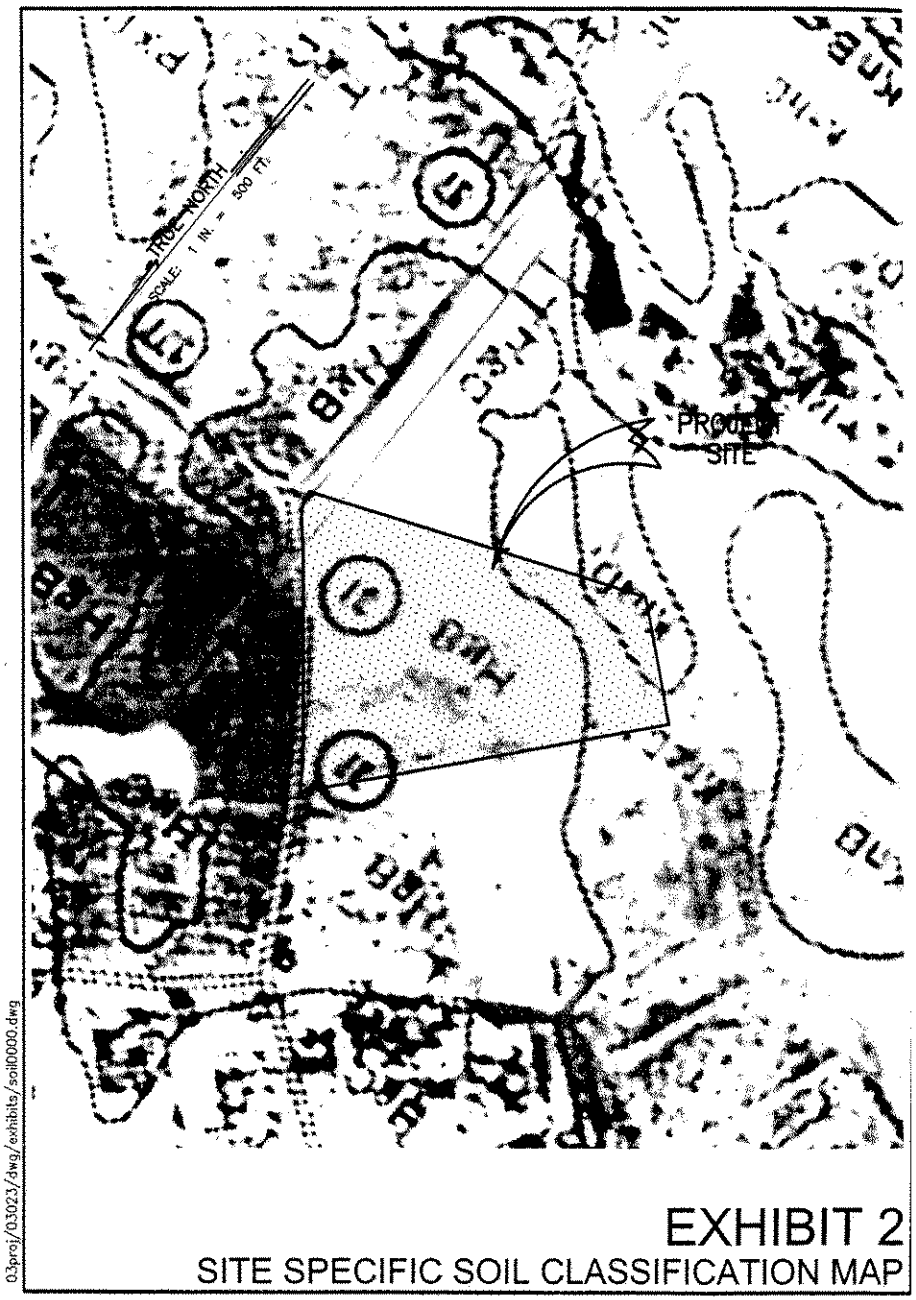

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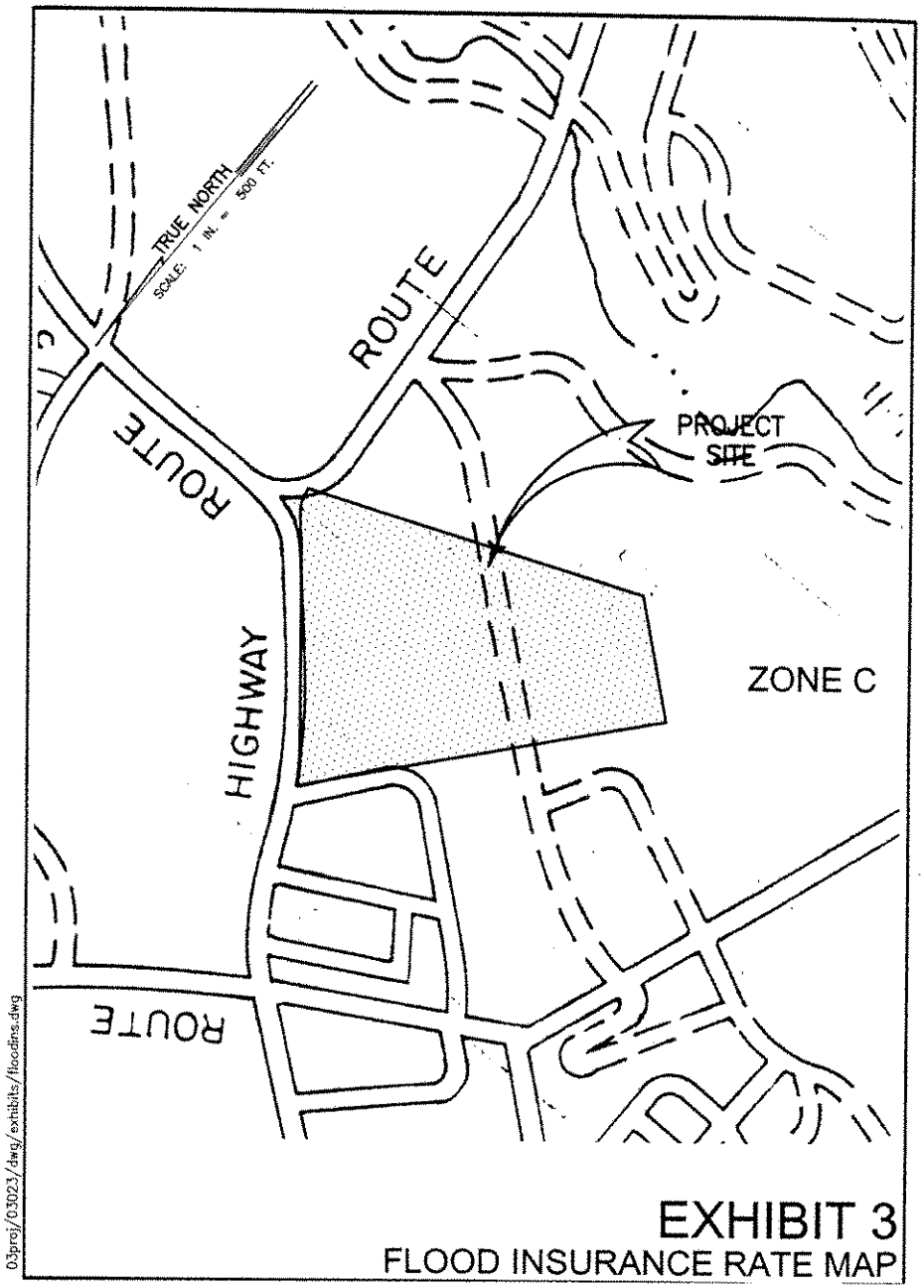

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EXHIBIT 3
FLOOD INSURANCE RATE MAP

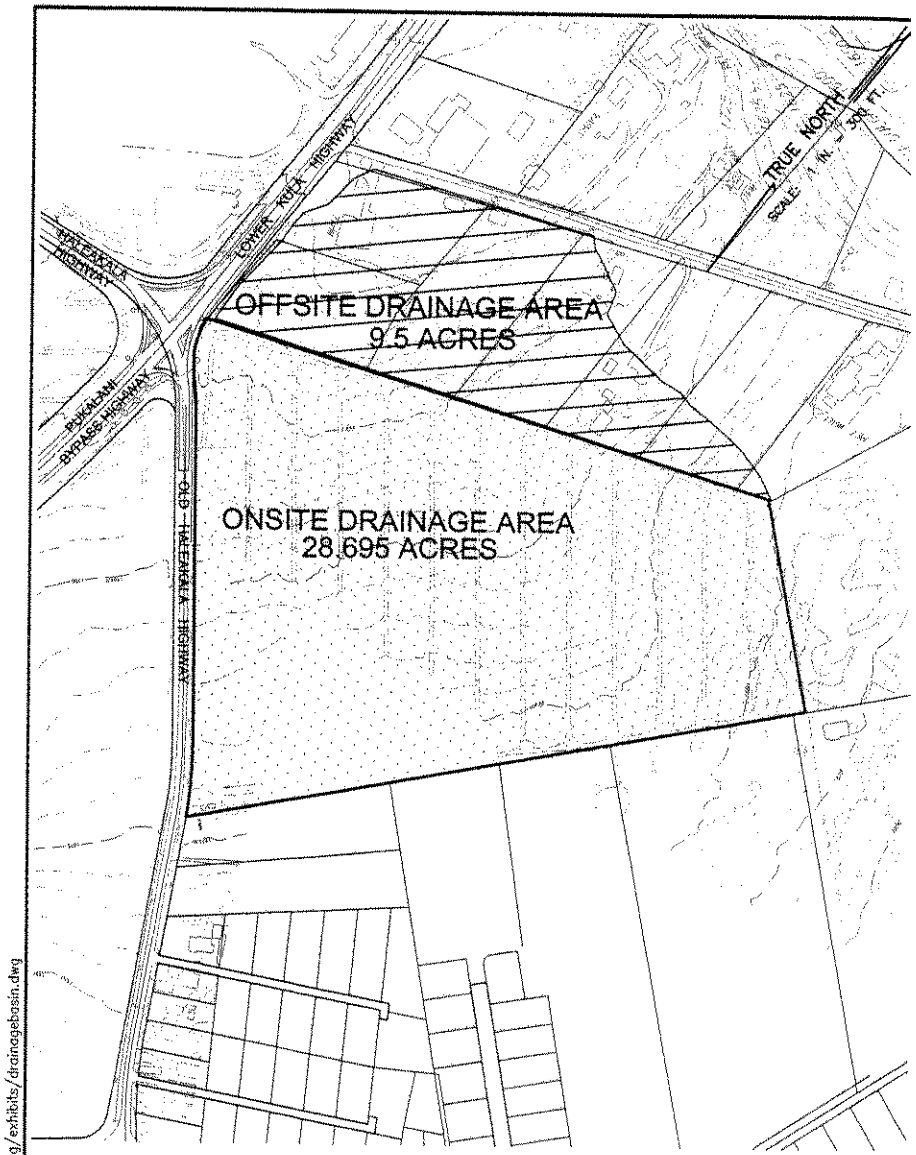

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EXHIBIT 4
ONSITE/ OFFSITE DRAINAGE AREA MAP

APPENDIX A

HYDROLOGIC CALCULATIONS

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: June 21, 2002

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the Project Site.

1. 50-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Pukalani, Maui,
R(50 Yr.-1Hr.) = 2.80 inches

2. Total Area:

Area (Ac.):		28.70

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15
	Runoff Coefft., C:	0.28

4. Time of Concentration:

Approx. Elev. Diffl. (ft.)		95
Higher Elev. (ft.):	1,735	
Lower Elev. (ft.):	1,640	
Approx. Runoff Length (ft.):		1,740
Average Slope:		5.46%
Time of Concentration (min.):		33.5

5. Intensity:

Intensity (in./hr.):	3.8

6. Total Runoff:

Q = C x i x A (cfs):	**30.53**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: June 21, 2002

HYDROLOGIC CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff for the Project Site.

1. 50-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Pukalani, Maui,
R(50 Yr.-1Hr.) = 2.80 inches

2. Total Area:

Area (Ac.):		28.70

3. Runoff Coefficent:

From Weighted Coefficient Calculations

Runoff Coefficient C:		0.420

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.)		95
Higher Elev. (ft.):	1,735	
Lower Elev. (ft.):	1,640	
Approx. Runoff Length (ft.):		1,740
Average Slope:		5.46%
Time of Concentration (min.):		24

5. Intensity:

Intensity (in./hr.):		4.35

6. Total Runoff:

Q = C x I x A (cfs):		**52.43**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: June 21, 2002

WEIGHTED RUNOFF COEFFICIENT CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff coefficient for the Project Site.

Developed Area[1]: C= .90 (Table 2, Rules for the Design of Storm Drainage Facilities in the Dounty of Maui)
Area = 3.44 acres

Open Area:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.00
Development Type:	Agricultural	0.15
Runoff Coeff't., C:	0.25	

Area = 21.488 acres

Paved Area: C=.95 (Table 2)
Area= 3.767 acres

Total Area: Area=28.695 acres

Weighted Coefficient = $\frac{(.90)(3.44) + (.25)(21.488) + (.95)(3.767)}{28.695}$

Weighted Coeffiecient= 0.42

1a. C obtained from average between C (driveways) and C (roofs)
1b. Assume developed hard surface area is 3,000 s.f. for each single family house lot.

W.S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, Hawaii 96793
JUNE 27, 2003

HYDROLOGIC REPORT FOR

PRE-DEVELOPMENT KUALONO

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A

50 YEAR STORM FREQUENCY

BASIN IDENTIFIER KUALONO SUBDIVISION

BASIN AREA = 28.70 ACRES
RUNOFF COEFF. = 0.28
RAINFALL INT. = 3.93 IN/HR
TIME OF CONC. = 33.50 MINUTES
VOLUME = 174082.08 CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
16.8	3.0
33.5	6.0
50.3	6.2
67.0	6.3
83.8	18.9
100.5	31.5
117.3	22.5
134.0	13.4
150.8	11.9
167.5	10.3
184.3	8.2
201.0	6.1
217.8	6.1
234.5	6.0
251.3	5.1
268.0	4.2
284.8	3.4
301.5	2.6
318.3	1.3

W.S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, Hawaii 96793
JUNE 27, 2003

HYDROLOGIC REPORT FOR

POST-DEVELOPMENT KUALONO SUBDIVISION

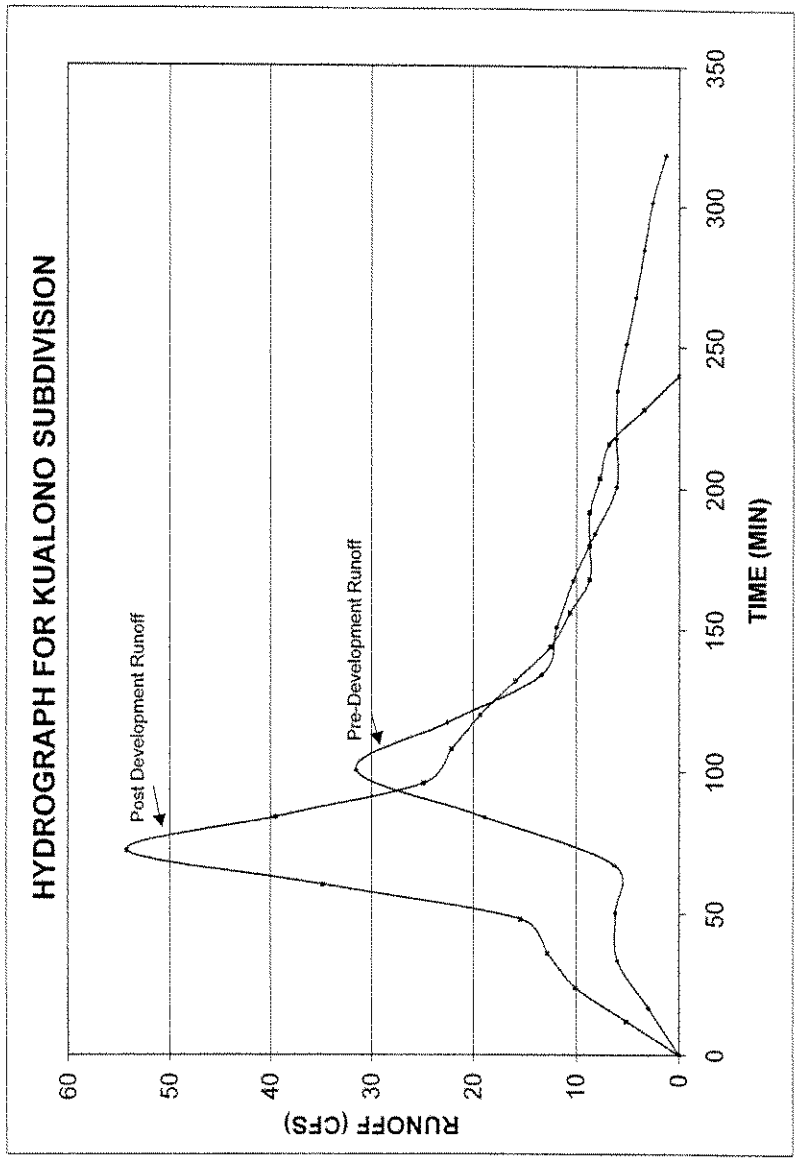
UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A

50 YEAR STORM FREQUENCY
BASIN IDENTIFIER KUALONO SUBDIVISION

BASIN AREA = 28.70 ACRES
RUNOFF COEFF. = 0.42
RAINFALL INT. = 4.50 IN/HR
TIME OF CONC. = 24.00 MINUTES
VOLUME = 231205.36 CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
12.0	5.1
24.0	10.1
36.0	12.8
48.0	15.4
60.0	34.8
72.0	54.2
84.0	39.5
96.0	24.8
108.0	22.1
120.0	19.3
132.0	15.9
144.0	12.5
156.0	10.6
168.0	8.7
180.0	8.7
192.0	8.7
204.0	7.7
216.0	6.8
228.0	3.4



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W.S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, Hawaii 96793
JUNE 27, 2003

REQUIRED STORAGE VOLUME

PROJECT: Kualono Subdivision
LOCATION: Pukalani, Maui, Hawaii
JOB NUMBER: 03-023

PURPOSE: Determine the required storage volume for the proposed development.
(50 year, 1-hour rainfall= 2.8 inches)

REQUIRED STORAGE VOLUME

Post-Development Discharge Volume: 231205 Cubic Feet

Pre-Development Discharge Volume: 174082 Cubic Feet

Required Storage Volume: 57123 Cubic Feet

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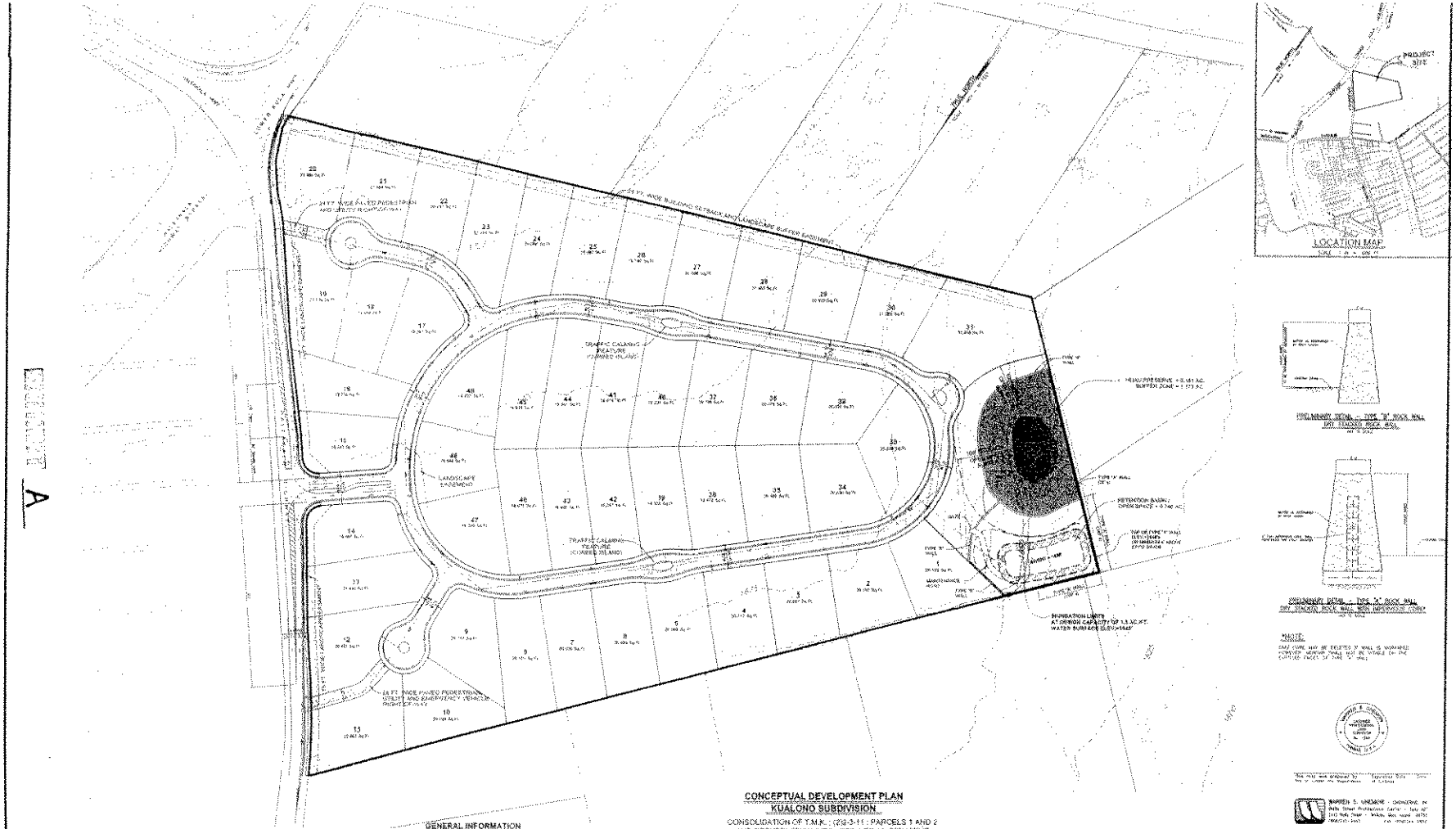
EXHIBIT A



CONCEPTUAL DEVELOPMENT PLAN
KUALONO SUBDIVISION

CONSOLIDATION OF T.M.K.: (2)3-2-11: PARCELS 1 AND 2
AND RESUBDIVISION INTO LOTS 1 TO 49, INCLUSIVE

BEING A PORTION OF GRID OF MINISTER OF INTERIOR TO W. M. BAILEY

KEAWA KULA MAUI HAWAII

SCALE: 1" = 60'-0"

OWNER: DOWLING COMPANY, INC.
ADDRESS: 2005 EAST MAIN STREET
WAILUKU, MAUI, HAWAII 96793

GENERAL INFORMATION

GROSS AREA:
TMK: (2) 3-2-11: 01 = 14.497 ACS.
TMK: (2) 3-2-11: 02 = 14.894 ACS.
TOTAL = 29.391 ACS.
ZONING: R-3 RESIDENTIAL AREA (COUNTY ORDINANCE)
MIN. LOT SIZE = 10,000 S.F.
MIN. LOT WIDTH = 70 FT.
NO. OF HOUSELOTS = 49
MINIMUM SETBACK OPEN SPACE
AND RETENTION BASIN = GROSS AREA = 2.894 ACS ±

RETENTION BASIN SPECIFICS:

TOP OF TYPE "A" WALL - ELEV.	= 1648 FT
BASIN INVERT ELEV.	= 1638 FT
WATER SURFACE ELEVATION @ DESIGN CAPACITY	
TWO FEET FREEBOARD	= 1646 FT
DESIGN CAPACITY OF BASIN	= 1.3 AC.-FT
CAPACITY TO TOP OF WALL	= 2.6 AC.-FT
FACTOR OF SAFETY	= 2

WARREN S. UNEMORI - ENGINEERING INC.
Civil Engineering Land Surveying
2145 Wells Street, Suite 207
Wailuku, Maui, Hawaii 96793
Phone: (808) 244-9069 Fax: (808) 244-9599

T.M.K.: (2)3-2-11: 01 AND 02

ARCHAEOLOGICAL PRESERVATION PLAN FOR A HEIAU STRUCTURE LOCATED WITHIN THE KUALONO SUBDIVISION AT TMK: 2-3-11:1 AND 2 MAKAEHA *AHUPUA'A;* MAKAWAO DISTRICT; ISLAND OF MAUI

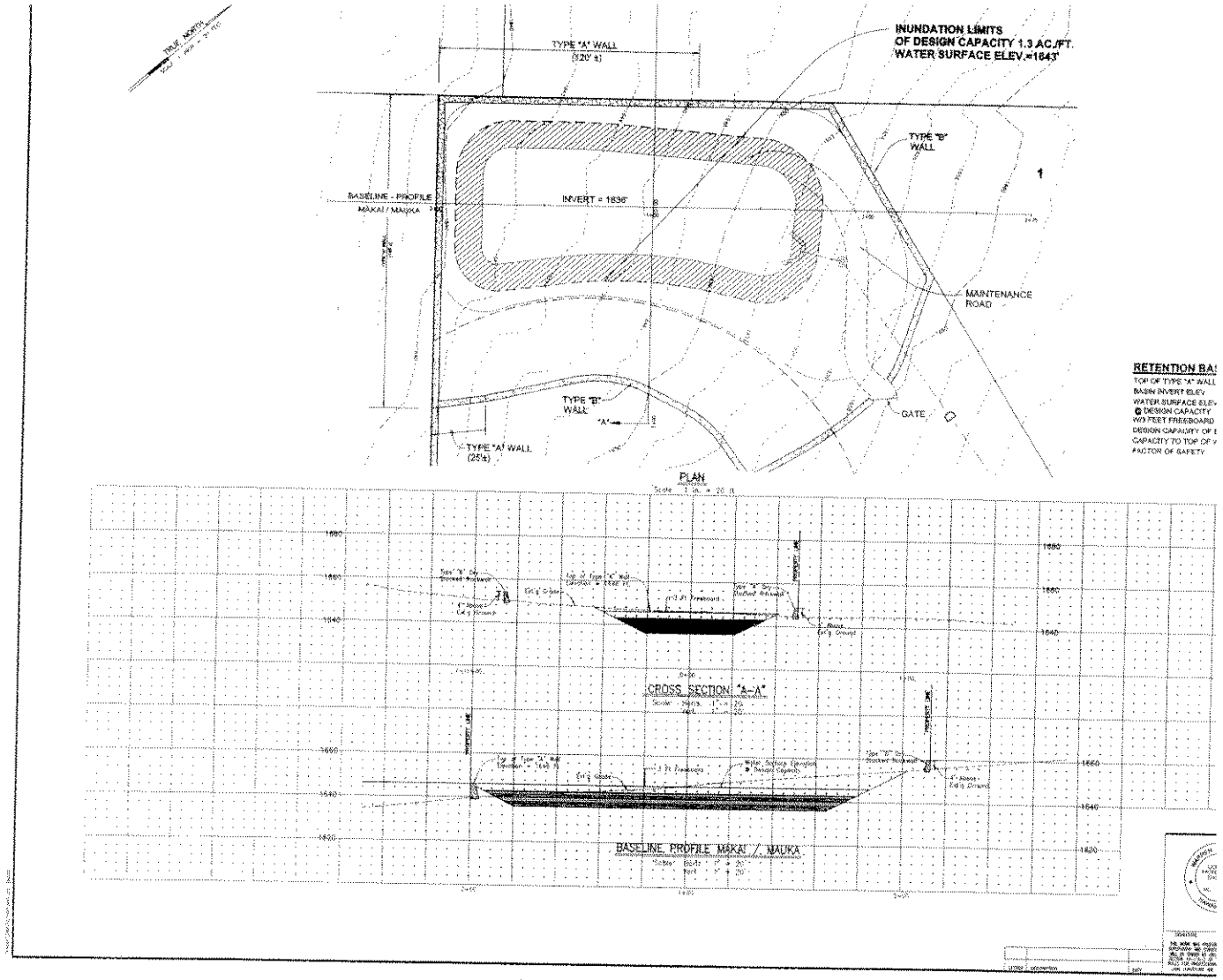
FOR: Hanohano LLC

BY: Lisa J. Rotunno-Hazuka,
And Jeffrey Pantaleo (MA)

MAY 2004

ARCHAEOLOGICAL SERVICES HAWAII, LLC.
16 S. Market St. Suite G
Wailuku, HI 96793

EXHIBIT B


TRUE NORTH
TYPE "A" WALL
(320' ±)
INUNDATION LIMITS
OF DESIGN CAPACITY 1.3 AC./FT.
WATER SURFACE ELEV.=1643'
TYPE "B"
WALL
1
BASELINE - PROFILE
MAKAI / MAUKA
INVERT = 1636'
MAINTENANCE
ROAD
TYPE "B"
WALL
"A"
GATE
TYPE "A" WALL
(25'±)
PLAN
RETENTION BA
TOP OF TYPE "A" WALL
BASIN INVERT ELEV.
WATER SURFACE ELEV
DESIGN CAPACITY
FEET FREEBOARD
DESIGN CAPACITY OF
CAPACITY TO TOP OF
FACTOR OF SAFETY
CROSS SECTION "A-A"
BASELINE PROFILE MAKAI / MAUKA

SHEET C

DRAFT

MAINTENANCE PLAN FOR KUALONO SUBDIVISION DRAINAGE SYSTEM

I. PURPOSE:

This maintenance plan outlines routine maintenance procedures and record keeping requirements for the Kualono Drainage System (KDS). The KDS consists of the drainage system within the subdivision streets and the retention basin at the northwest corner of the project site.

II. BACKGROUND:

The KDS must be properly maintained in order to function as designed and constructed. The Kualono Homeowner's Association (KHOA) will be responsible for the maintenance of the KDS when completed.

III. ROUTINE MAINTENANCE PROCEDURES:

The KHOA will perform routine maintenance procedures as noted below.

A. Retention Basin:
   1. Inspect for possible settlement of the embankment and seepage or wet spots on the downstream face of the embankment at least once per year and after storms that discharge storm waters into the basin.
   2. Keep basin free of trees, shrubs, and other vegetation overgrowth.
   3. Keep basin free of rubbish and debris.
   4. Maintain grassed areas and re-plant bare soil areas to prevent soil erosion.
   5. Remove silt and debris from the basin at least once per year or sooner when 6 inches of silt accumulates within the basin.

B. Drainage System:
   1. Inspect drainage system at least once per year and after storms that discharge runoff into the onsite retention basin.
   2. Remove silt and debris from structures when the depth of silt is 3 inches above the bottoms of the system.
   3. Keep catch basins and drainlines free of rubbish and debris.
   4. Prevent grass clippings, leaves, and other landscape waste from entering drain inlets and catch basins.
   5. Repair or replace damaged structures.

IV. RECORD KEEPING & REPORTING REQUIREMENTS:

The KHOA will keep a maintenance log of inspections and worked performed. The maintenance log will be made available to appropriate government officials upon request.

EXHIBIT D

V. FUTURE CONVEYANCE OF ALL OR PORTIONS OF THE KUALONO DRAINAGE SYSTEM TO THE COUNTY OF MAUI:

Hanohano LLC hopes to convey all or portions of the KHOA's Drainage System to the County of Maui when construction of the project is completed. Should the County Council accept all or portion of the drainage system, maintenance of that portion of the drainage system under the subsequent jurisdiction of the County will be maintained by them in accordance with the procedures discussed herein or as amended by the County Council as a prerequisite to acceptance of the drainage system by the County.

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JOHN CHILD & COMPANY
APPRAISERS & CONSULTANTS

Karen Char, MAI, CRE
Paul D. Cool, MAI, CRE
Shelly H. Tanaka
Elie E. Kato

May 18, 2004

Via Email

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Maui, Hawaii 96793

Dear Don:

Re: Proposed Kualono Subdivision

John Child & Company prepared market assessments for the proposed Kualono Subdivision as of July 25, 2003. This letter responds to your request for additional clarification of the data and analyses used to formulate the buyer profile for the subdivision.

As part of our research, we interviewed residential real estate brokers including brokers for subdivisions that were marketed and sold during the late-2002 to early-2003 time period. These interviews indicated local residents comprised the primary new housing market segment for product similar to the Kualono Subdivision lots. Secondary demand from mainland transplants, second homebuyers, and investors was reported to be relatively minimal.

- According to Albert Chiarella, principal broker for the nearby 57-lot Kulamanu Ridge subdivision, about 70% of the buyers were Maui residents intending to build a primary residence for themselves or their parents. The remaining buyers were primarily mainland residents relocating to Maui. Few or none were second homebuyers or investors. The quarter- to half-acre lots were priced between $180,000 and $220,000.

- Although larger than the Kualono Subdivision lots, homesites in the Wailuku Country Estates were generally priced at about the mid-$200,000 to low-$300,000 level and were considered competitive to the Kualono Subdivision lots in terms of pricing and overall market appeal. As of May 2003, all but 12 of the 184 lots had been sold within a twelve-month marketing period.

  Richard Nishihara, principal broker for Wailuku Country Estates, reported that about 80% of the buyers were primary homebuyers from Maui. While some were first-time homebuyers (i.e., former renters), many were trade-up buyers that planned to sell their existing home.

841 Bishop Street, Penthouse • Honolulu, Hawaii 96813
T 808.533.2951 • F 808.523.7672 • email:info@johnchild.com

EXHIBIT E

Anecdotal evidence obtained during interviews with residential real estate brokers on Maui confirmed the low interest rate environment and strong residential resales were fueling the trade-up market. This pattern is consistent with home ownership patterns observed throughout Hawaii. Homeowners transfer built-up equity into larger, newer or more conveniently located homes with higher values. This trade-up process is accelerated in appreciating markets.

Based on these interviews and market data and considering the anticipated pricing, the Kualono subdivision lots were projected to appeal most to trade-up buyers with built-up equity in their existing homes.

* * * * *

We appreciate having the opportunity to assist you on this interesting assignment. Please contact us if you have any questions.

Sincerely,

JOHN CHILD & COMPANY, INC.

Paul D. Cool, MAI, CRE
Vice President

Shelly H. Tanaka
Appraiser

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

MAY 18 2004

ALAN M. ARAKAWA
Mayor

ALICE L. LEE
Director

HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

May 12, 2004

Ms. Gwen Ohashi Hiraga
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Ohashi Hiraga:

SUBJECT: PROPOSED KUALONO (fka HANOHANO) SUBDIVISION, PUKALANI, MAUI, HAWAII

In response to your letter of March 19, 2004, this is to provide confirmation that the affordable housing requirements for the proposed 49-lot subdivision is 10%. As we discussed, Hanohano, LLC will be required to provide a per unit cash contribution for a total of $125,000.00 (10% of 49 lots = 5 lots x $25,000.00).

As we further discussed, these funds would be provided as a donation to Habitat for Humanities for its use in providing affordable housing units. Payment of the cash contribution (donation) is expected to be paid up front, and will be a condition of final subdivision approval.

Please proceed in preparing the appropriate Affordable Housing Agreement for review by my office. You may also proceed in contacting Habitat for Humanities to discuss the details of a Donor Agreement with the organization.

Should you have any questions, please feel free to call me.

Sincerely,

ALICE L. LEE
Director

cc: Don Fujimoto, Hanohano, LLC

EXHIBIT F

CKM CULTURAL RESOURCES

Specializing in Cultural Impact Statements
(using State of Hawaii O.E.Q.C. methods),
Blessings, Weddings, Lectures
and Ho'oponopono

May 12, 2004

IMINA I KA NA'AUAO E PAHU IA MAKOU IMUA
(Seeking the knowledge to push us forward)

Mr. Don Fujimoto
Hanohano LLC
2005 Main Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision

Dear Mr. Fujimoto,

This letter responds to the Office of Hawaiian Affairs= April 5, 2004 comments regarding the presence of rare, threatened or endangered species and important habitats within the limits of the proposed subdivision.

I would like to clarify that there are no rare, threatened or endangered species of plant and animal life on the subject property, nor are there any important habitats on the property. The native plant growth, wildlife, and habitats that are described in the Cultural Impact Assessment describes conditions in the Kula region as a whole and is not intended to represent that there are rare, threatened or endangered species and critical habitats on the subject property.

Please feel free to call me should you have any questions.

Very truly yours,

Charlie K. Maxwell, Sr.

CKM:tn
dowling/pukalani/charesponse.ltr

Kahu Charles Kauluwehi Maxwell, Sr.
157 Alea Place · Pukalani, Maui, HI 96768
Phone: (808) 572-8038 · Fax: (808) 572-0602 · Cell: 870-3345
Email: kale@moolelo.com · Website: www.moolelo.com

EXHIBIT G

5.6.6 Ecological Resources, Endangered Species, Cultural and Historic Resources, and Wetlands

There are no known wetlands, critical habitats, or threatened and endangered species designated for the subject site.

VEC is unaware of any cultural or historic resources associated with the property other than the historic heiau located on the southern portion of the property. (See Figure 2 and Photo #8, Appendix A). An archeological inventory survey conducted by Archeological Services indicated no other significant findings.

5.6.7 Indoor Air Quality

There were no structures located on the subject site at the time of the site visit. This section does not apply.

Background Information:

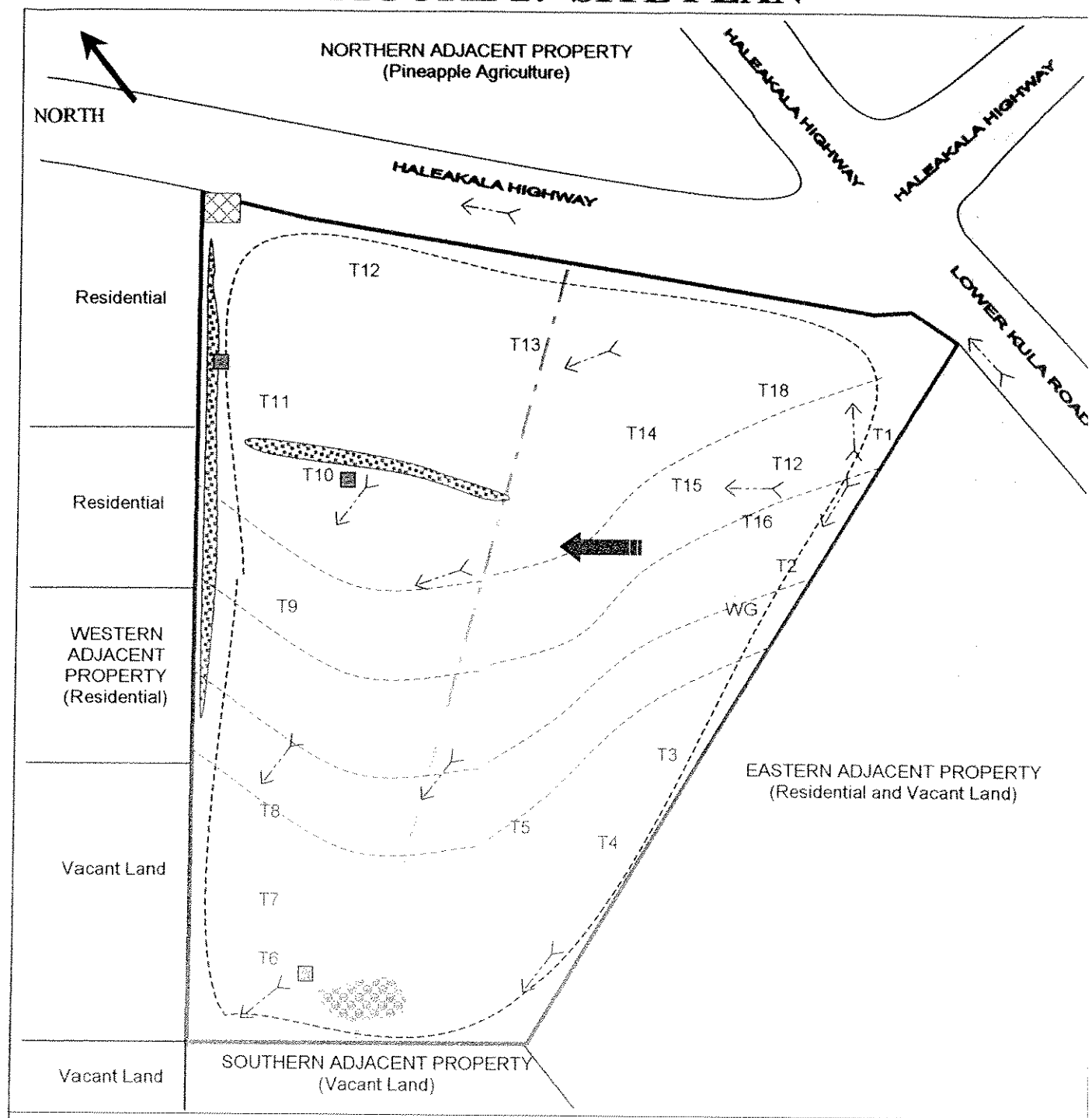
Indoor air quality (IAQ) problems primarily result from indoor pollution sources that release gases or airborne particles. The term "Sick Building Syndrome" (SBS) is used to describe situations in which building occupants experience acute or chronic health and discomfort effects that appear to be linked to time spent in a building and may be localized in a particular room or zone or may be widespread throughout the building. Frequently, problems result when a building is operated or maintained in a manner that is inconsistent with its original design or prescribed operating procedures or as a result of poor building design or occupant activities.

Sources of indoor air contaminants can originate from within the building or be drawn in from the outdoors. The following causes may contribute to IAQ problems:

1. *Inadequate ventilation* – As a result of the oil embargo in 1973, national energy conservation measures called for a reduction in the amount of outdoor air provided for ventilation. In many cases the reduced outdoor air ventilation rates were found to be inadequate to maintain the health and comfort of building occupants. Potential air pollutant sources in ventilation or heating, ventilating, or air-conditioning (HVAC) systems include, but are not limited to: dust or dirt in ductwork; microbiological growth (i.e. mold, mildew, or bacteria); improper use of biocides, sealants, and cleaning compounds; and refrigerant leakage. Inadequate ventilation may increase the concentrations of these indoor air contaminants.
2. *Biological contaminants* – Bacteria, molds, pollen and viruses are types of biological contaminants. These contaminants may breed in stagnant water that has accumulated in ducts, humidifiers and drain pans, or where water has collected on ceiling tiles, carpeting, or insulation. Surfaces exposed to high humidity with limited air movement may also be subject to microbiological contamination.
3. *Chemical contaminants from indoor sources* – Potential air pollutant sources of indoor chemical contaminants include, but are not limited to: adhesives, carpeting, upholstery, manufactured wood products, pesticides, combustion products (i.e. carbon monoxide, carbon dioxide, and nitrogen oxides), and cleaning agents emitting volatile organic compounds (VOCs). Tobacco smoke contributes high levels of VOCs, other toxic compounds, and respirable particulate matter. Research has shown that some VOCs can cause chronic and acute health effects at high concentrations, and some are known carcinogens.
4. *Chemical contaminants from outdoor sources* – The outdoor air that enters a building can be a source of indoor air pollution. Potential air pollutant sources of outdoor chemical contaminants include, but are not limited to: motor vehicle exhausts; plumbing vents; combustion products (i.e. carbon monoxide, carbon dioxide, and nitrogen oxides); and building exhausts (i.e. bathrooms and kitchens). These contaminants can enter the building through poorly located air intake vents, windows, and other openings.

Indicators of SBS or IAQ related health problems include, but are not limited to, headache, eye, nose, or throat irritation, dry cough, dry or itchy skin, dizziness or nausea, fatigue, and sensitivity to odors.

FIGURE 2: SITE PLAN



LEGEND

- SUBJECT PROPERTY BOUNDARIES
- ADJACENT PROPERTY BOUNDARIES
- PROJECTED GROUNDWATER FLOW DIRECTION
- PROJECTED STORMWATER FLOW DIRECTION
- PARCEL DIVISION
- UNPAVED ROAD
- CONTOUR LINES
- WG WHITE GOOD (STOVE)
- T# EXCAVATION PITS
- EMPTY 55-GALLON DRUM
- IRRIGATION INFRASTRUCTURE
- LANDSCAPE DEBRIS AND SOIL PILES
- HISTORIC HEIAU

SCALE	Not to scale
DATA BY	BD
DRAWN BY	MC
DATE	12/23/03

PHOTO 7

Fifty-five (55) gallon-drum located near the rockpile in southern portion of the property. No soil staining or odor was related to this drum.

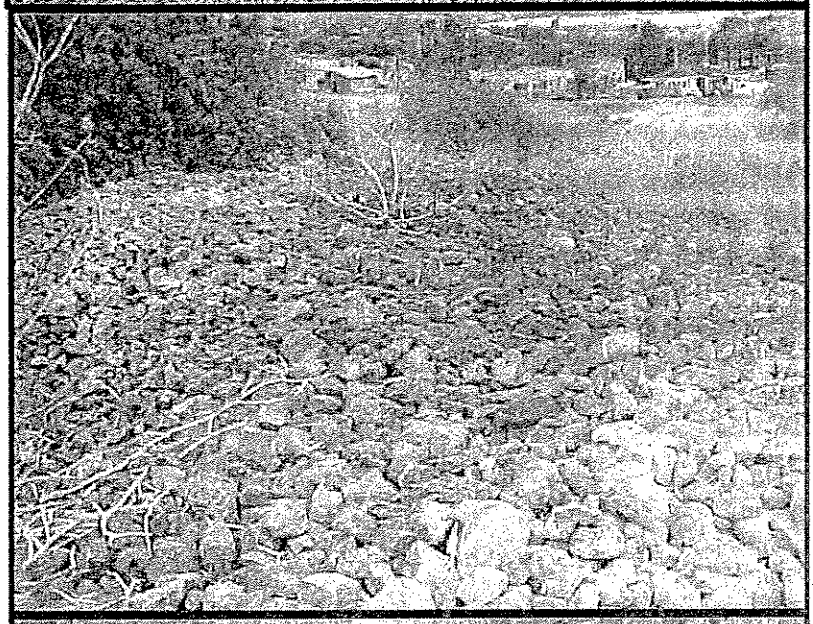


PHOTO 8

Historic "Heiau" located in the southern portion of the property.

PHOTO 9

One (1) of several archeological excavation trenches located throughout the subject property.

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

April 5, 2004

Hanohano LLC
Attn: Mr. Don Fujimoto
2005 Main Street
Wailuku, Hawaii 96793

Dear Mr. Fujimoto:

RE: Comments on the Draft Environmental Assessment Prepared for the Proposed Kualono Subdivision located at TMK 2-3-011: 001 and 002, Pukalani, Island of Maui, Hawaii (LTR 2004/0532) (LTR 2004/0821)

The Maui Planning Department (Department) is in receipt of the Draft Environmental Assessment (DEA) for the above referenced project and provides the following comments:

1. As noted in the Department's pre-consultation letter dated November 25, 2003, the subject property is located within the Interim Zoning District. The DEA is incorrect in stating that the property is zoned R-3, Residential. As such, please be advised that a Change in Zoning is required for the project.

   Further, as indicated in the pre-consultation letter from the Maui County Department of Housing and Human Concerns (DHHC), dated October 27, 2003, the Administration's Housing Policy applies to applications for a Change in Zoning which establishes land use designations in which a residential housing project is developed. The DHHC should be consulted with regards to any additional requirements, and any information should be included in the Final EA.

2. Lot owners will be required to construct their individual homes, and the report indicates that ohanas, or accessory dwellings, will not be permitted within the subdivision per the CC&R's. However, the County of Maui does not recognize or enforce restrictions listed within the CC&R's, and there remains the possibility that ohanas, or accessory dwellings, may be constructed with valid County building permits. As such, the alternative of a full build-out potential in

accordance with the allowances of Title 19, Maui County Code, should be provided. Further, this alternative should discuss potential impacts to educational facilities, traffic, and water.

3. The drainage plan proposes to collect the post developed runoff and convey it to a subsurface system to be located in the proposed park/retention basin. The subsurface system will manage the shorter "low-intensity" runoff, and for longer and higher rainfall intensities, storm water will discharge from the subsurface system into the park/retention basin area. The DEA further recognizes that a heiau is located in the retention basin.

   Discuss the impacts the proposed drainage plan may impose on the heiau during rainfall events and the proposed mitigative measures. Further note whether percolation/injection wells are proposed for the retention basin and discuss any related impacts to underlying aquifers.

4. The DEA indicates the applicant constructed a private well system to provide potable water to the proposed subdivision.

   a. Discuss results from the water quality testing conducted to date and provide the laboratory results.

   b. Identify the location of the well, pump house, storage tanks, etc. on the Site Plans.

   c. Identify any permits required for the development and/or use of the private well.

5. The DEA indicates septic systems will be used to manage wastewater from the proposed development.

   a. Discuss the potential impacts on the potable water system in the area of the development.

   b. Discuss any potential impact to the private potable water well discussed in Item #4 above.

6. The site plans indicate the construction of a driveway stubout near the southern property boundary as a potential second accessway.

a. Discuss the consultation activities with the adjacent property owner as to the location of the driveway. If the adjacent landowner has no intentions to continue the accessway, then the stubout would be ineffective as a second driveway.

b. Discuss an alternative of providing a second accessway onto Old Haleakala Highway and any potential impacts on traffic.

7. The DEA refers to the "Five Trees" intersection. Please label the intersection as such in the Site Plans.

8. The project site is identified in the Upcountry Greenway Masterplan as a priority route for walking and bicycling. Discuss how the proposed site plan is consistent with the masterplan.

9. The DEA states that a buffer zone of 60' - 100' will be established around the heiau (page 35.) The Department recommends establishing a 100 foot buffer zone. Further, Department recommends that the applicant consult with Cultural Resources Commission to ensure the adequacy of the buffer zone and mitigative measures for the preservation of the heiau. Please contact Ms. Dawn Duensing, Cultural Resources Planner, of this office for additional clarification and scheduling.

Thank you for the opportunity to comment. Should you require additional clarification, please contact Ms. Kivette A. Caigoy, Environmental Planner, at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:KAC:lar
c: Wayne Boteilho, Deputy Planning Director
Kivette A. Caigoy, Environmental Planner
Ann Cua, Staff Planner
Dawn Duensing, Cultural Resources Planner
State Land Use Commission
OEQC
General File
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MUNEKIYO & HIRAGA, INC.

May 27, 2004

Michael W. Foley, Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Kualono Subdivision
Draft Environmental Assessment (EA)
TMK 2-3-11: 01 and 02

Dear Mr. Foley,

Thank you for providing us with your April 5, 2004 comments on the above-referenced project. On behalf of the applicant, Hanohano LLC, we would like to provide the following information in response to your comments.

1. The applicant has concluded that the subject property is zoned R-3, Residential District under the Maui County Comprehensive Zoning Ordinance. While the Department of Planning may not now share in this conclusion, the applicant believes that this issue need not, and cannot be, resolved prior to and during the State Land Use Commission's proceedings on the environmental assessment and the petition for a district boundary amendment. Applicant will, however, continue its discussions with the Department of Planning on the propriety of the zoning of the subject property. In addition, the applicant and the Department of Housing and Human Concerns (DHHC) have agreed to address County affordable housing requirements through a cash contribution of $125,000.00 which will be provided as a donation to Habitat for Humanities for its use in providing affordable housing units. An agreement between the applicant and the DHHC will be prepared to formalize this commitment.

2. The applicant is willing to accept a condition from the State Land Use Commission regarding the prohibition of ohana units.

3. The retention basin will be located down slope from the heiau and beyond the 100-foot buffer surrounding the heiau. Refer to the attached revised site plan. Since the publication of the Draft EA, a 3-foot freeboard has been incorporated into the design of the retention basin. With the freeboard, the design capacity of the retention basin

has been increased from 1.3 acre-feet to 2.6 acre-feet thereby doubling the storage volume of the retention basin beyond its required capacity. No irrigation or percolation wells are proposed for the project.

4. An affiliate company, Kulamalu LLC (fka, Kulamalu, Limited Partnership), developed the Kaupakalua Well (State Well No. 5318-01). The well site is located on a portion of TMK 2-7-15:34 in Kaupakalua, approximately 4.5 miles to the northeast of the subject property. The well water is pumped into a 100,000 gallon control tank located at the well site. A booster pump then transmits the water from the control tank into the existing public water system along Kaupakalua Road. The well, control tank, booster pump, and waterline connection have been inspected and approved by the County and have been in use for the past several years. For developing the well source, the source developer (Kulamalu LLC) received a capacity allocation of 738,000 gallons per day (gpd) from the County of Maui. The applicant will purchase a portion of the remaining allocation (approximately 270,300 gpd) from Kulamalu LLC to satisfy the average daily water demand for the proposed project.

5. The installation and use of individual wastewater systems (IWS) by houselot buyers is not expected to have an adverse impact upon the potable water system serving the area. The design and installation of the individual wastewater systems (IWS) must comply with the applicable provisions of Chapter, 11-62, HAR of the State Department of Health (DOH) pertaining to "Wastewater Systems". The purpose of these regulations is to ensure that the disposal of wastewater from IWS and wastewater treatment works does not contaminate or pollute any existing or potential drinking water supply, does not create nuisances, does not become a hazard or potential hazard to public health, safety, and welfare, does not encourage the harboring of insects, rodents or other vectors. All IWS plans and specifications must be reviewed and approved by the DOH prior to installation, and no IWS can be operated until it has been inspected and approved by the DOH.

6. The site plan for the project has been revised to eliminate the street plug that was proposed adjacent to the heiau. Refer to the attached site plan. A 24-foot wide, paved pedestrian/utility/emergency vehicle right-of-way will be provided between the Old Haleakala Highway and the cul-de-sac on the Pukalani side of the subdivision. Since this access will only be used for utility services and emergency situations, potential adverse impacts to traffic are not anticipated.

7. The Five Trees Junction has been called out on the project's revised site plan.

8. The (draft) final report for the Upcountry Greenway Master Plan is currently being reviewed by the Planning Department. The master plan identifies existing roadway

rights-of-way which would provide opportunities for creating functional routes between existing community facilities. Designated by the master plan as the High School Connector, the segment of the Old Haleakala Highway from Makawao Avenue to King Kekaulike High School was identified as a trail lying within or adjacent to a right-of-way. This route was selected as a priority based upon the need to provide a safe pedestrian route along the Old Haleakala Highway between King Kekaulike High School and the town of Pukalani. Streets within the subdivision and along its frontage with the Old Haleakala Highway will be improved with sidewalks, curbs, and gutters. A paved 24-foot wide pedestrian/utility right-of-way will be provided between the subdivision's southern most cul-de-sac and the Old Haleakala Highway, while a paved 24-foot wide pedestrian/utility/emergency vehicle right-of-way will provide a link between the subdivision's northern most cul-de-sac and the highway. Collectively, these subdivision improvements will contribute to and enhance pedestrian circulation within the subdivision and along the Old Haleakala Highway.

9. The heiau and retention basin have been demarcated as separate, dedicated areas. Refer to the attached revised site plan. The heiau will have a 100-foot buffer and encompass 1.353 acres, while the retention basin will cover 0.740 acre. Within the 100-foot buffer, a dry-stacked, hand-built stone wall will be placed 60 feet from the heiau (except along its south side where the wall will follow the property line), while the remaining part of the buffer zone will be planted with grass. In addition, the applicant will be providing the Cultural Resources Commission with an overview of the preservation plan at their meeting on June 3, 2004.

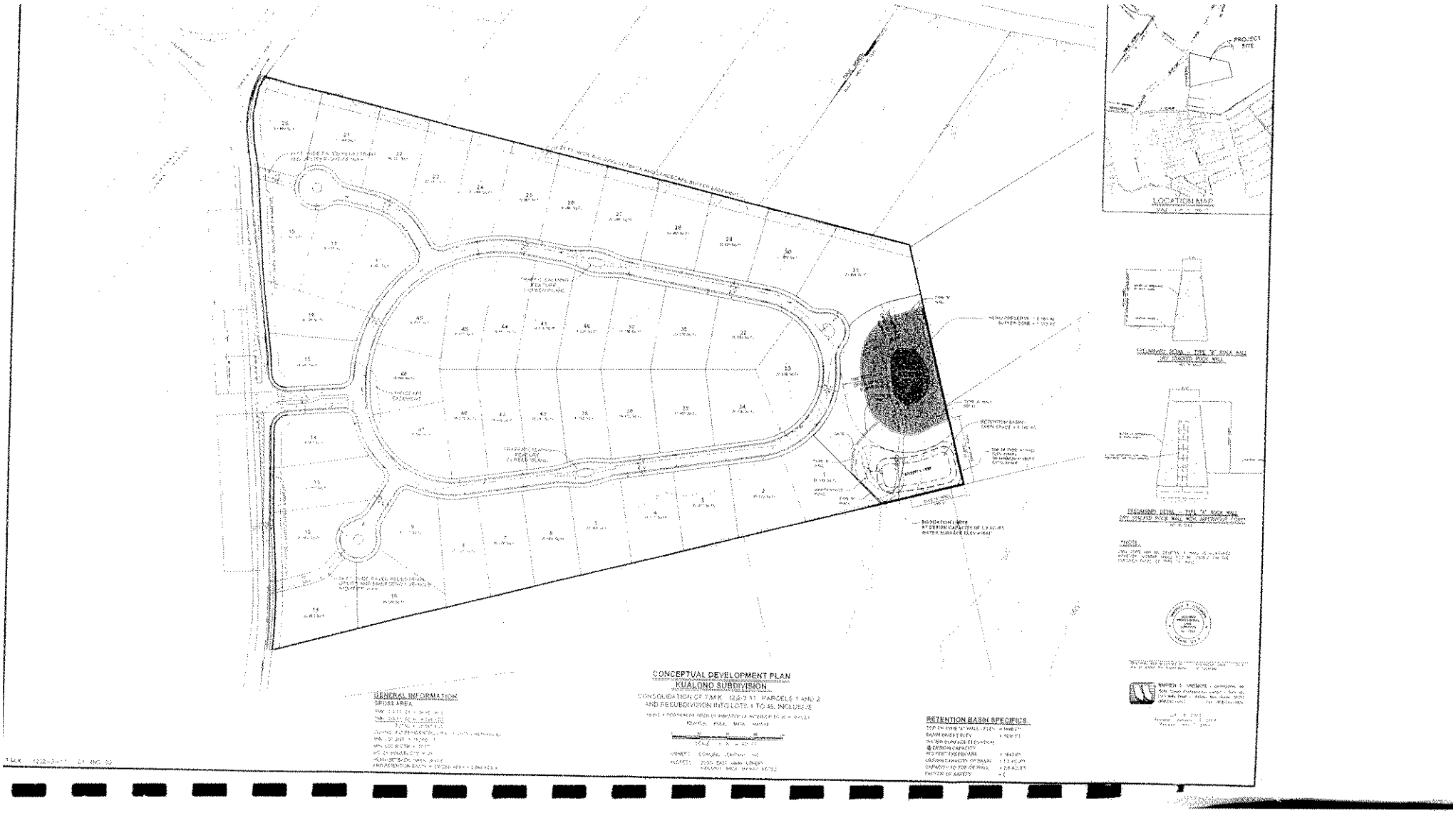
Thank you again for providing us with your comments. Please feel free to call me at 244-2015 should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
Attachment
cc: Anthony Ching, State Land Use Commission
Genevieve Salmonson, Office of Environmental Quality Control
Don Fujimoto, Hanohano LLC

dowling/pukalani/plann2.res


PROJECT SITE
LOCATION MAP
CONCEPTUAL DEVELOPMENT PLAN
KUALONO SUBDIVISION
GENERAL INFORMATION
GROSS AREA
RETENTION BASIN SPECIFICS

Kula Community Association

P.O. Box 417 - Kula, HI 96790

http://kulamaui.com

The vision of the Kula Community Association is to preserve open space, support agriculture, maintain a rural residential atmosphere, and to work together as a community.

The specific purpose of this association is to improve the quality of life for the residents of Kula, to promote civic welfare, and generally to benefit the community of Kula.

April 5, 2004

Mr. Don Fujimoto
Hanohano LLC
2005 Main St.
Wailuku, Maui HI 96793

Dear Mr. Fujimoto:

Subject: KUALONO SUBDIVISION (In Pukalani) - DRAFT ENVIRONMENTAL ASSESSMENT

I am writing in my capacity as Chair of the Kula Community Association Land Use and Planning Committee. We have only a few comments and we hope they are helpful.

1. The name of this subdivision (Kualono) and the corporation (Hanohano) proposing the subdivision are most unfamiliar to residents of the area. Consequently, although there may be impacts from the proposed project, there may be little feedback on the "Draft EA" from those affected or knowledgeable.

2. We ask that this draft EA be sent to all of the neighboring land owners **with a clear indication that this proposed subdivision will be their neighbor.** Specifically, the neighboring 1,300 student King Kekaulike High school leadership (at a minimum the Principal and PTA) should be not only notified, but also asked to respond to the Draft EA. Do not leave it up to the remote DOE hierarchy to respond; local knowledge is critical. Of special concern should be traffic flows, higher student foot-traffic, and the non-existent sidewalks in the immediate vicinity.

   Furthermore, the Draft EA should receive comments from the Maui Police Department, giving their assessment of the safety of the proposed foot and vehicular traffic. The subdivision will adjoin a major traffic intersection with much school traffic. Finally, the EA should receive comments from the developer of the proposed shopping center and elderly housing project immediately across the road.

3. The Kula Community Association Board met with the developer, Mr. Everett Dowling at its regular Board meeting. The KCA was very pleased to have the presentation and thanks Mr. Dowling for taking the initiative to explain the project.

Our main request was that there be strict prohibitions against "Ohana "dwellings within the subdivision. We arew very concerned with traffic safety and the possibility of too many cars and too many pedestrians exiting the subdivision. We note in the Proposed EA's letter response (to the DOE) that there will be no "Ohanas". We would like to ask that this reference be explicitly incorporated in the main text of the Final EA", i.e. "There will be NO "ohana" units permitted in the Kualono Subdivision" and that prohibition will be incorporated into the deeds of each parcel sold.

4. The maps used to describe the project location are very old and misleading. (For example, figures 5 + 6 + 7 and other maps do not even include the area's major highway, the Pukalani Bypass or the neighboring major King Kekaulike High School ! !) The maps would not be helpful to those reviewing the document or to the public trying to determine the impacts of the proposed project. This is a serious error that may preclude useful comments from those most affected by the project.

Thank you for your attention to our comments and suggestions. The KCA represents Upcountry residents who cherish the rural atmosphere of the Upcountry region. These wishes are clearly expressed in the Makawao-Pukalani-Kula Community Plan, as well as in Kula Community Association's vision and purpose statements (in the masthead on this letter). We look forward to your response and the incorporation of our comments into the Final EA.

Richard D. Mayer

Dick Mayer, Vice-President, Kula Community Association
Phone: (Maui) 878-1874
Email: dickmayer@earthlink.net

Cc: Mr. Anthony J. H. Ching, Executive Officer, Hawai'i State Land Use Commission
Ms. Gwen Ohashi, Hiraga, Munekiyo & Hiraga Inc.
Michael Foley, Director, Maui County Planning Department