# Draft Environmental Assessment

# PROPOSED MAUI MEDICAL PLAZA PROJECT AND RELATED IMPROVEMENTS AT TMK (2) 3-7-011:028 KAHULUI, MAUI, HAWAII

**Prepared for:**

**Kanaha Professional Plaza, LLC**

**May 2010**



MUNEKIYO & HIRAGA, INC.

# CONTENTS

# LIST OF FIGURES



# LIST OF TABLES

# LIST OF APPENDICES

## Executive Summary

| | |
|---|---|
| **Project Name:** | Proposed Maui Medical Plaza Project and Related Improvements |
| **Type of Document:** | Draft Environmental Assessment |
| **Legal Authority:** | Chapter 343, Hawaii Revised Statutes |
| **Agency Determination:** | Anticipated Finding of No Significant Impact (FONSI) |
| **Applicable Environmental Assessment Review "Triggers":** | Use of State and County Lands |
| **Location:** | TMK: (2) 3-7-011:028<br>151 Hana Highway<br>Kahului, Hawaii 96732<br>Maui Island |
| **Applicant:** | Kanaha Professional Plaza, LLC<br>350 Hukilike Street, Suite D<br>Kahului, Hawaii 96732<br>Contact: Robert T. McDaniel III<br>Phone: (808) 283-8811 |
| **Approving Agencies:** | County of Maui<br>Department of Planning<br>Maui Planning Commission<br>250 South High Street<br>Wailuku, Hawaii 96793<br>Contact: Jim Buika, Staff Planner<br>Phone: (808) 270-7735 |
| **Consultant:** | Munekiyo & Hiraga, Inc.<br>305 High Street, Suite 104<br>Wailuku, Hawaii 96793<br>Contact: Mark Alexander Roy, AICP, Project Manager<br>Phone: (808) 244-2015 |
| **Project Summary:** | The Applicant, Kanaha Professional Plaza, LLC, proposes the development of the Maui Medical Plaza at Kanaha in Kahului, Maui. Accessed from Hana Highway, the project site is a 2.5-acre parcel of land within the Kahului Harbor Industrial Subdivision. The Maui Medical Plaza is proposed as a 6-story (approximately 132,865-square foot) building, |

designed to accommodate physicians' offices, medical laboratories, radiology services, administrative services, and a pharmacy. Directly behind and attached to the medical building, a six-story parking structure will provide approximately 365 off-street parking stalls for patients, doctors, and other personnel. Related improvements include site grading, landscaping, and the installation of underground utilities and driveway access. The proposed project is intended to address the shortage of quality medical office space on Maui.

Inasmuch as the proposed driveway and utility improvements affect Hana Highway, a State facility, and East Kamehameha Avenue, a County facility, this Environmental Assessment (EA) is being prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS). Furthermore, the project site is situated within the County of Maui's Special Management Area (SMA), thus requiring the preparation and processing of a SMA Use Permit application. The Maui Planning Commission will serve as the approving agency for both the EA and SMA Use Permit.

# I. PROJECT OVERVIEW

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

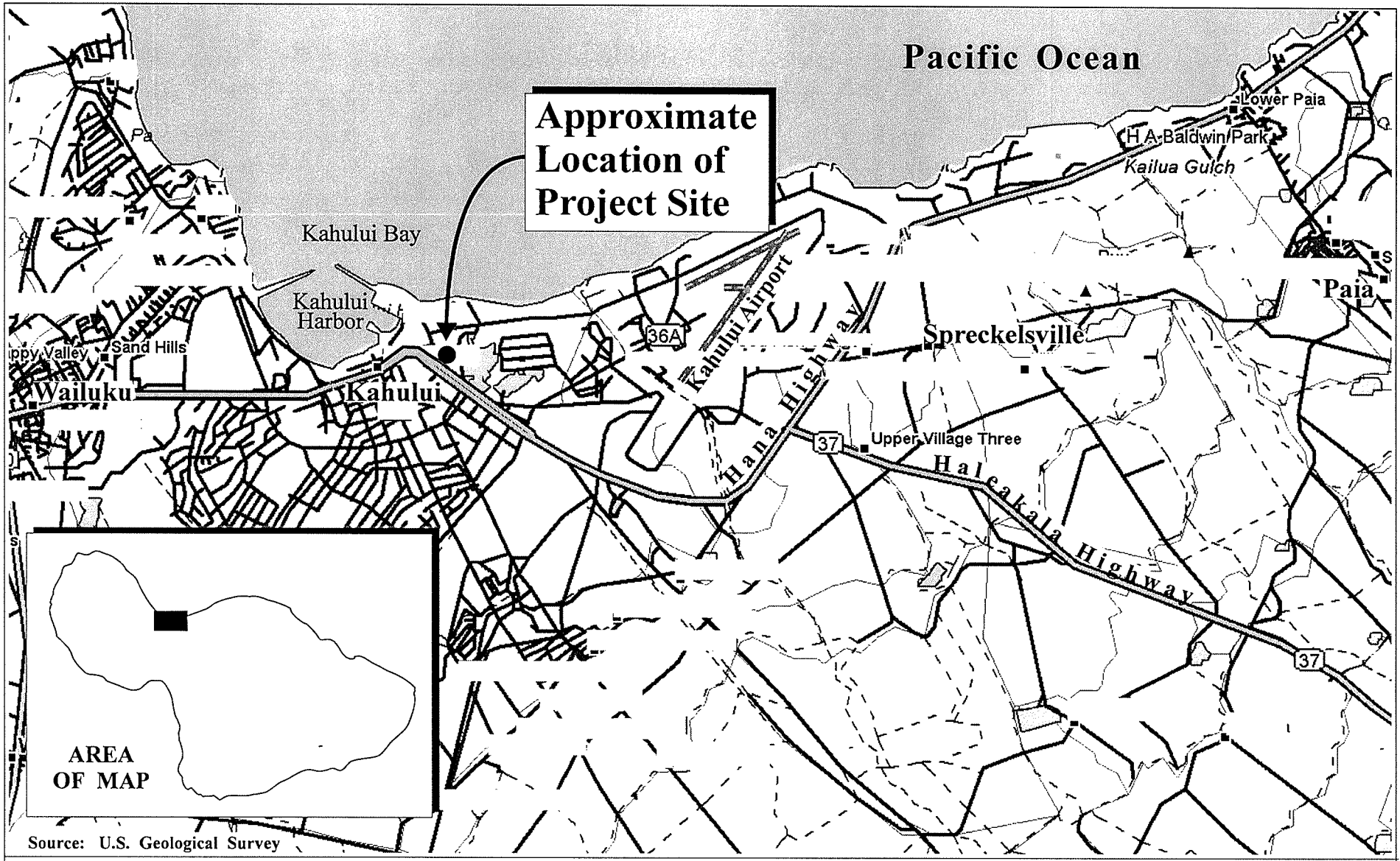
Kanaha Professional Plaza, LLC proposes the development of a professional medical plaza (referred to also as the Maui Medical Plaza at Kanaha) in Kahului, Maui, Hawaii. See **Figure 1**. The project site, identified by Tax Map Key (TMK) (2) 3-7-011:028, is part (Lot 8) of the Kahului Harbor Industrial Subdivision. See **Figure 2** and **Figure 3**. The property encompasses approximately 2.5 acres of land and is owned by Kanaha Professional Plaza, LLC. The project site is in the State Land Use "Urban" District, designated "Heavy Industrial" by the Wailuku-Kahului Community Plan, and is zoned "M-2 Heavy Industrial" by Maui County Zoning.

The project site is located makai of Hana Highway in the Kahului Harbor heavy industrial area. Access to the site is proposed to be provided from Hana Highway. Refer to **Figure 2**. Land uses in proximity to the project site include heavy and light industrial uses, retail facilities, and automobile dealerships. The property is located less than a mile from Kahului Airport, the island's major airport.

The Kanaha Pond Wildlife Sanctuary is located directly to the east of the project site. Refer to **Figure 1** and **Figure 2**. The Kanaha Pond Wildlife Sanctuary is a 143-acre wildlife preserve that serves as a breeding area for endangered Hawaiian birds. The pond was formally identified as a bird refuge in 1951 by the Hawaiian government and designated a registered natural landmark in late 1971 by the U.S. Department of the Interior. The project site is separated from the wildlife sanctuary by a privately owned drainage canal that serves to accommodate stormwater flows from other industrial areas in central Kahului.

## B. PROPOSED ACTION

The proposed Maui Medical Plaza will be a six (6) story building with a total gross floor area of approximately 132,865 square feet (including 16,804 square feet of lanai walkway), of which, 109,499 square feet will be leaseable space for medical doctors and technicians. See **Figure 4, Figure 5,** and **Figure 6.** A copy of the preliminary development and landscaping plans for the project are presented in **Appendix "A"**.




# Figure 1 Proposed Maui Medical Plaza Project

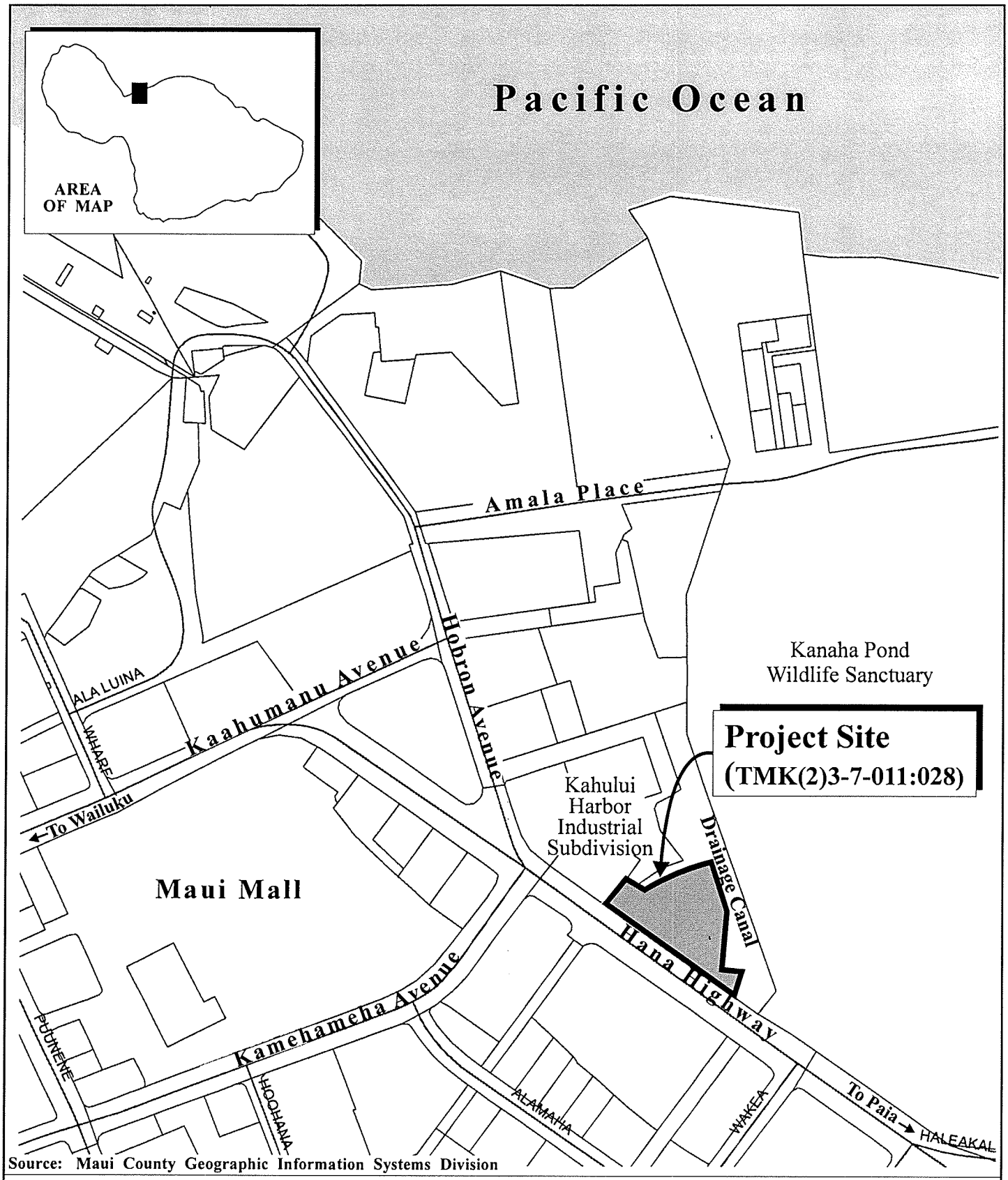
## Regional Location Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/regionalECL




Source: Maui County Geographic Information Systems Division

# Figure 2

# Proposed Maui Medical Plaza Project

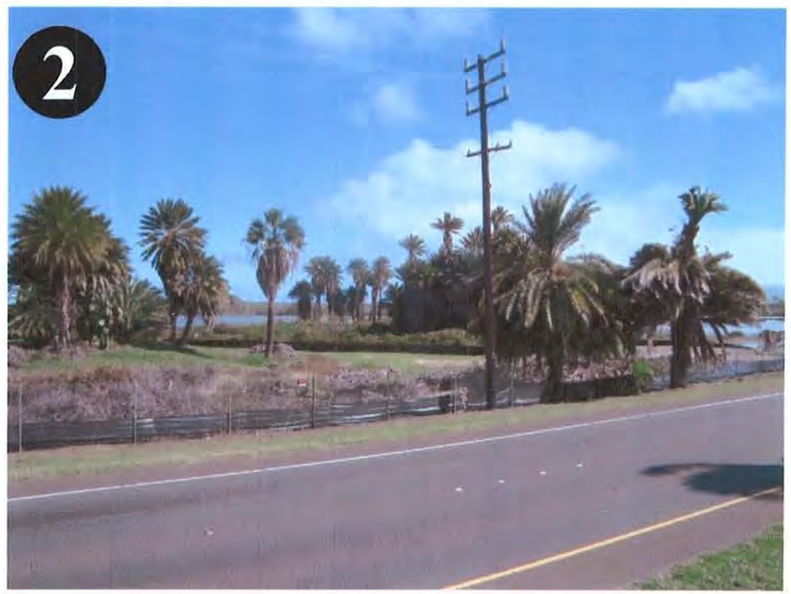
## Property Location Map

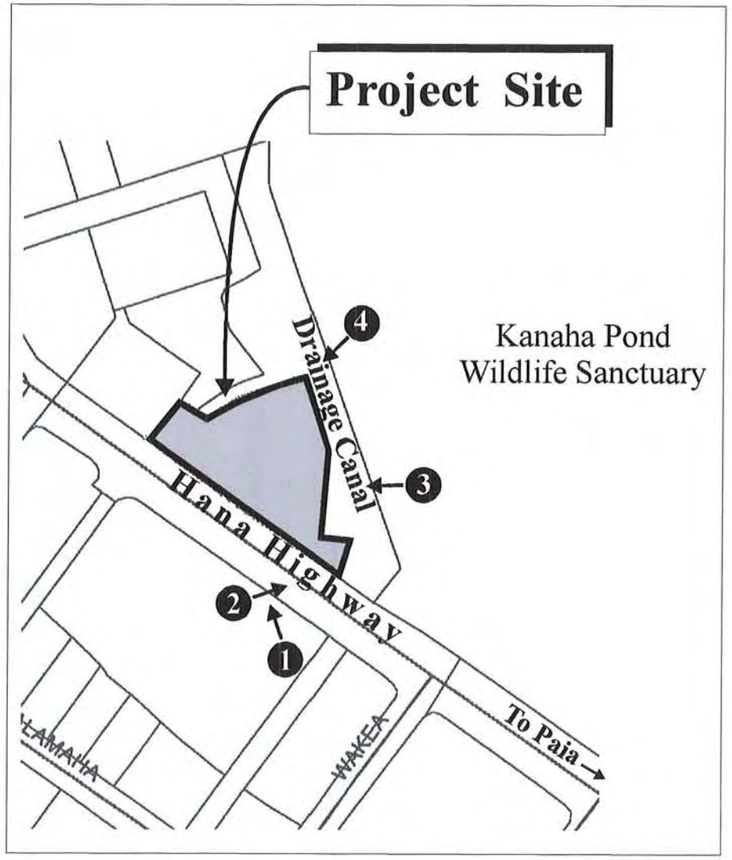
NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/propertyloca




Source: Munekiyo & Hiraga, Inc.

Figure 3

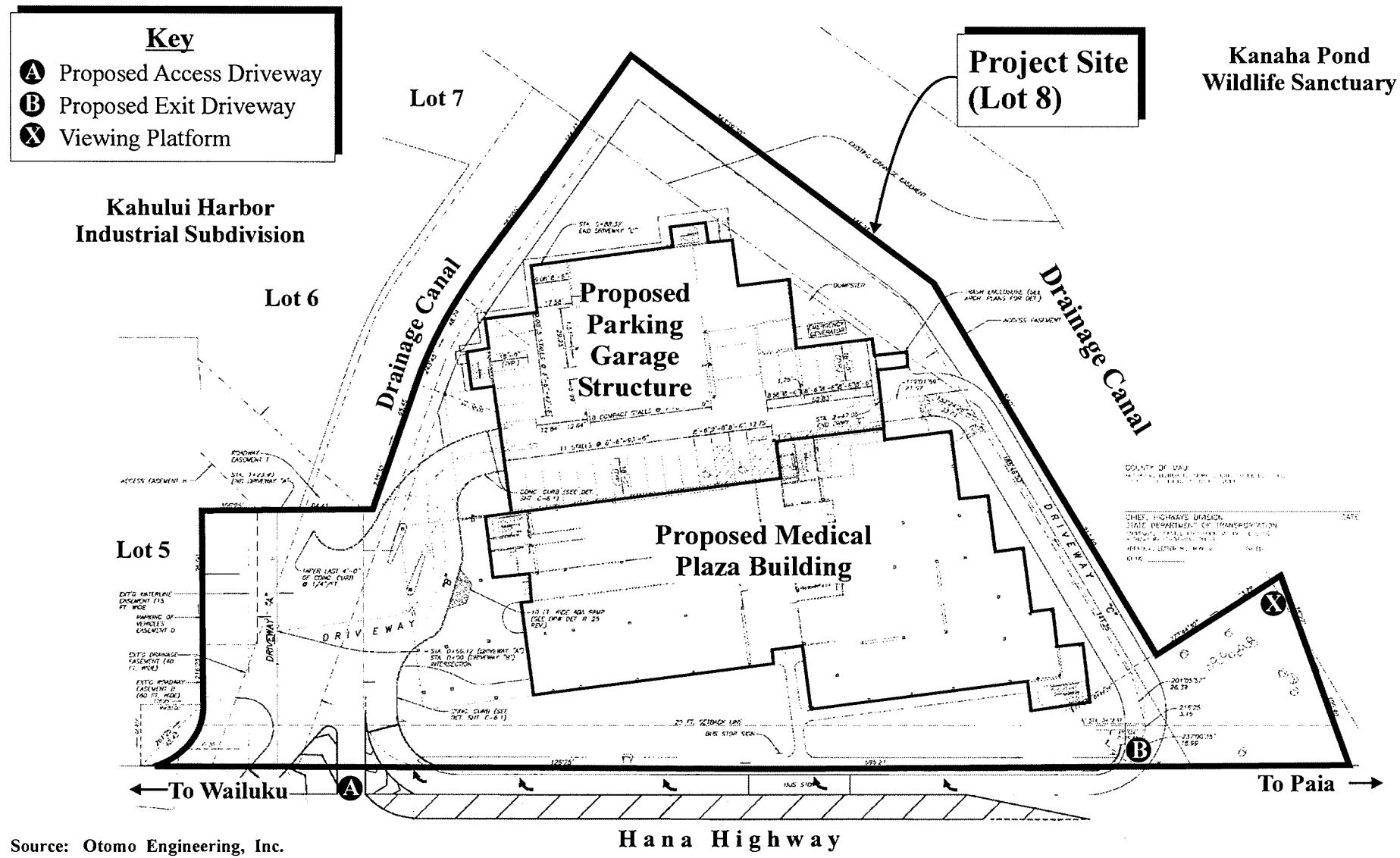
Proposed Maui Medical Plaza Project
Site Photographs

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/sitephotos




Source: Otomo Engineering, Inc.

# Figure 4 Proposed Maui Medical Plaza Project

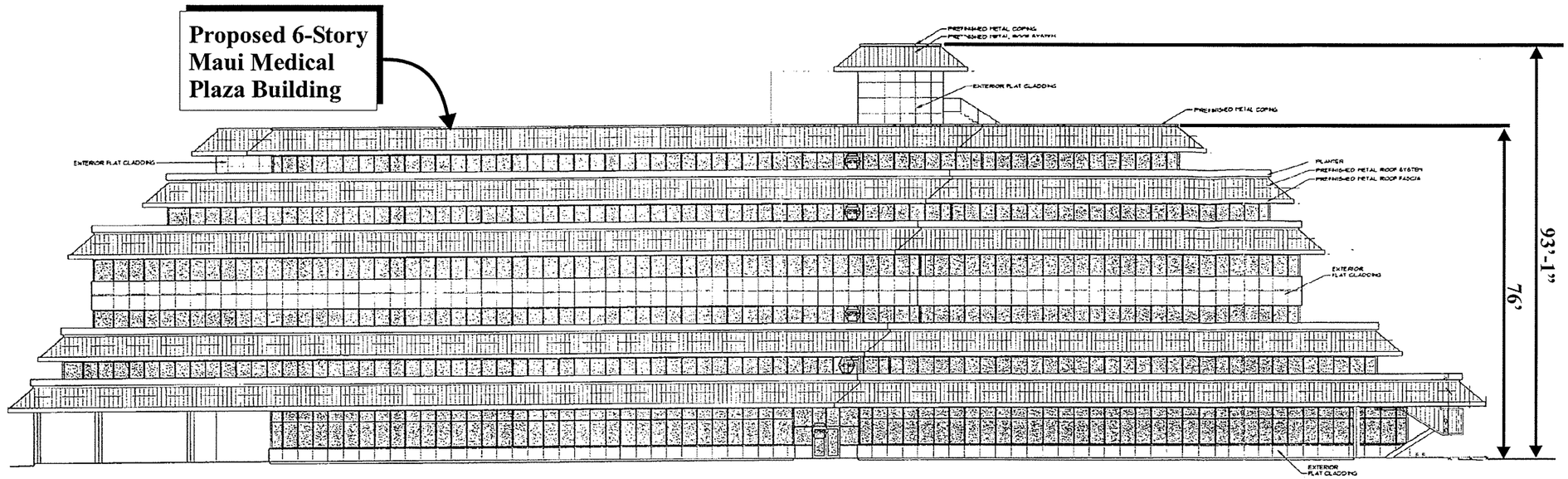
## Site Plan

NOT TO SCALE

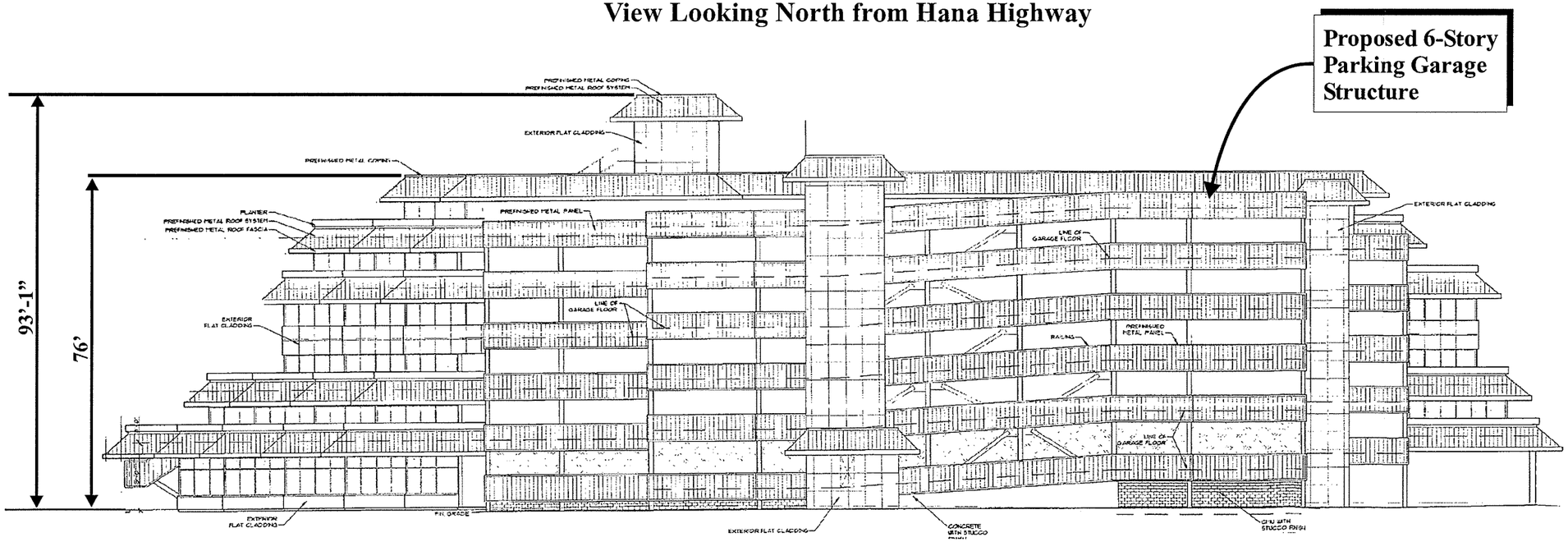
Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/siteplan




**View Looking North from Hana Highway**




**View Looking South from Drainage Canal**

**Source: Harrison G. Fagg & Associates**

Figure 5

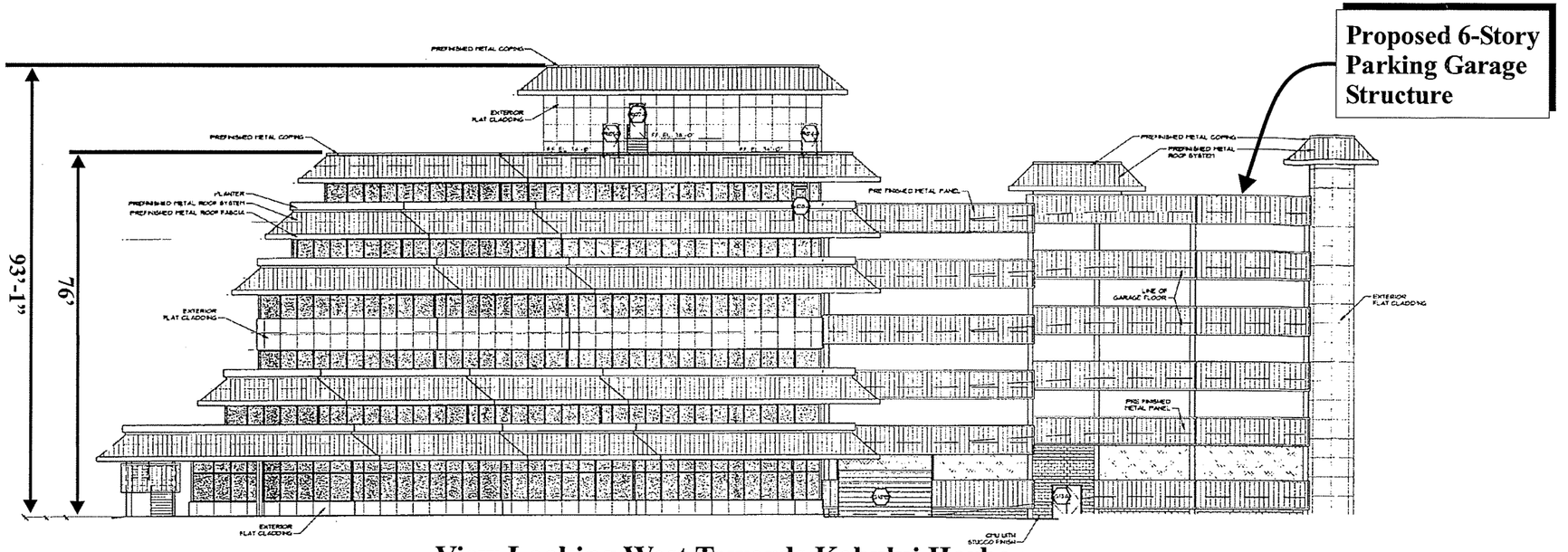
# Proposed Maui Medical Plaza Project
## North and South Elevations

**NOT TO SCALE**

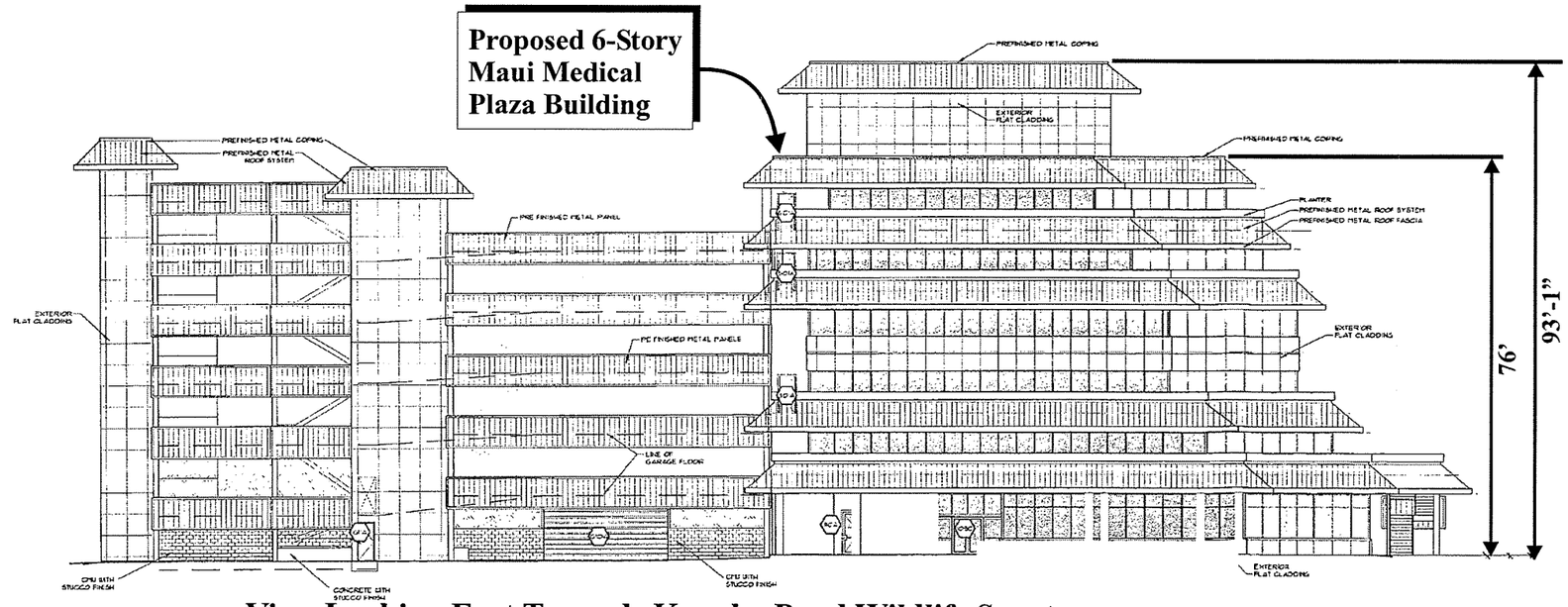
MUNEKIYO & HIRAGA, INC.

**Prepared for: Kanaha Professional Plaza, LLC**

MauiMedPlaza/Kanaha/northsouthelevations




**View Looking West Towards Kahului Harbor**




**View Looking East Towards Kanaha Pond Wildlife Sanctuary**

**Source: Harrison G. Fagg & Associates**

Figure 6

# Proposed Maui Medical Plaza Project

## East and West Elevations

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

**Prepared for: Kanaha Professional Plaza, LLC**

MauiMedPlaza/Kanaha/eastwestelevations

The proposed facility has been designed to accommodate physician offices, medical laboratories, a pharmacy, radiology services, and administrative services. A six-level attached parking structure of approximately 118,600 square feet is proposed to be constructed adjacent to the medical building, which will provide approximately 365 off-street parking stalls, six (6) motorcycle parking stalls and a bicycle rack. The parking structure will be located directly behind (to the north of) the office building. Refer to **Figure 4**. The combined gross floor area of the proposed structures is approximately 251,465 square feet. Project implementation will also involve a number of related improvements including site grading, landscaping (including a viewing platform overlooking Kanaha Pond), and the installation of underground utilities, interior circulation driveways and access connections to Honoapiilani Highway.

## C. PURPOSE AND NEED

Prior to developing plans for the proposed project, Kanaha Professional Plaza, LLC was initially contacted by medical professionals currently practicing on Maui who expressed the need for a new medical facility in Kahului that would provide the ability for existing businesses to expand their practices. Subsequently, numerous other independent physicians and medical professionals have come forward and expressed similar desires to locate within a single synergistic facility that would allow them to utilize equipment and business practices that are not feasible at their current locations. Within one (1) year of the inception of the proposed development concept, lease commitments have been received for over 64,000 sq. ft. of medical space at the proposed new facility.

The proposed Maui Medical Plaza at Kanaha is intended to address this shortage of quality medical office space and will provide a contemporary medical facility where local healthcare professionals can administer improved medical services to members of the community. The facility will be located in a central (urban infill) location in an area of concentrated development between Kahului Harbor and Kahului Airport, Maui's two (2) major ports.

## D. REGULATORY CONTEXT

### 1. Special Management Area Use Permit

The project site is situated within the limits of the County of Maui's Special Management Area (SMA). As such, a SMA Use Permit will be required from the Maui Planning Commission.

### 2. Department of Army Permit and Related Approvals

Construction of the proposed Maui Medical Plaza at Kanaha will involve the permanent filling of an approximately 0.94-acre (41,149 square feet) degraded wetland area located within the center of the project site. See **Figure 7.** This wetland has been determined to be a jurisdictional water of the United States. See **Appendix "B"**. As such, a Department of the Army (DA) permit will be required for the project and will be processed pursuant to Section 404 of the Clean Water Act. A wetland mitigation plan to compensate for the loss of this wetland area has been reviewed and accepted by the U.S. Army Corps Of Engineers (USACE). See **Appendix "B-1"** and **Appendix "B-2"**. The Maui County Planning Department has reviewed the wetland mitigation plan and has granted approval for a SMA Minor permit for the proposed mitigation action. Furthermore, the Planning Department has also issued the determination that the mitigation action is exempt from Chapter 343, Hawaii Revised Statutes (HRS) environmental review requirements, such that the preparation of an Environmental Assessment (EA) was not required. See **Appendix "B-3"**.

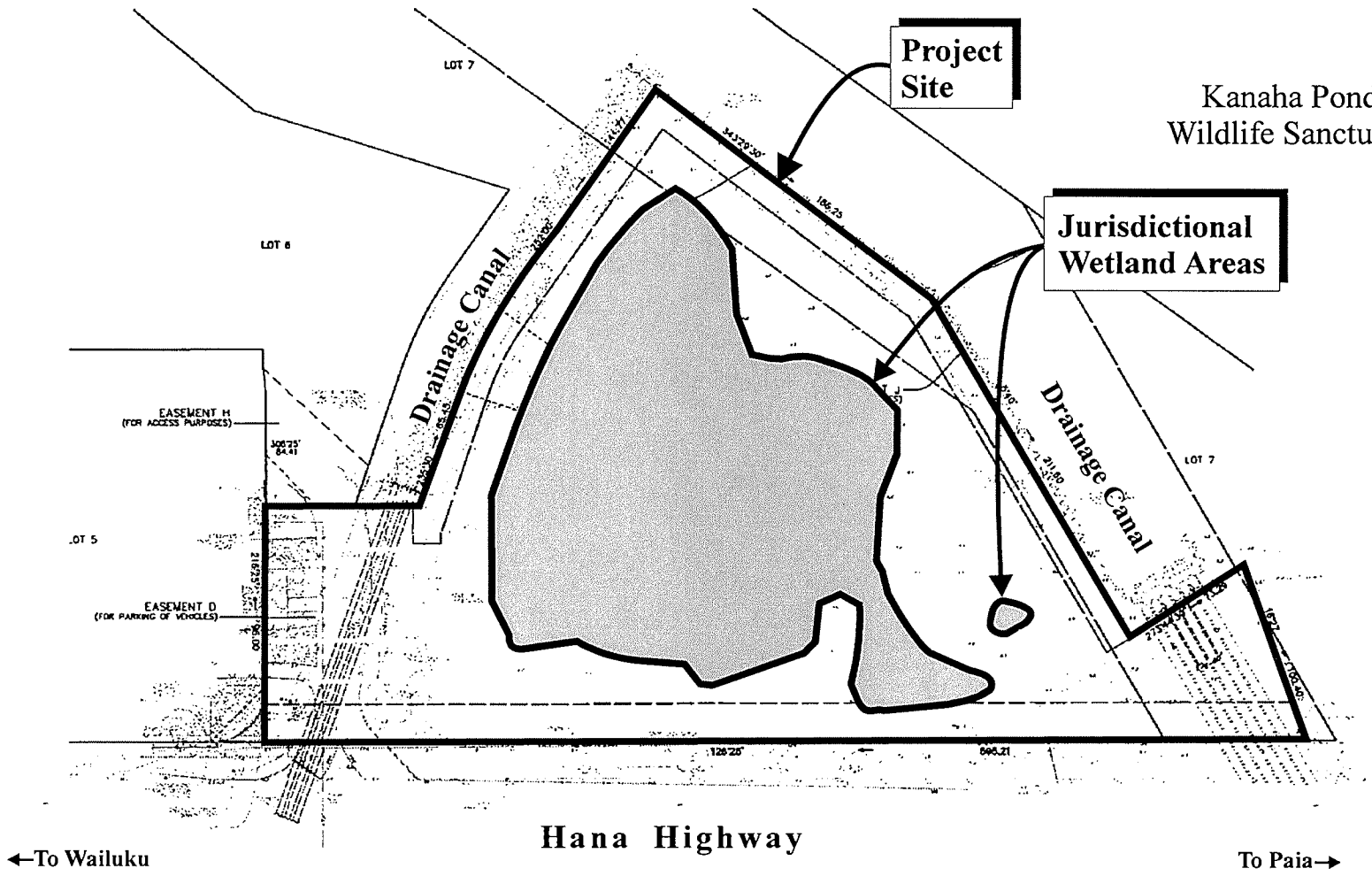
In addition to the DA permit, a Section 401 Water Quality Certification (from the State Department of Health, Clean Water Branch) and Coastal Zone Management (CZM) Program consistency determination (from the Office of Planning) is also be required for the proposed action. These applications have been submitted to the respective agencies and are currently under review. Issuance of the DA permit will occur following approval of Section 401Water Quality Certification and Coastal Zone Management Consistency applications.

### 3. Environmental Assessment

Inasmuch as the proposed action involves driveway and utility improvements on and across Hana Highway, a State of Hawaii facility, as well as project-related utility infrastructure connections along East Kamehameha Avenue, a County of Maui facility, an Environmental Assessment (EA) is being prepared in accordance with Chapter 343, Hawaii Revised Statutes (HRS). The Maui Planning Commission will serve as the approving agency for the EA.

## E. CONSTRUCTION COST AND TIMETABLE

The estimated construction cost for the Maui Medical Plaza at Kanaha is $34 million.




Source: R.T. Tanaka Engineers, Inc.

# Figure 7

# Proposed Maui Medical Plaza Project

## Wetland Delineation Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/wetlandmap

Construction of the project is anticipated to commence upon receipt of applicable permitting approvals from Federal, State, and County agencies. Infrastructure improvements and shell construction for the facility is anticipated to take 12 to 14 months following receipt of construction permits with tenant improvements to individual units to be completed thereafter.

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

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## A. SURROUNDING LAND USES

### 1. Existing Conditions

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

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

Land uses immediately surrounding the project site include retail establishments along Hana Highway to the south and east, with Kahului Harbor baseyard and shipping services to the north and west. Kanaha Pond, a State Wildlife Refuge, is located to the east of the project site. Also to the east is Triangle Square, a commercial plaza consisting of various retail, service, and restaurant establishments. Further east along Hana Highway lie a K-Mart store and a Costco Wholesale facility, as well as several buildings formerly utilized by Hawaiian Commercial & Sugar Company (HC&S) in support of its agricultural operations.

### 2. Potential Impacts and Mitigation Measures

The proposed construction of a medical plaza on the project site is not anticipated to adversely impact the surrounding land uses of Kahului Harbor, Kahului Airport, or downtown Kahului, which are predominantly commercial and industrial in nature. The healthcare services provided at the proposed medical plaza would complement the retail and business services provided at the various commercial centers located in proximity to the project site. Meanwhile, the property is separated from Kanaha Pond by an adjacent drainage canal that provides drainage function for commercial and industrial uses within Kahului. The construction and operation of the medical plaza facility is, therefore, not expected to present impacts on the use of Kanaha Pond as a State Wildlife Sanctuary.

## B. CLIMATE, TOPOGRAPHY, AND SOILS

### 1. Existing Conditions

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

Average daily temperatures at the project site (based on temperatures recorded at Kahului Airport) range from the high 60's to low 80's degrees Fahrenheit. September is historically the warmest month, while March is the coolest. Average annual rainfall in the vicinity of the project site (based on readings taken at Kahului Airport) amounts to approximately 18.82 inches (Maui County Data Book, 2009).

The project site is currently underutilized and varies in topography. Onsite elevations range from about 6 feet above mean sea level (amsl) along the western boundary to approximately 4.4 feet amsl at the northern end of the site. Approximately 0.94 acre of the parcel has been determined to qualify as a jurisdictional wetland by the U.S. Army Corps of Engineers (USACE). Refer to **Appendix "B"**. Generally, the wetland boundary lies within the 4-foot elevation contour line located approximately in the middle of the parcel. Refer to **Figure 7**. The 0.94-acre jurisdictional wetland has been severely disturbed and has been determined to have little or no functional value based on historic records of fill, United States Army Corps of Engineers (USACE) review, agency site reviews, and determinations.

Underlying the project site is the Pulehu-Ewa-Jaucas soil association. See **Figure 8**. This association occurs in basins and on alluvial fans and is characterized by well-drained and excessively drained soils that have a moderately-fine to coarse-textured subsoil or underlying material.

The proposed project involves work in the Jaucus Sand, Saline, 0 to 12 percent slopes (JcC) soil classification. See **Figure 9**. This soil occurs near the ocean in areas where the water table is near the surface and salts have accumulated. It is somewhat poorly drained in depressions but excessively drained on knolls. In depressions there is normally a layer of silty alluvial material flocculated by the high concentration of soluble salts. The water table is normally within a depth of 30 inches from the surface. This soil is generally used for pasture, wildlife habitat, and urban development. Vegetation on the salty soil in the depressions consists of salt-tolerant plants. Kiawe grows profusely on the better-drained soils on knolls.

The Detailed Land Classification-Island of Maui establishes a soil productivity rating ranging from "A" to "E", with "A" representing the highest level of productivity and "E" being very poor for agricultural production. This rating system is based on factors, including machine tillability, stoniness, texture, clay properties, drainage, rainfall, elevation, and slope. The land underlying the project site is unclassified, as it is situated within an existing urbanized area.

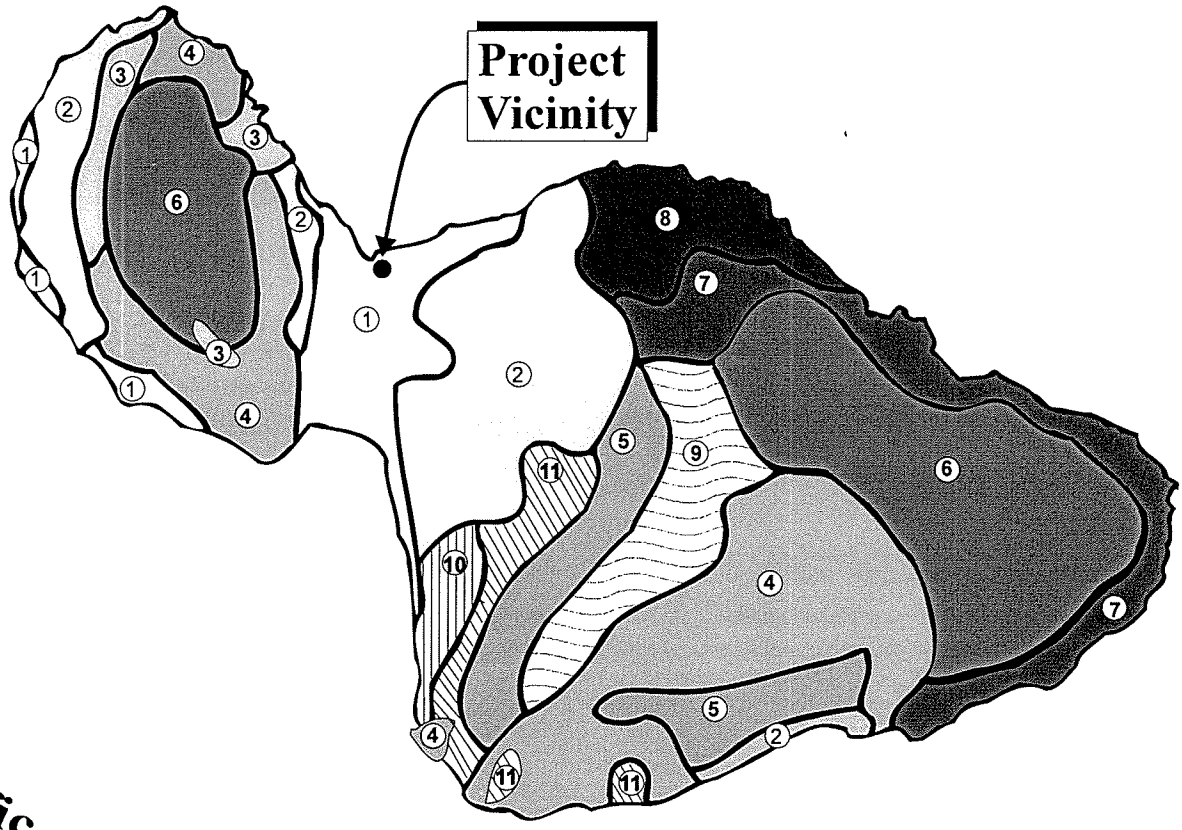
In 1977, the State Department of Agriculture established a classification system for identifying Agricultural Lands of Importance to the State of Hawaii (ALISH), primarily, but not exclusively, on the basis of soil characteristics. The three (3) classes of ALISH lands are: "prime", "unique", and "other important" agricultural lands with the remaining non-classified lands categorized as "unclassified". Due to its location within an urban area, the project site is designated "unclassified" by the ALISH system, with no agricultural uses.

## 2. Potential Impacts and Mitigation Measures

The proposed project is not anticipated to adversely affect topography and soil characteristics within the project site or at the nearby Kanaha Pond Wildlife Sanctuary. In seeking to mitigate the filling of the wetland area within the project site, the wetland mitigation plan, developed in coordination with the USACE, will rehabilitate a 5-acre portion of another Central Maui wetland (Waihee Coastal Dunes and Wetland Refuge) located approximately 10 miles west of the

# 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 8

# Proposed Maui Medical Plaza Project

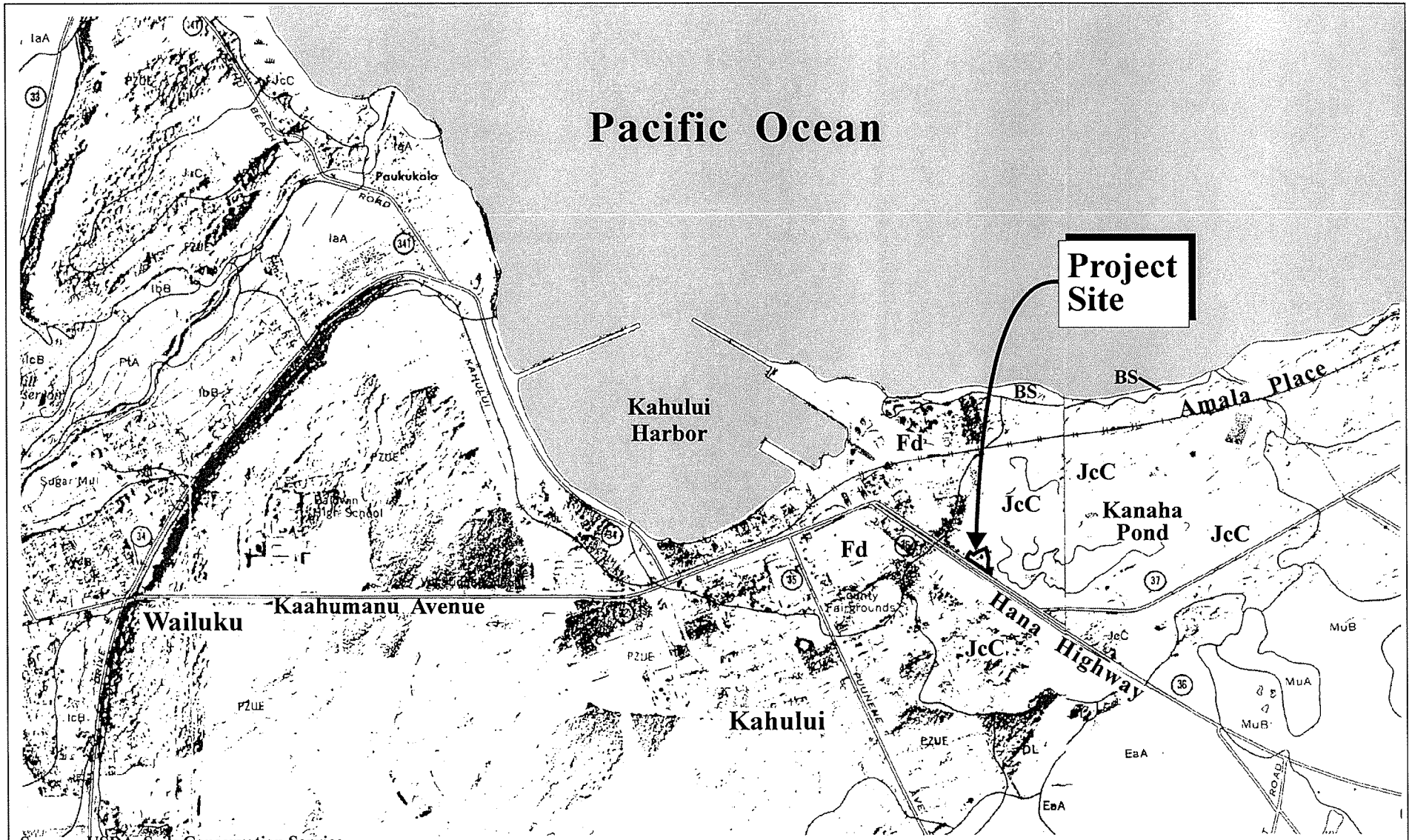
## Soil Association Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/SOILASSOC




Source: USDA, Soils Conservation Service

Figure 9

# Proposed Maui Medical Plaza Project

## Soil Classification Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/soilclass

project site. Refer to **Appendix "B-1"**. To prevent soil erosion during site work and construction, the applicant will implement a Best Management Practices (BMP) program that prescribes the following measures:

- Grade and grass onsite detention basins prior to the commencement of construction

- Strategically locate silt and dust fences along the perimeter of the project site to control the movement of dust and silt from the project site into adjacent properties

These BMPs will undergo review and approval by the State Department of Health during the National Pollutant Discharge Elimination System (NPDES) permit application process, and by the County Department of Public Works as part of the grading permit application process. A BMP Plan is provided as part of the Preliminary Engineering Report in **Appendix "H"**.

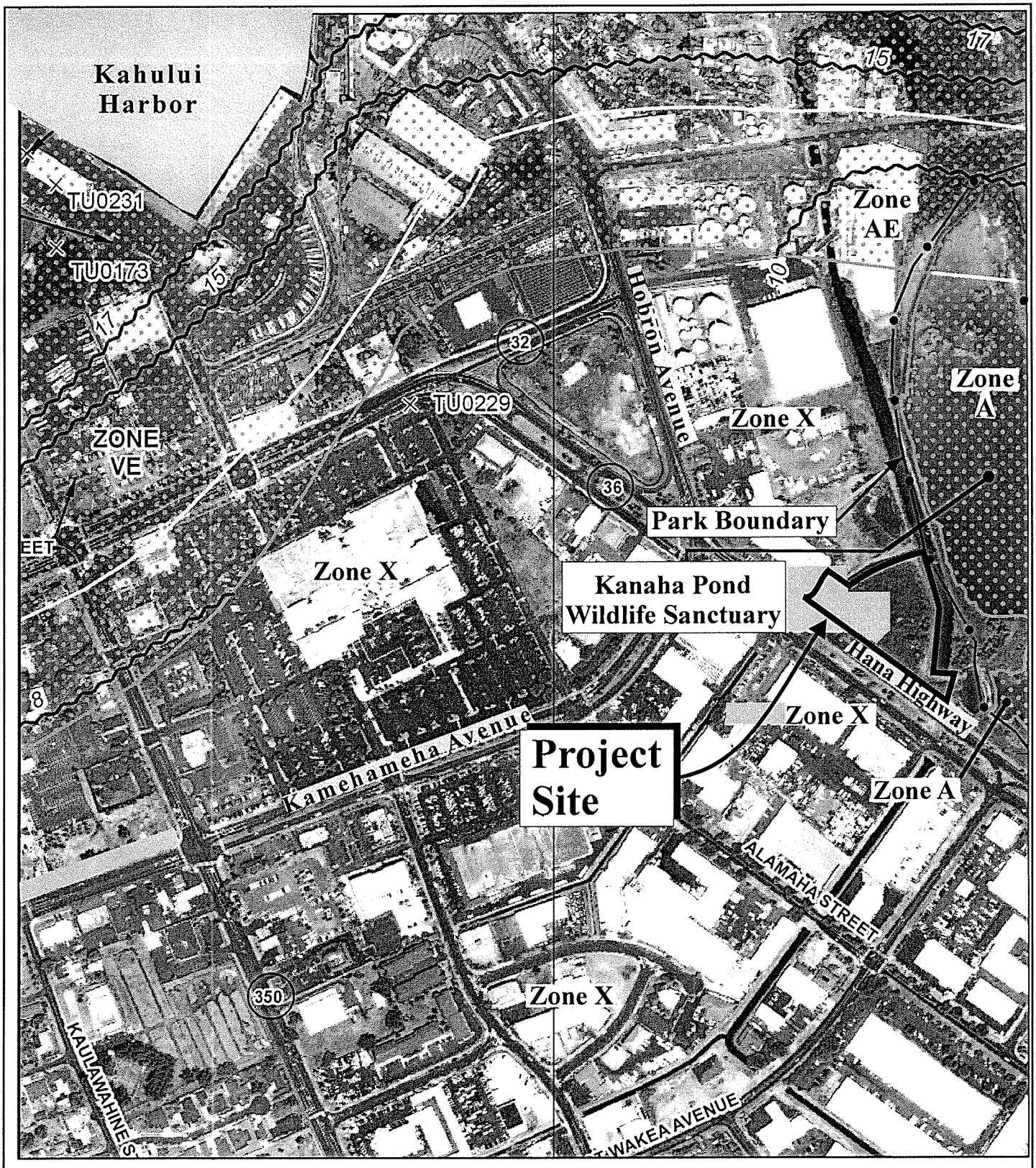
## C. FLOOD AND TSUNAMI HAZARDS

### 1. Existing Conditions

The Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) shows that the project site is situated entirely in Flood Zone X (unshaded), an area determined to be outside the 0.2 percent annual chance flood plain. See **Figure 10**. According to the State Civil Defense Tsunami Evacuation Map for the area, the project site is, however, located within a tsunami evacuation area.

### 2. Potential Impacts and Mitigation Measures

The project site is not a shoreline property and is situated over 2,200 feet from the nearest area of coastline. It is also not located within a designated Special Flood Hazard area. As such, a Special Flood Hazard Area Development Permit will not be required for project implementation. Given the FIRM designation for the project site and its location inland of the shoreline, no adverse impacts to flood or tsunami hazard parameters are anticipated with implementation of the proposed project.




Source: FIRM Community Panel No. 1500030392E

# Figure 10

# Proposed Maui Medical Plaza Project

## Flood Insurance Rate Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/FIRM

## D. FLORA AND FAUNA

### 1. Existing Conditions

A Biological Resources Survey was conducted on the project site by Robert W. Hobdy in 2006. See **Appendix "C"**. The survey identified the majority of the area as being covered in a dense shrubland of Indian Fleabane. Interspersed within it and along the disturbed margins are patches of non-native seashore salt grass and Bermuda grass. Kiawe and hybrid date palm trees were scattered across the property, as were a few wetland plants, including *kaluha* and *aeae*. In all, 32 plant species were recorded within the project site during the survey. Five (5) species, *kaluha, aeae, akulikuli, kipukai,* and *popolo*, were identified as indigenous to Hawaii and of common occurrence. The remaining 27 plant species recorded in the project site were all weeds or varieties of common landscape species.

The survey involved four (4) site visits to the property, as well as an evening survey for terrestrial fauna within the project site. The evening visit was made to find evidence of occurrence of the Hawaiian hoary bat. During the site visits to the property, no mammals were observed, nor was there any evidence of the Hawaiian hoary bat. However, terrestrial fauna known to occur in the vicinity of the project site include introduced species such as, rats and mice, feral cats, mongoose, and dogs.

Avifauna found at the project site included four (4) species of non-native birds, including the common mynah, house sparrow, spotted dove, zebra dove. During the survey, species of one (1) endemic waterbird, the *aeo* or Hawaiian stilt, was observed flying over the project site, yet these birds did not land within the property. Other birds typically found in this area but not seen during the site visits include the House finch, Japanese white-eye, cattle egret, and the Pacific golden plover. Endangered water birds that frequent the neighboring Kanaha Pond include the *alae keokeo* or Hawaiian coot, and the *koloa* or Hawaiian duck. These birds were not observed within the project site during the site visits.

There were no known rare, threatened, or endangered species of flora or fauna identified within the project site during completion of the survey.

### 2. Potential Impacts and Mitigation Measures

The project site consists of a highly altered environment dominated by introduced

plants and weeds. No Federally listed endangered or threatened plant species have been found to occur within the property. Further, there are no plants that are potential candidates for assignment of Endangered or Threatened status. No special plant habitats were found on the property, although important wetland vegetation does occur in the nearby Kanaha Pond Wildlife Sanctuary.

The Biological Resources Survey concluded that there is little of interest or concern regarding the project site in its current state, and any proposed changes in land uses are not expected to have a significant negative impact on the botanical resources in this part of Maui. The survey did not present any recommendations for flora within the project site.

With regards to fauna and avifauna, no Federally listed Endangered or Threatened species have been observed within the project site, though one (1) endangered bird species, the *aeo* or Hawaiian stilt, was observed flying overhead during one of the site visits. Other endangered waterbirds are known to breed and nest in the nearby Kanaha Pond Wildlife Sanctuary.

The property in its current state is not suitable as a waterbird habitat, and while *aeo* were observed flying over the site, no endangered waterbirds were observed on site during the survey. The property does not serve as a waterbird habitat, and this condition is anticipated to continue.

The survey report concluded that with careful design and construction, the project would not result in significant negative impacts to the adjacent wetland habitat or to bird species residing within the Kanaha Pond Wildlife Sanctuary. The survey presented the following recommendations in regards to ensuring protection of avifauna within the area:

1. Place buildings with their backs to the drainage canal so that human use is concentrated on the Kahului side.

2. Plant a selection of tall native vegetation along the drainage canal boundary to provide a visual barrier between the Kanaha Pond Wildlife Sanctuary and the project structures.

3. Ensure careful management of material and chemical pollutants in the construction and use of the proposed facilities.

These recommendations have been incorporated into the design and construction plans for the project.

Coordination with the Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife will be undertaken by Kanaha Professional Plaza, LLC to ensure that the potential for wild fowl disturbances within Kanaha is minimized to a reasonably practicable level during implementation of the project.

## E. STREAMS, WETLANDS, AND RESERVOIRS

### 1. Existing Conditions

There are no streams running through or around the project site. However, two (2) man-made drainage canals define the northeastern and northwestern borders of the project site. These canals are a part of a network of drainage canals constructed in the late 1970's by the United States Army Corps of Engineers (USACE), designed to channel groundwater out of the Kahului Industrial Area. Material dredged during construction of the drainage canals was deposited on both sides of each canal to create levees. The levee on the eastern side of the drainage channel on the northeastern border of the project site prevents the direct intermixing of the drainage waters with the waters of the adjacent Kanaha Pond.

Kanaha Pond is located to the east of the project site, beyond the drainage channel that runs along the site's northeastern border. Kanaha Pond and its twin, Mauoni Pond, the remnants of which are located to the northwest of the project site, were built in the mid-1500's by reigning Maui chief Kiha-a-Piilani. Portions of these ponds were filled, however, during the dredging of Kahului Harbor. The Kanaha Pond Wildlife Sanctuary was established in 1962, and the National Park Service designated Kanaha Pond a National Natural Landmark in 1971.

An approximately 0.94-acre portion of the 2.5-acre project site was determined by the USACE to be a wetland, based on vegetation, its shallow water table, and disturbed wetland soil types. Refer to **Figure 7**. Prior to the construction of the drainage canal network and the dredging of Kahului Harbor, this wetland on the project site and the surrounding industrial areas would likely have been connected to the greater Kanaha Pond wetland ecosystem.

There are no reservoirs located within or within the vicinity of the project site.

## 2. Potential Impacts and Proposed Mitigation Measures

Drainage improvements associated with the proposed action are designed to retain all runoff onsite, such that under normal conditions no runoff from the project site will enter the adjacent drainage canals. Thus, adverse impacts to these drainage canals are not anticipated to result from the proposed project.

While the project site was once a part of the Kanaha Pond wetland system, the development of the drainage canal network in the 1970's (and the associated deposition of fill material on surrounding areas) functionally separated the small onsite wetland from the greater Kanaha Pond ecosystem. Because the project site is no longer connected to the Kanaha Pond ecosystem, impacts to this nearby wetland are not anticipated.

With respect to the wetland within the project site, the natural groundwater drainage pattern of this wetland was drastically altered by the filling of these lands with dredged material from Kahului Harbor, and by the construction of the drainage canal network. As a result, this onsite wetland is absent of surface or ponded waters and does not connect to the adjacent drainage canal or the nearby Kanaha Pond Wildlife Sanctuary. Refer to **Appendix "B"**. Moreover, the subject property no longer presents a suitable open water habitat for native waterbirds, as dense brush covers the entire area. In effect, the proposed action is not anticipated to adversely impact the capacity of this wetland environment to serve as a habitat for native waterbirds. Notwithstanding, in the interest of compensating for the filling of this wetland, the applicant has coordinated with USACE to develop a wetland mitigation plan that provides for rehabilitation of a 5-acre portion of another wetland, the Waihee Coastal Dunes and Wetland Refuge, which is located approximately 10 miles to the west of the project site in Waihee. Refer to **Appendix "B-1"**.

# F. AIR AND NOISE CHARACTERISTICS

## 1. Existing Conditions

Air quality in the Wailuku-Kahului region is considered good as emissions from point sources, including the Maui Electric Company (MECO) Kanaha power plant and the HC&S Puunene sugar mill, as well as non-point sources such as automobile emissions, do not generate problematic concentrations of pollutants. The relatively high quality of air can also be attributed to the region's constant exposure to winds

which quickly disperse concentrations of emissions. This rapid dispersion is evident during burning of sugar cane in fields located to the southeast of the Kahului residential core.

The State of Hawaii, Department of Health maintains one (1) air quality monitoring station on the island of Maui, located in Kihei. The station monitors for particulate matter less than or equal to 10 micrometers ($PM_{10}$) and 2.5 micrometers ($PM_{2.5}$). The measurement of air quality is expressed as mass per unit volume or micrograms per cubic meter ($\mu g/m^3$). According to data collected at the station in 2006, the annual average concentration of $PM_{10}$ over a 24-hour period was 26 $\mu g/m^3$ and the average annual concentration of $PM_{2.5}$ over a 24-hour period was 5 $\mu g/m^3$ (State of Hawaii, Department of Health Clean Air Branch, 2007). These readings are well below the State standard of 150 $\mu g/m^3$ for the average concentration of $PM_{10}$ over a 24-hour period and the national standard of 65 $\mu g/m^3$ of $PM_{2.5}$ over a 24-hour period. Although levels of particulate matter increase when agricultural burning takes place, prevalent tradewinds from the north and northeast minimize nuisance air quality problems in the vicinity. In 2007, the entire State of Hawaii was in attainment for all National Ambient Air Quality Standards.

The predominant factor in noise quality at the project site is automotive traffic traveling along Hana Highway. A secondary factor affecting ambient noise levels at the site is air traffic utilizing the nearby Kahului Airport.

## 2. Potential Impacts and Mitigation Measures

Airborne particulates, including dust, may be generated during site preparation and construction activities. Dust control measures, such as regular watering and sprinkling, will be implemented as needed to minimize wind blown emissions. In the long term, vehicle-generated emissions are not anticipated to adversely impact local and regional ambient air quality conditions.

As with air quality, ambient noise conditions will be temporarily impacted by construction activities. Heavy construction equipment, such as bulldozers, front end loaders, and dump trucks and trailers, will be the dominant source of noise during site construction. Construction generated noise will be mitigated through Best Management Practices (BMPs) and construction activities will be limited to daylight work hours only. Further, coordination with the Department of Land and Natural Resources, Division of Forestry and Wildlife will be undertaken by Kanaha

Professional Plaza, LLC prior to project implementation to ensure that construction noise impacts on Kanaha Pond are minimized to reasonably practicable levels.

Given the proximity of the project site to Kahului Airport, applicable design elements will be incorporated into the construction plans to ensure that interior noise levels within the proposed Maui Medical Plaza building are maintained at acceptable levels. In the context of long-term operations, the proposed action is, therefore, not anticipated to significantly affect ambient noise levels in the immediate vicinity of the project site.

## G. ARCHAEOLOGICAL RESOURCES

### 1. Existing Conditions

Xamanek Researches LLC conducted an Archaeological Assessment Survey of the 2.5-acre project site in December 2006. See **Appendix "D"**. The project site is located in the *ahupuaa* of Wailuku, a large land unit stretching around Kahului Bay from Paukukalo in the west to Kaupakalua in the east. The project area is located adjacent to Kanaha Pond and east of Mauoni Pond (SHIP No. 50-50-05-1783), freshwater fish ponds that date back to the pre-Contact period.

Archival resources indicate that Kanaha Pond and Mauoni Pond were divided by a rock wall, commissioned initially by Maui high chief Kiha-a-Piilani who lived in the Mid-1500's. The ponds are also associated with an early 18$^{th}$ century Oahu high chief Kapiiohookalani who ordered construction at the ponds, naming them for his son Kanahaokalani and his daughter Kahamaluihiikeaoihilani. A narrow extension of the pond on its northwestern corner was said to have connected to the ocean near an old landing to the west of the present Pier 1 in Kahului Harbor. The pond area was again impacted by human activity in 1910 when Kahului Harbor was first dredged.

Additional impacts to the area occurred in the late 1970s when the USACE approved a flood control project that created a network of drainage canals that served to channel groundwater out of the developing Kahului Industrial Area and into the ocean. Some of this drainage network was constructed alongside the project site, further separating the property from Kanaha Pond. The construction of the drainage canals adjacent to the project site created levees and berms that are still present today. In addition, an access road to service the drainage canal on the northern side of the

parcel is built on a berm that consists of dredged material associated with the above-mentioned flood control project.

### 2. Potential Impact and Mitigation Measures

The Archaeological Assessment Survey encountered no evidence of archaeological features on the property. Test results suggest that portions of the project site have been impacted by previous earth moving activities associated with the construction of the existing drainage control canal and access road, and previous fill activities. Additionally, there was no evidence of cultural deposits or significant cultural material remains found during the survey. Given the lack of cultural resources, no further archaeological work is recommended for the project site. Precautionary monitoring during construction was recommended by the Archaeological Assessment Survey report.

Consultation with the State Historic Preservation Division (SHPD) regarding the review of the Archaeological Assessment Survey report yielded concurrence with the report's findings and recommendations. See **Appendix "D-1"**. As such, archaeological monitoring will be implemented as a precautionary measure during all construction related ground alterations within the project site. An archaeological monitoring plan has been prepared for the project, and this monitoring plan was approved by SHPD on September 6, 2008. See **Appendix "D-2"** and **Appendix "D-3"**.

In accordance with Section 6E-43.6, Hawaii Revised Statutes and Chapter 13-300, Hawaii Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and SHPD and OHA will be contacted to establish the appropriate protocols and level of mitigation.

## H. CULTURAL RESOURCES

A Cultural Impact Assessment (CIA) report, prepared by Jill Engledow, evaluated the probability of impacts on potential cultural resources, cultural values, and rights within the project site and its vicinity. See **Appendix "E"**.

### 1. Existing Conditions

As noted previously, the project site is located within the *ahupuaa* of Wailuku, in

the district of Wailuku. The ahupuaa of Wailuku is part of a greater area, known as Na Wai Eha, "The Four Waters", so named after the four (4) major streams that fed the taro-growing areas of Waikapu, Wailuku, Waiehu, and Waihee.

The land area that became Kahului Town in the 20th century, when the coastal flat area was filled with materials dredged in the development of Kahului Harbor, was once marsh land. Within these marshes, early chiefs developed two (2) large fishponds called Kanaha and Mauoni. Both Kanaha and Mauoni were *loko wai*, "an inland freshwater fish pond which is usually either a natural lake or swamp, which can contain ditches connected to a river, stream, or the sea and which can contain sluice gates". Freshwater streams fed the *loko wai*, where mullet were found into the early 1900s. In 1924, the Maui News reported that "Fine catches of large mullet are being made in Kanaha ponds since the pumping in of material dredged from the harbor bottom began. It appears that the seawater which goes with the filling material attracts the mullet to the vicinity of the pipe outlet and there they are gathered into nets, put into gunny sacks, and taken away."

In traditional, pre-Contact times, the Hawaiian economy was based on agricultural production (wetland and dry land) and marine operations, as well as raising livestock and collecting plants and birds. Between A.D. 600-1100, the focus of permanent settlement continued to be the fertile and well-watered windward valleys, such as those valleys of the West Maui Mountains. Amid the agricultural and habitation sites were other places of cultural significance.

The Wailuku district was a center of political power and was the site of numerous battles between chiefs of Maui, Oahu, and Hawaii during the 1700s. Near the end of the 18th century, Kahekili, paramount Chief of Maui, resided in Wailuku, and eventually defeated in battle Chief Kalaniopuu of Hawaii Island. A temporary truce followed this 1776 encounter, though this truce was broken in 1790 in the battle of Kepaniwai, when Kahekili was defeated by the chief who would become Kamehameha I.

As the sugar industry developed, Kahului evolved into an important shipping hub. From the early 1900s, Kahului grew into a network of warehouses, stores, and wheelwright and blacksmith shops in close proximity to the harbor. In fact, the dredging of Kahului Harbor supplied the fill material that enabled the expansion of Kahului Town into the former wetlands and possibly parts of the Kanaha and Mauoni

fish ponds. After the 1941 attack on Pearl Harbor, lands to the north and east of the project site were annexed by the U.S. government to support the development of the Naval Air Station Kahului, commonly referred to as NASKA. Aviation facilities within NASKA would eventually become Kahului Airport, and the remains of old military buildings and concrete ammunition storage structures still exist within Kanaha Pond.

Western contact brought changes to the Hawaiian land system with the introduction of private ownership of land. The Board of Land Commissioners was established in 1845 to uphold or reject all private land claims of both foreigners and Hawaiians. The Great Mahele of 1848 divided Hawaiian lands between the king, the chiefs, and the government, and began the process of private ownership of lands. Two (2) years later the *Kuleana* Act completed the Mahele process by authorizing the Land Commission to award fee simple titles to native tenants for their land. These *kuleana* parcels, also known as Land Commission Awards (LCA), were generally among the richest and most fertile in the islands and came from the king, government, or chiefs' landholdings. According to the CIA report, there were over 400 *kuleana* awarded in the district of Wailuku, but none were identified in the project site.

## 2. Potential Impacts and Mitigation Measures

Lands in the vicinity of the project site have undergone urban development since the early 1900s, and Kanaha Pond has been a wildlife sanctuary since the 1950s.

In an effort to assess potential impacts to cultural resources, contact was made with organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. An effort was also made to identify and consult with individuals who have an association with the project area. Refer to **Appendix "E"**. The cultural consultant sought consultation via letter request to Thelma Shimaoka, Coordinator of the Maui branch of the Office of Hawaiian Affairs; the Central Maui Hawaiian Civic Club, and the Maui County Cultural Resources Commission. Individuals contacted for possible contribution to the CIA report included the following: Wes Wong, a retired forester and Wailuku resident, Guy Haywood, former resident of the Kahului Harbor area, and Lani Medeiros, former resident of the Kanaha/airport area.

Wes Wong said his grandfather, Wong Nung, moved to Maui from Kailua, Oahu in 1908 and obtained a government lease on the entire Kanaha Pond, where he raised ducks. Water circulated naturally between the pond and the ocean, so that fish came

in, spawned, and were caught for food. Wong Nung held the lease until about 1916. Wes Wong stated that he never heard stories of native plant gathering at the site, but noted that the *makaloa*, a sedge used for making fine mats in ancient times, grows in the pond. Wes Wong stated that he didn't know of any other traditional gathering or uses being conducted within the pond today.

Another informant, Maui attorney Guy Haywood, moved to Hawaii with his parents in 1946. His father, a physician, worked at the Puunene and Paia hospitals and helped pioneer the efforts in the development of the Maui Clinic. Haywood recalled his family living in a two-story house near the present site of the Maui Beach Hotel, where about six (6) houses were occupied mostly by railroad supervisors, and an additional ten (10) or fifteen (15) houses closer to the harbor. Later, the Haywood family moved to a house at the junction of Kaahumanu and Hobron Avenues. Mr. Haywood noted that when the family lived in their first house on the beach, the children went fishing off the pier and could dive from the pier or the breakwater. By the time they moved to the second house, access to the pier at the beach had become more restricted. Mr. Haywood recalled that the children did not go into the pond or the nearby areas. Their home was situated with two (2) or three (3) houses on a triangular piece of land. The rest of the land was covered with kiawe trees. He also indicated that many of the residents didn't go to Kanaha, because it wasn't the way to the beach, and there was no public access to Kanaha Pond. He said there are still concrete military bunkers in the pond where the County was storing materials up until the time Mr. Haywood was County Corporation Counsel in the early 1990s.

Lani Medeiros, now on staff at the Maui Historical Society, lived on Palapala Drive (between Kanaha Pond and Kahului Airport) in 1972. She said that people didn't use the area around the pond at that time, noting that the area was covered with weeds, grass, and water.

The traditional and customary rights of Native Hawaiians can be broken down into access rights, gathering rights, burial rights, and religious rights. According to the findings of the CIA report, the project site has not been used for traditional cultural purposes within recent times. It was also concluded in the CIA report that Hawaiian rights relating to gathering, access, or other customary activities within the project site, will not be affected by the Maui Medical Plaza at Kanaha project. As such, the CIA report concludes that there will be no direct adverse effects upon cultural practices or beliefs. Notwithstanding, should there be unanticipated finds of cultural

or archaeological significance, including human burials, during project construction activities, appropriate protocols will be implemented in accordance with procedures established by the SHPD, OHA, and the Maui/Lanai Islands Burial Council.

# I. SCENIC AND OPEN SPACE RESOURCES

## 1. Existing Conditions

Scenic resources to the west of the project site include Iao Valley and the West Maui Mountains. Toward the east is Haleakala, while the Pacific Ocean and the Kanaha Pond Wildlife Sanctuary lie to the north. The majority of undeveloped lands in the Central Maui isthmus are utilized for sugar cane cultivation. This agricultural use creates a vast expanse of sugar cane fields that establishes and dominates the open space character of the region.

## 2. Potential Impacts and Mitigation Measures

The project site is part of an industrial-zoned subdivision located in Kahului near the Kahului Harbor and is not part of a designated scenic corridor. The medical plaza building is proposed as a six-story structure that utilizes a staggered or stepped-back design. Each story of the building will be surrounded by landscaped planters to complement the architectural elements of the structure. A view analysis of the proposed project has been prepared and is presented in **Appendix "F"**. This design concept has been refined using comments that were received during pre-consultation presentations to the Maui County Urban Design Review Board (UDRB). Further, review of the project's design features will be undertaken by the UDRB during the processing of the project's Special Management Area (SMA) Use Permit application. Implementation of a medical plaza in lieu of a more intensive industrial use is anticipated to enhance the architectural character of the harbor area in Kahului by providing a transition between the heavy industrial uses surrounding the harbor and the open space environment of the nearby Kanaha Pond Wildlife Sanctuary. Undeveloped areas within the property will also be appropriately landscaped so as enhance the scenic character of downtown Kahului. Accordingly, the proposed project is not anticipated to have an adverse impact upon the scenic and open space character of the surrounding Kahului area.

# J. SOCIO-ECONOMIC ENVIRONMENT

## 1. Existing Conditions

The population of the County of Maui has exhibited relatively strong growth over the past decade with the 1995 resident population of 117,895 persons increasing to 139,104 persons in 2005 (Maui County Data Book, 2009).

As of 2005, the population of Maui Island was estimated at 129,471 persons, with approximately 46,626 persons residing in the Wailuku-Kahului region. Forecasts for 2010 and 2020 reflect an island-wide population of 140,289 persons and 162,370 persons, respectively, and a Central Maui population of 51,312 persons and 60,877 persons, respectively (County of Maui, Department of Planning 2006).

The Kahului region is the island's center of commerce. Combined with neighboring Wailuku, the region's economic character encompasses a broad range of commercial, service, and governmental activities. The Kahului Harbor, a deep sea port, and Kahului Airport, both located in the Wailuku-Kahului region, provide vital links to off-island economies and links through which virtually all imports and exports pass. Visitor arrivals on the island of Maui were at 2,463,595 in 2007, with the vast majority traveling through Kahului Airport (Maui County Data Book, 2009). County government, major private companies, financial institutions, and medical facilities, are based in the Wailuku-Kahului region. The Wailuku-Kahului region supported an estimated 33,312 jobs as of 2000, representing approximately 44 percent of the total jobs on Maui. Economic expansion is estimated to increase to 37,240 jobs by 2010 and 40,391 jobs by 2020 (County of Maui, Department of Planning, 2006). In addition, this region contains approximately 35,000 acres of agricultural lands largely devoted to sugar cane. This vast expanse of agricultural land, managed by HC&S, is considered a key component of the local agriculture industry.

The unemployment rate (not seasonally adjusted) for Maui County was 8.9 percent in March 2010, with Maui Island's rate at 8.8 percent. These numbers represent respective increases of 0.3 percent and 0.3 percent from March 2009 (Department of Labor and Industrial Relations, 2010). The State's unemployment rate for March 2010 was 6.8 percent, up by 0.2 percent from the same time in 2009.

### 2. Potential Impacts and Mitigation Measures

Short-term benefits to the local economy will occur with the provision of construction-related employment. In the long term, the proposed medical facility will provide ongoing benefits to the growing Maui community in the form of enhanced medical services at a central, accessible location in the main urban area of the island. Moreover, the proposed medical facility will also create jobs for qualified workers in the expanding healthcare sector.

## K. PUBLIC SERVICES

### 1. Existing Conditions

#### a. Recreation

County recreational facilities are administered and maintained by the Department of Parks and Recreation. The Wailuku-Kahului region contains a network of recreational facilities comprised of mini-parks, as well as neighborhood and district parks. The region's seven (7) mini-parks are distributed throughout the area, while the region's eleven (11) neighborhood and three (3) district parks provide a wide range of facilities to meet the recreational needs of the community.

In the vicinity of the project site, a wide range of shoreline and ocean recreation activities such as boating, fishing, diving, surfing, canoeing, kayaking, picnicking, and windsurfing are available at the Kahului Harbor and nearby beach parks. County parks in the vicinity of the project site include Kanaha Beach Park, Hoaloha Park, Kahului Community Center Park, Keopuolani Park, and the War Memorial Sports Complex. Iao Valley State Park is located in the Central Maui region as well.

#### b. Police and Fire Protection

Police protection for the Wailuku-Kahului region is provided by the Maui Police Department, headquartered at the Wailuku Station approximately 1.9 miles west of the project site. The Wailuku-Kahului region is served by the department's Central Maui patrol.

Fire prevention, suppression, and protection services for the Wailuku-Kahului

region are provided by the Maui Fire Department's Kahului Station, which lies about 1.3 miles to the southeast of the subject property, and the Wailuku Station, located in Wailuku Town about 3.0 miles west of the project site.

### c. Solid Waste

Single-family residential solid waste collection service is provided by the County of Maui on a weekly basis. Residential solid waste collected by County crews are disposed at the County's Central Maui Landfill, located 4.0 miles southeast of the project site. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies.

### d. Health Care

Maui Memorial Medical Center, the only major medical facility on the island, services the Wailuku-Kahului region. Acute, general, and emergency care services are provided by this facility, which currently contains 201 beds.

In addition, a number of private medical and dental clinics and offices are spread throughout Wailuku and Kahului. Notable facilities include Kaiser Permanente and Maui Medical Group in Wailuku. However, the 2010 Hawaii Health Workforce Assessment, prepared by researchers from the University of Hawaii, John A. Burns School of Medicine, found that there are 33 percent fewer physicians in Maui County than what would be necessary to support the County's population (Wiles, 2010).

### e. Education

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

Intermediate School (Grades 6 to 8), and Baldwin High School (Grades 9 to 12).

The University of Hawaii-Maui College (UH-MC), located in Kahului, is the island's primary higher-education institution.

## 2. Potential Impacts and Mitigation Measures

The proposed action is an urban infill project and is not anticipated to have an adverse impact on regional public services. The proposed project will not extend existing service limits for emergency services, nor will it place additional burdens upon existing recreational, educational, and medical facilities. Implementation of the Maui Medical Plaza will alleviate the demand for additional medical services in the region and have a beneficial impact on health services on the island of Maui.

In regards to solid waste, potential facility uses that may require the application, storage, and disposal of materials classified as hazardous materials and biological wastes include:

- General and Specialized Medical Practice
- Laboratory Services
- Pharmacy
- Clinical Research
- Imaging
- Outpatient Surgery

It is anticipated that the majority of the space will be designed for physician offices, which will not require special environmental applications. The separate medical practices within the new facility that require tailored storage, disposal, environmental protection, and utilization will contract with a certified regulated medical waste disposal provider either individually or collectively to remove and process these items. These private companies provide specially designed receptacles for use in each room of an office. It is anticipated that each practice that warrants this service will contract with a private disposal company for pick-up and processing of their "sharps" material and bio-hazardous waste. Independent medical practices throughout Maui also state that they contract with private medical waste companies for effective management of hazardous waste disposal in compliance with Federal regulations including EPA, DOT and OSHA rules.

# L. INFRASTRUCTURE

## 1. Roadways

### a. Existing Conditions

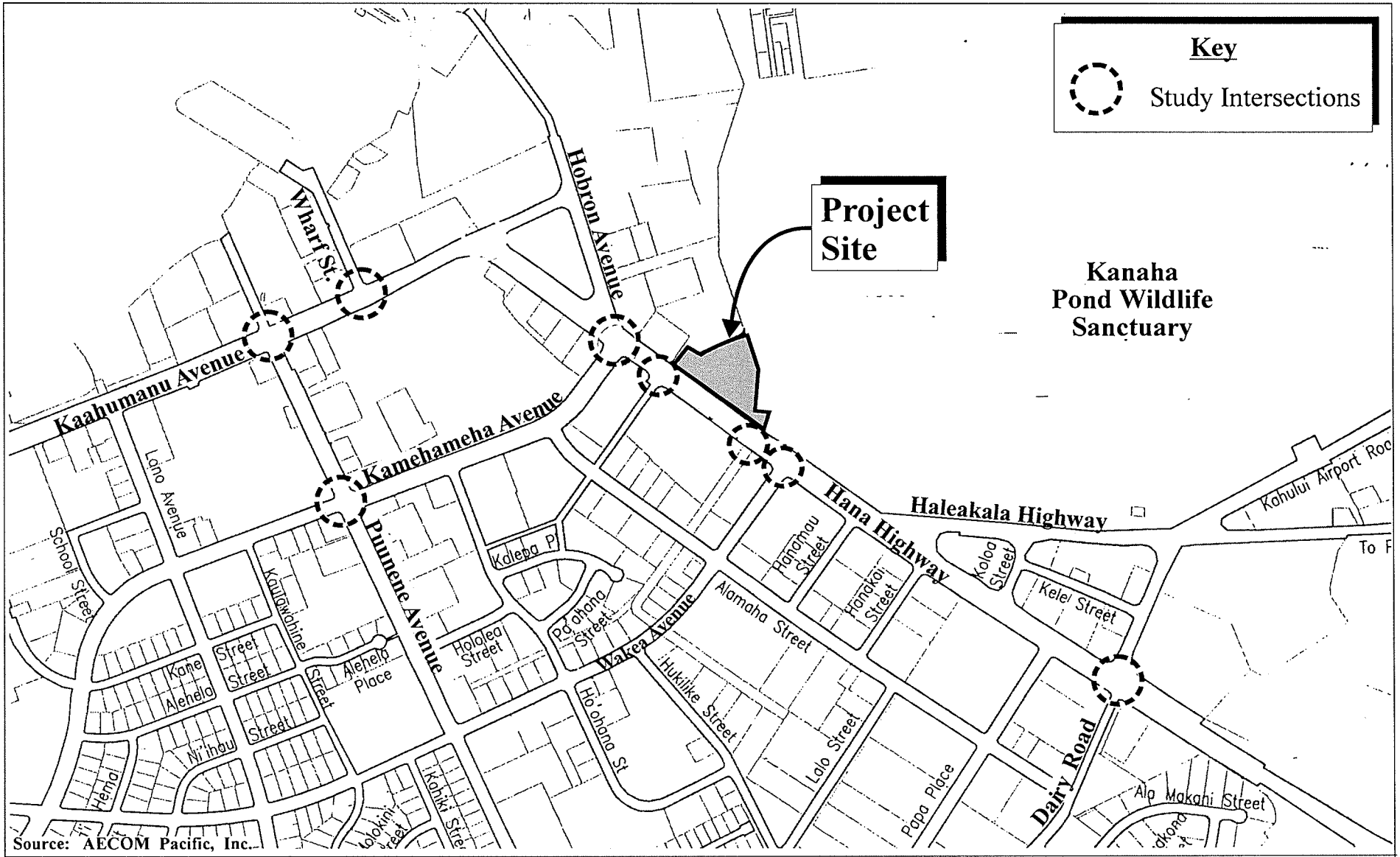
The Wailuku-Kahului region is served by a roadway network which includes arterial, collector, and local roads. See **Figure 11**. The following is a summary of the roadway network serving the project site:

**Hana Highway**

Hana Highway (Route 36) is a divided 4-lane, State-owned highway that provides access between the communities of Paia and Kahului. Most of the intersections on the highway are channelized with separate turning lanes. The posted speed limit is 45 miles per hour (mph) to the east of the project site and 30 mph directly in front the project site. The Hana Highway alignment becomes Kaahumanu Avenue at the Hobron Triangle where the roadway transitions from a northwest-to-southeast alignment to an east-to-west alignment. Hobron Avenue, a 2-lane County-owned roadway (providing access to the industrial uses surrounding the harbor and the Kanaha area beyond) connects to Hana Highway at this location.

There are two (2) intersections on Hana Highway in the vicinity of the project site that are controlled by traffic signals. The traffic signal at the Dairy Road intersection operates on an 8-phase timing plan. The traffic signal at the Hobron Avenue/Kamehameha Avenue intersection operates with a split phase for the two (2) side streets.

The Wakea Avenue intersection along Hana Highway is currently unsignalized. The Wakea Avenue eastbound approach is currently operating as separate left- and right-turn lanes, although it is not wide enough to be striped as such. Inbound left turns from Hana Highway and outbound left turns from Wakea Avenue are made through the median and are stop-sign controlled within the median.




Source: AECOM Pacific, Inc.

Figure 11

# Proposed Maui Medical Plaza Project

## Area Roadways and Intersections

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

Prepared for: Kanaha Professional Plaza, LLC

MauiMedPlaza/Kanaha/trafficstudyintersec

**Kaahumanu Avenue**

Kaahumanu Avenue (Route 32) is a divided 6-lane, State-owned highway that provides access between Kahului and Wailuku. Its intersections with Wharf Street/Maui Mall driveway and Puunene Avenue are signalized and have separate left-turn lanes on the highway approaches. The Wharf Street/Maui Mall driveway traffic signal has simultaneous signal phases for the side street approaches. The Puunene Avenue intersection traffic signal operates on a split phase.

**Puunene Avenue**

Puunene Avenue is a 4-lane, State-owned collector (Route 350) that connects Kaahumanu Avenue with Kuihelani Highway and Mokulele Highway. The intersection with Kamehameha Avenue is signalized with separate left-turn lanes on all approaches and an 8-phase traffic signal timing plan.

**Kamehameha Avenue**

Kamehameha Avenue is a 4-lane, County-owned roadway providing east-west access from Hana Highway to Puunene Avenue and to the residential community west of Puunene Avenue. Kamehameha Avenue serves the adjoining commercial uses from Hana Highway to Puunene Avenue.

**b. Potential Impacts and Mitigation Measures**

A Traffic Impact Analysis Report (TIAR) has been prepared by AECOM, Inc. for the purposes of assessing traffic impacts attributed to the proposed project and to identify appropriate measures to mitigate these impacts. See **Appendix "G"**. A review of the TIAR was completed by various divisions of the State Department of Transportation following submittal of the report in January 2010. By letter dated March 18, 2010, the Highway Division granted conditional approval for vehicle access rights for the proposed access/exit driveways for the proposed project. See **Appendix "G-1"**.

The study examined existing and future traffic conditions with and without the project utilizing accepted methodological protocols for trip generation,

traffic assignment, and level of service (LOS) analysis. LOS is a qualitative measure used to describe the conditions of traffic flow, with values ranging from free flow conditions at LOS A to congested conditions at LOS F. LOS ratings of A through D are generally considered acceptable for intersection operations with LOS ratings E and F indicating a need to provide mitigating measures. For signalized intersections, major streets are usually designed to have a higher LOS than side streets or turning lanes due to higher volumes of traffic traveling along these corridors.

Traffic turning movement counts were taken in April and May 2009 at the following intersections within the study area (refer to **Figure 11**):

- Kaahumanu Avenue and Puunene Avenue Intersection (signalized)
- Kaahumanu Avenue and Wharf Street/Maui Mall Driveway Intersection (signalized)
- Hana Highway and Hobron Avenue/Kamehameha Avenue Intersection (signalized)
- Hana Highway and Dairy Road Intersection (signalized)
- Kamehameha Avenue and Puunene Avenue Intersection (signalized)
- Hana Highway and Wakea Avenue Intersection (unsignalized)
- Proposed Project Access (unsignalized)
- Proposed Project Exit (unsignalized)

The traffic turning movement counts involved a traffic surveyor observing traffic flow and recording the movements of each vehicle at study intersections. Traffic counts at the four (4) Kaahumanu Avenue and Kamehameha Avenue intersections were taken on April 21 and 23 and May 7 and 14, 2009, while the University of Hawaii-Maui College (UH-MC) was in session. Traffic counts at the Dairy Road and Wakea Avenue intersections with Hana Highway were taken on May 20 and 21, 2009, when UH-MC was in recess. Traffic counts at these two (2) Hana Highway intersections were accordingly adjusted upwards to align with the higher counts taken at the four (4) Kamehameha Avenue and Kaahumanu intersections while UH-MC was

in session. Traffic counts for the existing access driveway to the property were obtained from a previous traffic study for the property. It was recognized during these traffic counts that the peak direction of traffic flow on Hana Highway and Kaahumanu Avenue is toward Wailuku in the morning peak hour and in the opposite direction toward Paia in the afternoon peak hour.

Traffic growth in the study area will come from regional growth in other areas whose traffic passes the project site, and from other projects in the vicinity of the proposed project. A traffic growth factor of 6.6 percent was applied to existing traffic counts to reflect the regional growth in traffic between 2009 and 2013, which is the year that the project is expected to be fully occupied. The traffic generated by known projects in the area (including Hobron Avenue Phase I/II, Maui Lani, Kane Street Commercial Mixed Use Project, Maui Business Park Phase II, Lono Avenue Student Housing and Kahului Town Center) was added to the traffic counts and the regional growth factor applied in order to produce a forecast for the year 2013 without the project.

A 3-step process of trip generation, trip distribution, and trip assignment was then used to forecast the future traffic that would be generated in 2013 by the proposed project. The trip generation step estimates the number of trips generated by the proposed project during morning and afternoon peak hours in the horizon study (2013) year. The Institute of Transportation Engineers' (ITE) Trip Generation Report (Seventh Edition, 2003) was utilized to forecast the volume of vehicle trips that would be generated by the proposed project during the morning and afternoon peak hour periods. Two (2) alternative sets of trip generation rates for the Medical Office Building (ITE Land Use 720) were utilized for the proposed project. See **Table 1**.

**Table 1**. Trip Generation Rates for Medical Office Building

| ITE Land Use Category | Trip Generation Rate (AM Peak Hour) | Trip Generation Rate (PM Peak Hour) |
|---|---|---|
| Medical Office Building (Floor Area) | 2.48 Trips Per 1,000 s.f. | 3.27 trips per 1,000 s.f. |
| Medical Office Building (Number of Employees) | 0.53 trip per employee | 1.06 trips per employee |
| Source: Institute of Transportation Engineers | | |

Using the trip generation rates based on floor area, the proposed medical office building is expected to generate 326 and 489 trips in the morning and afternoon peak hours, respectively. When using trip generation rates based on the number of projected employees, the facility is forecasted to generate 106 and 212 trips in the morning and afternoon peak hour trips, respectively. As such, the trip generation rates based on employees result in one-half the number of trips in the morning peak hour compared to the number of trips in the afternoon peak hour. Both trip generation rates were used in the TIAR in order to present reasonable low and high estimates for trip generation for the proposed project. These estimates are referred to throughout this section as the low and high trip generation scenarios.

The project generated trips were then distributed by direction of travel to and from the project site, and assigned to the various traffic movements at the intersections within the study area. The project generated traffic assignments volumes were then added to the background (without project) traffic forecasts to obtain 2013 with-project traffic forecasts for the low and high trip generation scenarios.

A LOS analysis, based on the following five (5) scenarios, was completed as a final element of the analysis using the above-noted information to assess operational conditions at signalized and unsignalized intersections within the study area:

- 2009 Existing Conditions
- 2013 Conditions (Without Project)
- 2013 Conditions (With Project – Low Trip Generation Scenario)
- 2013 Conditions (With Project – High Trip Generation Scenario)
- 2013 Conditions (With Project – High Trip Generation Scenario, assuming signalization of Wakea Avenue intersection)

The results of the LOS analysis are presented below in **Table 2** (signalized intersections) and **Table 3** (unsignalized intersections) below:

**Table 2.** Signalized Intersection Level of Service Analysis

| Intersection | 2009 Existing | | 2013 Ambient | | 2013 Total Low | | 2013 Total High | | 2013 Total High w/Wakea Signal | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) |
| Kaahumanu Ave & Puunene Ave | C | D | C | E | C | E | C | E | C | D |
| Kaahumanu Ave & Wharf St/Maui Mall Driveway | A | B | A | B | A | B | A | A | B | B |
| Hana Hwy & Hobron/ Kamehameha Avenue | C | F | D | F | D | F | C | F | C | F |
| Hana Hwy & Dairy Rd | D | E | D | E | D | F | E | F | E | F |
| Puunene Ave & Kamehameha Ave | D | D | D | D | D | E | D | D | D | D |
| Hana Hwy & Wakea Ave | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | C | C |

**Table 3.** Unsignalized Intersection Level of Service Analysis

| Intersection | 2009 Existing | | 2013 Ambient | | 2013 Total Low | | 2013 Total Low w/Wakea Signal | | 2013 Total High | | 2013 Total High w/Wakea Signal | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) | LOS (AM Peak Hour) | LOS (PM Peak Hour) |
| **PROJECT ACCESS** | | | | | | | | | | | | |
| Mauka Rdwy, EB LT | F | F | F | F | F | F | B | F | F | F | C | F |
| Proj. DW, WB RT | C | B | C | C | C* | C* | C* | C* | C* | C* | C* | D* |
| Hwy Median, SB LT | C | B | C | C | D | C | N/A | N/A | D | C | N/A | N/A |
| **PROJECT EXIT** | | | | | | | | | | | | |
| Proj. DW, WB RT | N/A | N/A | N/A | N/A | C* | D* | C* | D* | D* | F* | D* | F* |
| **WAKEA AVE** | | | | | | | | | | | | |
| Wakea Ave EB RT | B | F | B | F | B | F | N/A | N/A | B | F | N/A | N/A |
| Wakea Ave EB LT | F | F | F | F | F | F | N/A | N/A | F | F | N/A | N/A |
| Hana Hwy NB LT | C | D | C | F | C | F | N/A | N/A | C | F | N/A | N/A |

**Legend:**

EB - Eastbound
WB - Westbound
SB - Southbound
DW - Driveway
RT - Right Turn
LT - Left Turn
NB - Northbound

* Denotes traffic operations statistics generated by the Highway Capacity Analysis Program (HCAP). HCAP does not accurately calculate the level of service for four (4) lanes of traffic. Use of this procedure is expected to calculate a worse than actual LOS for these turning movements. Actual operations at these driveways are, therefore, expected to be better than shown.

A summary of the LOS findings at each signalized and unsignalized intersection is presented in the following section.

**Kaahumanu Avenue/Puunene Avenue Intersection (Signalized)**

The Kaahumanu Avenue/Puunene Avenue intersection is currently operating at LOS C in the morning peak hour and is forecast to remain the same for the future scenarios. The intersection is currently operating at LOS D in the afternoon peak hour and is forecast to change to LOS E for the future conditions. This change in level of service would occur with the increase in ambient traffic and would remain at the same LOS E with the project generated traffic until Wakea Avenue traffic signalization is completed. Traffic operations at this intersection would not be adversely affected by traffic generated from the proposed project.

**Kaahumanu Avenue and Wharf Street/Maui Mall Intersection (Signalized)**

The Kaahumanu Avenue and Wharf Street/Maui Mall driveway intersection is currently operating at LOS A in the morning peak hour and is forecasted to remain the same for the future scenarios until Wakea Avenue traffic signalization is completed. The intersection is currently operating at LOS B in the afternoon peak and is forecast to remain the same or better for all forecast conditions. Traffic operations at this intersection would not be adversely affected by traffic generated from the proposed project.

**Hana Highway and Hobron Avenue/Kamehameha Avenue Intersection (Signalized)**

The Hana Highway and Hobron Avenue/Kamehameha Avenue intersection is the closest signalized intersection to the proposed project. All traffic exiting the project would have to pass through this intersection. The intersection is currently operating at LOS C in the morning peak hour and is forecast to change to LOS D or remain at LOS C for the future scenarios. Hobron Avenue is the only approach operating at an unacceptable LOS E in the morning peak hour. This approach is forecast to change from LOS E to

F with the increase in ambient traffic, with slight increases in delay due to traffic from the proposed project.

The Hana Highway and Hobron Avenue/Kamehameha Avenue intersection is currently operating at LOS F in the afternoon peak hour and is forecast to experience longer delays as increases in ambient traffic and project generated traffic are added. The Hana Highway southbound, Hobron Avenue and Kamehameha Avenue approaches are currently operating at LOS F. The Kamehameha Avenue approach is operating at LOS F in part due to the right-turn lane experiencing long delays from high traffic volumes. Delay on the Kamehameha Avenue right-turn lane would increase with the ambient traffic and increase with the additional project generated traffic. Delay on the eastbound approach of Hana Highway would increase with the additional traffic from the ambient traffic and the proposed project. Delay on the Hobron Avenue approach would increase with the ambient traffic but remain unchanged with the additional project generated traffic. The widening of Hana Highway proposed by the State Department of Transportation (SDOT) would provide mitigation to existing traffic problems at the Hobron Avenue/Kamehameha Avenue intersection by increasing the capacity of Hana Highway roadway corridor.

**Hana Highway/Dairy Road Intersection (Signalized)**

The Hana Highway/Dairy Road intersection is currently operating at LOS D in the morning peak hour and is forecast to change to LOS E for the future scenarios with the high scenario trip generation rates. The intersection is currently operating at LOS E in the afternoon peak hour and is forecast to remain the same for the ambient forecast condition but change to LOS F for the future with project scenarios. Two (2) regional roadway improvement projects currently being planned by the SDOT would mitigate the existing and forecast traffic problems at this intersection. The proposed widening of Hana Highway to six (6) lanes between Dairy Road and Kaahumanu Avenue would increase capacity on the main highway in the northwest direction. The proposed Kahului Airport Access Road would also provide regional mitigation through the diversion of traffic from Dairy Road.

**Puunene Avenue/Kamehameha Avenue Intersection (Signalized)**

The Puunene Avenue/Kamehameha Avenue intersection is currently operating at LOS D in the morning peak hour and is forecast to remain the same for the future scenarios. The intersection is currently operating at LOS D in the afternoon peak hour and is forecast to remain the same for future scenarios with one (1) exception. This result indicates that the traffic operations at this intersection would not be affected by traffic generated by the proposed project.

**Hana Highway/Wakea Avenue Intersection (Unsignalized)**

The Wakea Avenue eastbound approach is currently operating as separate left- and right-turn lanes although it is not wide enough to be striped. The right-turn movement is operating at LOS B in the morning peak hour and is forecast to remain at the same level for the future scenarios. This movement is operating at LOS F in the afternoon peak hour. The left-turn movement is already operating at LOS F in both morning and afternoon peak hour periods. The left-turn movement from the highway is currently operating at LOS C in the morning peak hour and is forecast to remain at the same level for the future scenarios. This movement is currently operating at LOS D in the afternoon peak hour and is forecast to worsen to LOS F in the future. The implementation of the planned signalization program by SDOT would provide mitigation to the current and forecast operational conditions at this intersection. This intersection would operate at LOS C in both morning and afternoon peak hour periods with both traffic signal control and the proposed project in place. Under this scenario, the traffic operations at this intersection would not be adversely affected by traffic generated by the proposed project.

**Existing Project Access Driveway (Unsignalized)**

The existing access driveway (Kanaha Place) currently serves a commercial complex on the northwest side of the project site. The new roadway configuration at this location would have the same traffic movements currently permitted on Kanaha Place:

- Inbound right turns from Hana Highway
- Inbound left turns from the median break of Hana Highway
- Outbound right turns onto Hana Highway

New traffic islands would delineate these movements at the Hana Highway intersection under a with-project scenario. This driveway would provide access to the existing commercial complex and the new parking garage for the Maui Medical Plaza. All of the traffic entering the project site would have to use this access driveway. Lane striping would prohibit vehicles leaving this driveway from entering the left-turn lane on Hana Highway into Kamehameha Avenue due to the proximity of these two (2) roadway elements.

The outbound right-turn movement at the existing project access driveway is currently operating at LOS C and B in the morning and afternoon peak hours, respectively, indicating acceptable traffic operations. The movement is forecast to be at an acceptable LOS C under with-project conditions, except with the high trip generation scenario (with Wakea Avenue traffic signalization), when LOS D is forecast during the afternoon peak hour. The access roadway is expected to have acceptable traffic operations following project implementation.

The left turn from the Hana Highway median break is currently operating at LOS C and B in the morning and afternoon peak hours, respectively, and is forecast to change to LOS D and C under with-project scenarios. While LOS B and C imply acceptable conditions, observations of highway traffic operations elsewhere indicate that left turns from the highway are difficult to make for LOS B and C conditions and would probably require mitigation. The signalization of Wakea Avenue being proposed by SDOT would mitigate this situation by allowing this median break to be closed.

**Proposed Exit Driveway (Unsignalized)**

The development of a right-turn out only exit driveway is proposed in conjunction with the project and would be located southeast of the existing

access driveway. This would create a clockwise traffic pattern within the project site. The project exit driveway is expected to handle up to 70 percent of the traffic leaving the proposed project, based on the site design. The exit driveway is forecast to operate at LOS C in the morning peak hour with the low trip generation rates and LOS D with the high trip generation rates. The driveway is forecast to operate at LOS D in the afternoon peak hour under the low trip generation scenario and LOS F with the high trip generation scenario. These results indicate the possible need for mitigation at this intersection under the high trip generation rate scenario. A plan to reduce the volume of project-generated traffic at this driveway so that trips produced by the proposed project are closer to the low trip generation scenario is a recommended mitigation measure.

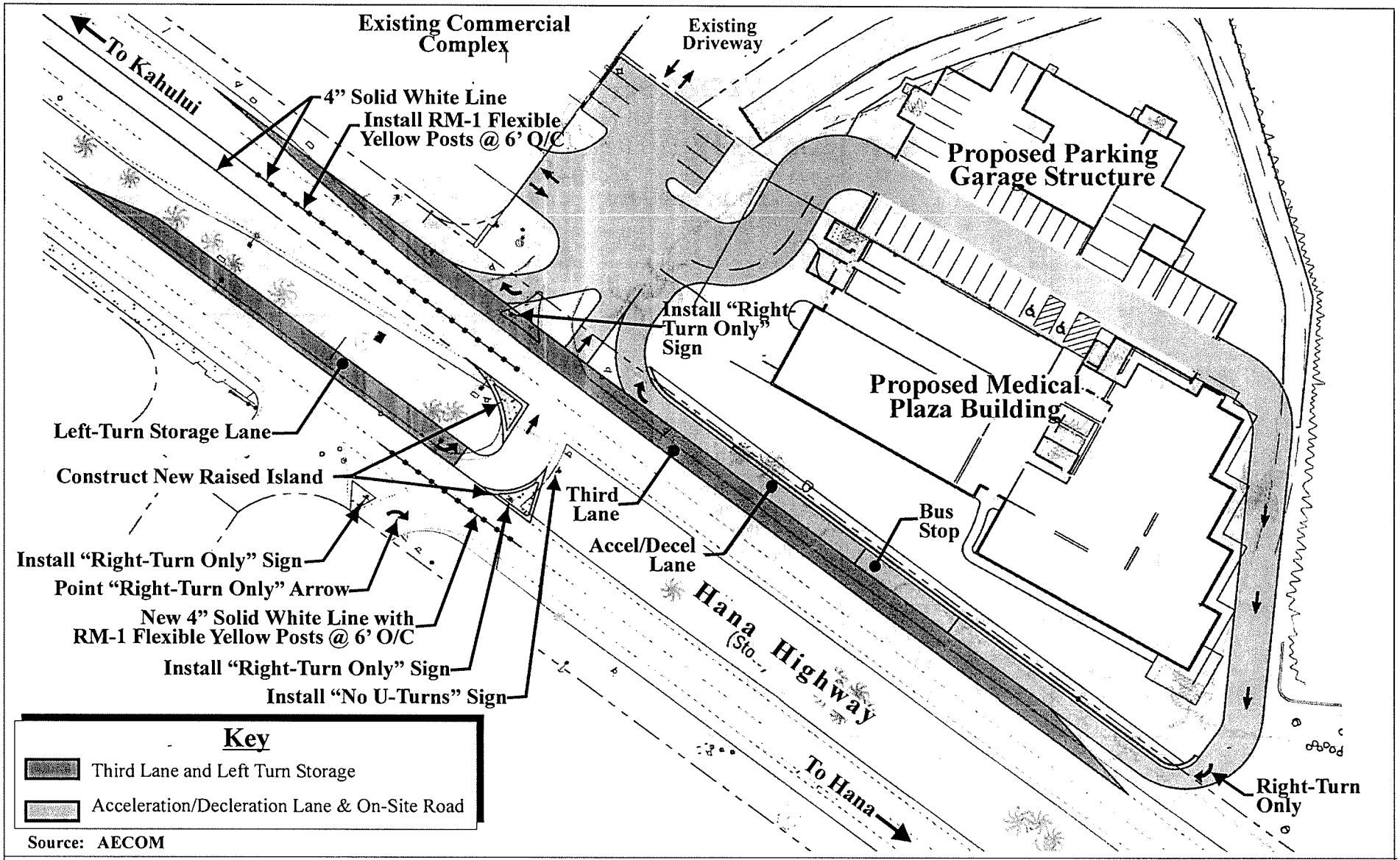
The existing U-turn on Kaahumanu Avenue would operate at LOS B in the morning peak hour and at LOS C or D in the afternoon peak hour, indicating acceptable conditions.

The TIAR concluded that the traffic impacts associated with the proposed project can be minimized with implementation of the following mitigation measures as summarized on **Figure 12**:

- Widen the northwest bound approach of Hana Highway fronting the project site to include three (3) through lanes. The third lane would be designed to accommodate the future widening of Hana Highway from Kaahumanu Avenue to Dairy Road. Refer to **Figure 12**.

- Install an acceleration/deceleration lane fronting the entire project site. This lane would provide the length necessary for traffic exiting the project to merge into the through lanes of the Hana Highway. Refer to **Figure 12**.

- Construct a bus stop facility on the acceleration/deceleration lane fronting the property to encourage use of mass transit for access to the proposed project. Refer to **Figure 12**.




Source: AECOM

# Figure 12 Proposed Maui Medical Plaza Project

## Proposed Roadway Improvements

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/RoadwayNetwork

- As noted previously, install traffic islands, lane striping and yellow posts at the project access driveway to prohibit vehicles leaving this driveway from entering the left-turn lane on Hana Highway into Kamehameha Avenue due to the proximity of these two (2) roadway elements. Refer to **Figure 12**.

- Install a left-turn lane in the median of Hana Highway near the existing project access driveway to accommodate left-turn movements from the southeast bound stretch of Hana Highway into the project site. U-turns would no longer be permitted at this median opening. Refer to **Figure 12**.

- Implement a Traffic Management Plan to minimize the volume of trips generated to and from the proposed project. Traffic Demand Measures (TDM) that could be considered under such a plan could include encouragement of car-pooling programs among employees, provision of preferred parking and/or bus passes, installation of bicycle storage facilities, and work schedule management.

- Coordinate with SDOT to identify public/private partnership opportunities aimed at facilitating the timely implementation of planned regional roadway improvements in the area, including:

  - Widening of Hana Highway from Kaahumanu Avenue to the new Airport Access Road.

  - Construction of the new Kahului Airport Access Road.

  - Installation of traffic signals at the Hana Highway/Wakea Avenue intersection.

- Add a second right-turn lane to the Kamehameha Avenue approach to Hana Highway to increase the roadway traffic capacity at this intersection. A preliminary layout of this double right-turn lane is presented in **Figure 8** of the TIAR. Refer to **Appendix "G"**. Alternatively, the shared left-turn lane at this intersection could be made into a separate left-turn lane so that the current split-phase signal timing could be replaced with a more efficient 8-phase traffic signal timing plan.

- Add a left-turn storage lane to the existing U-turn median opening on Hana Highway on the Wailuku side of the Hobron Avenue/Kamehameha Highway intersection. A conceptual plan showing the proposed U-turn storage lane is presented in **Figure 9** of the TIAR. Refer to **Appendix "G"**.

According to the TIAR, once implemented, these improvements would enhance the operational efficiency of the regional roadway system in the downtown Kahului area, thereby mitigating both existing and ambient (with project) conditions along Hana Highway in the vicinity of the proposed project. Refer to **Appendix "G"**.

## 2. Water

### a. Existing Conditions

A Preliminary Engineering and Drainage Report for the proposed project was prepared by Otomo Engineering, Inc. See **Appendix "H"**.

Domestic water and fire flow in the vicinity of the project site are provided by the County of Maui, Department of Water Supply water system. There are existing 8-inch and 16-inch waterlines which run along the southbound lanes of Hana Highway.

Domestic water and fire flow for the Kahului area are serviced from the 3.0 million gallon Mokuhau tank and wells in Happy Valley, which sit at an elevation of 358 feet. The source for this water system is from the Central Maui source.

### b. Potential Impacts and Mitigation Measures

In accordance with the Department of Water Supply's Domestic Consumption Guidelines for a business development, the average daily demand for the proposed project has been calculated at approximately 15,000 gallons per day. Fire flow demand for commercial development is 2,000 gallons per minute for a 2-hour duration. The water system will be designed

to meet the anticipated domestic and fire flow demands. Refer to **Appendix "H"**.

The project will connect to the County's existing 16-inch waterline on Hana Highway to provide for domestic and fire protection services. The required water meter size will be determined at the time the building permit is applied for. The project will meet the requirements of the Water Availability Ordinance, Chapter 14.12, Maui County Code, as applicable. A water meter will be applied for and secured after the required improvements are installed, inspected and accepted by the DWS.

The following conservation measures, as recommended by the Department of Water Supply, will also be evaluated for implementation in the proposed project:

- Use of non-potable water
- Use of climate-adapted plants for landscaping
- Elimination of single-pass cooling systems
- Maintenance of fixtures to prevent leaks
- Utilization of low-flow fixtures and devices
- Prevention of over-watering by automated systems

## 3. Wastewater

### a. Existing Conditions

Wastewater collected in the Kahului area is conveyed to the Kahului Wastewater Pump Station, which is located to the northwest and on the opposite side of Hana Highway of the project site. Wastewater collected from the pump station is transported to the Wailuku-Kahului Wastewater Reclamation Facility (WWRF). According to the County of Maui, Wastewater Reclamation Division, as of March 2010, the Wailuku-Kahului

WWRF has a plant capacity of 7.9 million gallons per day (mgd) and an allocated capacity of 6.95 mgd.

There are no existing sewer facilities on or immediately adjacent to the project site. The nearest sewer system is the recently installed sewerline traversing across Kamehameha Avenue, between Alamaha Street and Hana Highway. The sewerline crossing is located approximately 630 feet to the northwest of the project site. An 8-inch sewerline was recently installed as part of the Consent Decree Sewer Rehabilitation Project, 24-Hour Fitness Line.

### b. Potential Impacts and Mitigation Measures

The proposed medical plaza is designed to accommodate up to 200 medical professionals and staff. Based on this, the Preliminary Engineering and Drainage Report estimates that the proposed facility will generate 4,000 gallons of wastewater daily. As part of the proposed utility improvements, an offsite sewerline will be constructed from the northwest end of the project, along Hana Highway, and along Kamehameha Avenue, to connect to the recently installed 8-inch sewerline on Kamehameha Avenue. No sewer lift station is anticipated. A copy of the offsite sewerline extension plan (C-5.2) is presented in **Appendix "A"**.

The Wailuku-Kahului WWRF, with an allotted capacity of 6.95 mgd, and an average daily flow of approximately 4.9 mgd, currently has the capacity to accommodate the projected wastewater flow from the proposed project. Refer to **Appendix "H"**.

## 4. Drainage

### a. Existing Conditions

According to the Preliminary Engineering and Drainage Report, presently, onsite runoff sheet flows toward the middle of the project site and ponds in the low-lying area. Peak runoff resulting from a 50-year, 1-hour storm event is presently calculated at 2.84 cubic feet per second (cfs). The corresponding volume generated by the runoff is 2,728 cubic feet. Offsite runoff from the

two (2) westbound lanes and shoulder area of Hana Highway immediately fronting the project site sheet flows onto the project site. It is estimated that the existing 50-year, 1-hour offsite runoff is 2.37 cfs with a corresponding volume of approximately 996 cubic feet. It is estimated that approximately 10,700 cubic feet of runoff can be presently stored within the subject property before it overflows into the adjacent drainage canal, which is situated between the project site and Kanaha Pond. The drainage canal conveys runoff to an outlet at the ocean. Refer to **Appendix "H"**.

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

Implementation of the proposed project is expected to increase the 50-year, 1-hour storm runoff generated from 2.84 cfs before development to 6.69 cfs, a net increase of approximately 3.85 cfs and 2,887 cubic feet of storage volume. The offsite runoff from Hana Highway (estimated at 2.37 cfs) will not change from the existing conditions. The project's drainage system will be required to accommodate the net increase in runoff generated from the project, which is 3.85 cfs.

The proposed drainage plan for the project is to provide onsite detention basins with sufficient storage capacity to accommodate the increase in runoff under post-development conditions. The existing runoff pattern of the onsite runoff will be maintained both during and after construction of the project.

To mitigate the increases in runoff, the applicant will install onsite drainage improvements which will involve the installation of onsite detention basins creating a total storage volume of 16,850 cubic feet. The proposed onsite detention basins will generate an additional 6,150 cubic feet of storage, which is over twice the 2,887 cubic feet of storage required for the anticipated increase in project-generated runoff. The detention basins have been designed to provide sufficient volume to accommodate 100 percent of the total post-development flow from the project site for both the 50-year, 1-hour storm and 2-year, 24-hour storm events.

During extreme rain events, any runoff that exceeds the storage capacity of the onsite detention basins will continue to overflow into the adjacent drainage canal as it is presently doing. This is anticipated to occur at a lesser

frequency than under present conditions due to the increase in onsite storage volume that will be provided as a result of project implementation. Post-development runoff from the project site is not expected to enter into Kanaha Pond under either normal or extreme events.

The onsite drainage plan will intercept runoff through the use of grated catch basins and area drains, whereupon it will be conveyed to the onsite detention basins. Gutter and/or downspouts from the building will also be connected to the site drainage system to convey runoff into the proposed detention basins. The system will also be designed to utilize filters to aid the removal of pollutants from run-off entering the grated catch basins.

As part of the Best Management Practices (BMP) plan, the onsite detention basins will be graded and grassed prior to commencement of the project so to allow them to function during construction operations. In addition, silt and dust fences will be strategically located along the perimeter of the project site to control the movement of dust and silt from the project site to adjacent properties. These measures will be reviewed and approved by the State Department of Health and the County Department of Public Works as part of the respective National Pollutant Discharge Elimination System (NPDES) permit and grading permit processes.

The following BMP measures, as recommended by the Department of Water Supply, will also be evaluated for incorporation into the BMP program for the project:

- Prevent cement products, oil, fuel and other toxic substances from falling or dripping on the ground as this can cause them to leach into the nearby wetland. Store them in proper containers on non-porous surfaces and protect from the elements.

- Retain ground cover until the last possible date.

- Stabilize denuded areas by sodding or planting as soon as possible. Replanting would 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.

In summary, despite the increase in impervious surface, such as building roofs, pavement, and concrete walkways, storm runoff to adjacent or downstream properties will not increase above pre-development levels. Further, onsite drainage and soil erosion control measures and conformance with "Rules for the Design of Storm Drainage Facilities in the County of Maui" will reduce the potential of sediments contained in the runoff from entering the ocean. As a result, the proposed project will not result in drainage impacts to adjacent or downstream properties. Refer to **Appendix "H"**.

## 5. Electrical and Communication Systems

### a. Existing Conditions

Electrical, telephone, and cable television (CATV) services to the project site are available through Maui Electric Company, Hawaiian Telcom, and Oceanic Time Warner, respectively. There are existing overhead utility lines traversing on both sides of Hana Highway fronting the project site. Electrical service is available from the existing overhead lines immediately fronting the project site. There are existing underground telephone and cable TV services to the northwest of the proposed entry driveway.

### b. Potential Impacts and Mitigation Measures

The proposed electrical, telephone and cable TV distribution systems for the proposed project will be installed underground from the existing facilities along Hana Highway. The existing overhead utility lines along Hana Highway will remain overhead. All outdoor lighting will be in compliance with the applicable County lighting standards.

Coordination will be undertaken during the construction plans processing phase to ensure that electrical, communication, and lighting system requirements are addressed for the proposed project. Given the central location of the project site and proximity to existing infrastructure, the proposed project is not anticipated to result in significant impacts to electrical and communication service providers.

# M. CUMULATIVE AND SECONDARY IMPACTS

## 1. Cumulative Impacts Analysis

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

The proposed project is not part of a larger action, nor would it occur within the context of such actions. There are no significant community growth impacts resulting from or occurring with the project. There are no other facility upgrades anticipated within the project context.

In general, processes and mechanisms for coordinating mitigation measures attributable to cumulative impacts are in place. An example of a process which addresses cumulative impacts is the scoping of infrastructure studies (including traffic impact) to include those projects which are anticipated to be implemented within a timeframe similar to that of the proposed action. An example of this is the Traffic Impact Analysis Report (TIAR) that has been prepared for the proposed project which has examined and evaluated traffic impacts of the project, in the context of projected regional growth. Based on the analysis, the TIAR has recommended the implementation of applicable roadway improvements designed to mitigate the incremental impact of the proposed project. While other projects have been assumed to contribute to the projected future growth in regional traffic set forth in the TIAR, some are still in the planning and entitlement stage and for various reasons may be subject to delay or may not materialize at all within the time horizon of this project.

It is important to note, however, that the implementation timeframes for these future development projects are dependent on their respective regulatory and market parameters which are not linked to the proposed project. The proposed Maui Medical Plaza at Kanaha Project is being planned and is intended to be implemented within the timeframe set forth in Chapter I of this document.

Additionally, the County of Maui is currently undertaking its General Plan Update. A specific component of the General Plan Update is the preparation of a Maui Island

Plan. The plan is required as part of a Managed and Directed Growth Plan, as provided by Chapter 2.80B of the Maui County Code:

> *The managed and directed growth plan shall describe existing and future land use patterns and planned growth for the twenty-year planning period and include a discussion on how these patterns are consistent with and support the vision, principles, goals, and policies of the County and the island of Maui. The managed and directed growth plan shall include a map that delineates urban and rural growth areas, consistent with, and illustrative of, the Maui island plan's vision, principles, goals, and policies.*

The Maui Island Plan is designed to be comprehensive in nature, considering existing community plan-designated land uses, as well as proposals for future uses to the planning horizon year of 2030. Thus, the Maui Island Plan establishes a context for structured land use planning to ensure that long range planning and development are properly sequenced.

The review of the draft Maui Island Plan has been completed by the General Plan Advisory Committee (GPAC) and the Maui Planning Commission, and the County Council review of this plan is underway. Existing and future developments in the Wailuku-Kahului region are being reviewed as part of this ongoing comprehensive planning process to evaluate the potential cumulative impact of proposed development projects up to the Year 2030. The proposed action is consistent with the goals and objectives set forth in the draft Maui Island Plan as it is an urban infill project that will result in the development of the last remaining lot within an existing industrial subdivision in Kahului. The subject property is, therefore, located within an existing urban town center within the proposed Urban Growth Boundary for the Wailuku/Kahului area.

## 2. Secondary Impacts Analysis

Secondary impacts are those which have the potential to occur later in time or farther in distance, but are still reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. Secondary impacts from highway projects, for example, can occur because they can induce development by removing transportation access-related impediments to growth.

The project will result in construction-term expenditures, wages and taxes. Over the long term, the project will increase access to medical services for Maui Island residents at a central location in proximity to the main residential and commercial center of the island. The project is not anticipated to have a significant adverse impact on the physical environment. Furthermore, no adverse impacts to historic properties, cultural practices, or rare, threatened or endangered species are anticipated. Necessary engineering infrastructure systems and services will be provided to serve the project.

The proposed Maui Medical Plaza at Kanaha is, therefore, not anticipated to result in significant adverse cumulative or secondary impacts.

# III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

# III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

This section discusses the relationship of the proposed development of the proposed Maui Medical Plaza to State and County land use plans, policies, and controls for the Central Maui region.

## A. STATE LAND USE DISTRICTS

Chapter 205, Hawaii Revised Statutes (HRS), relating to the Land Use Commission established four (4) major land use districts in which all lands in the state are placed. These land use districts have been designated "Urban", "Rural", "Agricultural", and "Conservation". Permitted activities within each of the land use districts are contained in Chapter 205, HRS.

The proposed project is located within the State "Urban" district. See **Figure 13**. The proposed project is compatible with, and permitted within, the State "Urban" land use district.

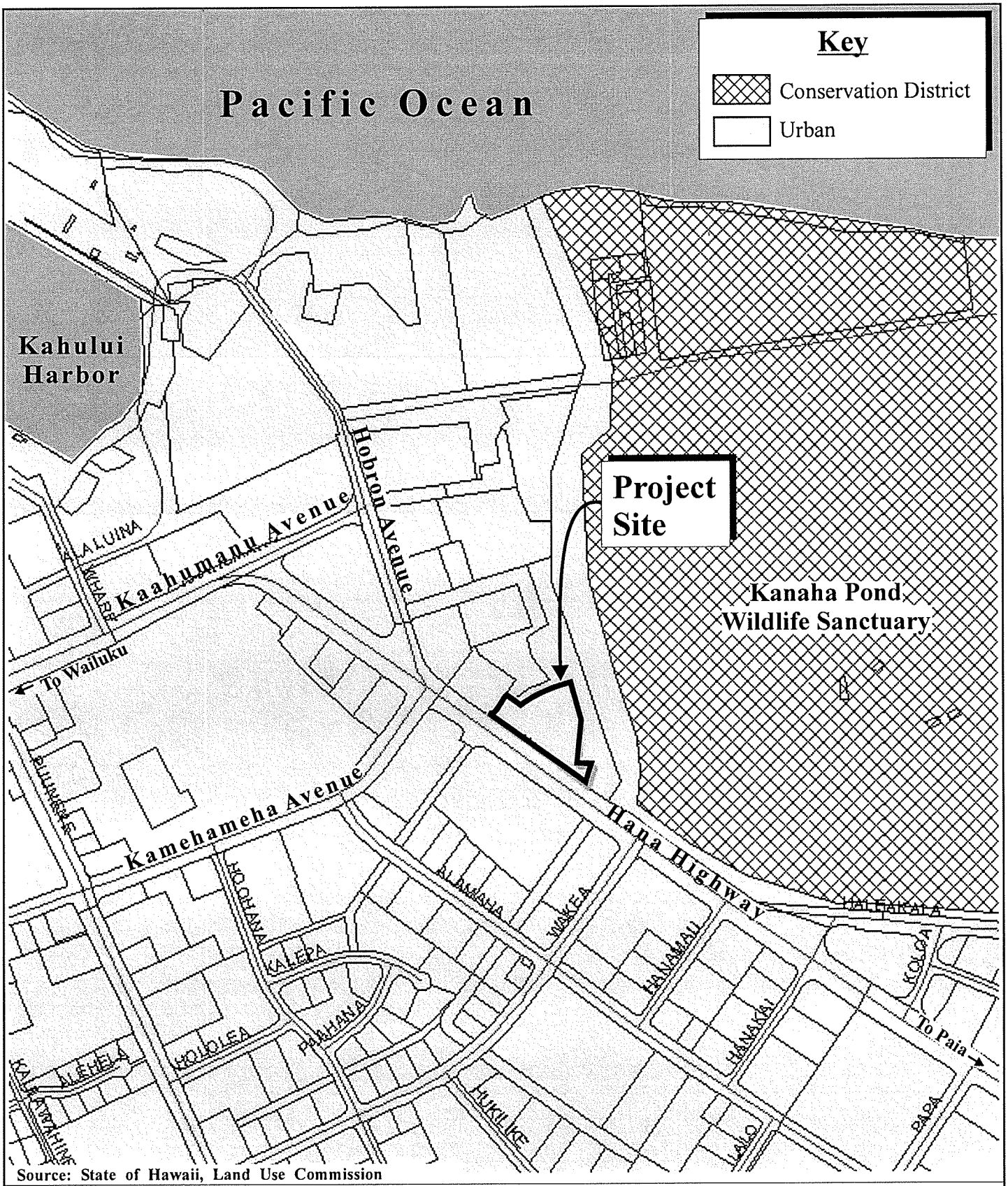
## B. HAWAII STATE PLAN

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-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. Examples of State objectives and policies relevant to the proposed project are as follows:

### 1. Section 226-05, Objectives and policies for population. To achieve this objective, it shall be the State policy to:

a. Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

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




Source: State of Hawaii, Land Use Commission

# Figure 13 Proposed Maui Medical Plaza Project

## State Land Use Designations Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/SLUD

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

   a. Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.

   b. Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.

   c. Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.

   d. Encourage urban developments in close proximity to existing service and facilities.

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

   a. Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvements in consonance with State and County plans.

   b. Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.

   c. Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.

4. **Section 226-16, Objectives and policies for facility systems-water. To achieve the facilities systems water objectives, it shall be the policy of the State to:**

   a. Coordinate development of land use activities with existing and potential water supply.

5. **Section 226-17, Objectives and policies for facility systems-transportation. To achieve the facilities systems transportation objective, it shall be the policy of the State to:**

   a. Encourage a reasonable distribution of financial responsibilities for transportation among participating government and private parties.

b. Encourage transportation systems that serve to accommodate present and future development needs of communities.

6. **Section 226-20, Objectives and policies for socio-cultural advancement--health. To achieve the health objectives, it shall be the policy of this State to:**

a. Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.

b. Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.

c. Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.

The proposed project is in conformance with the above-noted objectives and policies of the Hawaii State Plan.

## C. MAUI COUNTY GENERAL PLAN

As indicated by the Maui County Charter, the purpose of the general plan shall be to:

> *... indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density; land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.*

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan and a Maui Island Plan. The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010. The Maui Island Plan is currently in the process of review and formulation by the Maui County Council.

With regard to the Countywide Policy Plan, Section 2.80B.030 of the Maui County Code states the following.

> *The countywide policy plan shall provide broad policies and objectives which portray the desired direction of the County's future. The countywide policy plan shall include:*
>
> *1. A vision for the County;*
> *2. A statement of core themes or principles for the County; and*
> *3. A list of countywide objectives and policies for population, land use, the environment, the economy, and housing.*

Core principles set forth in the Countywide Policy Plan are listed as follows:

1. Excellence in the stewardship of the natural environment and cultural resources;
2. Compassion for and understanding of others;
3. Respect for diversity;
4. Engagement and empowerment of Maui County residents;
5. Honor for all cultural traditions and histories;
6. Consideration of the contributions of past generations as well as the needs of future generations;
7. Commitment to self-sufficiency;
8. Wisdom and balance in decision making;
9. Thoughtful, island appropriate innovation; and
10. Nurturance of the health and well-being of our families and our communities.

Congruent with these core principles, the Countywide Policy Plan identifies goals objectives, policies and implementing actions for pertinent functional planning categories, which are identified as follows:

1. Natural environment

2. Local cultures and traditions

3. Education

4. Social and healthcare services

5. Housing opportunities for residents

6. Local economy

7. Parks and public facilities

8. Transportation options

9. Physical infrastructure

10. Sustainable land use and growth management

11. Good governance

With respect to the proposed Maui Medical Plaza at Kanaha, the following goals, objectives, policies and implementing actions are illustrative of the project's compliance with the Countywide Policy Plan.

**PROTECT THE NATURAL ENVIRONMENT**

**Goal:** Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.

**Objective:**

1. Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.

**Policies:**

b. Preserve and reestablish indigenous and endemic species' habitats and their connectivity.

c. Restore and protect forests, wetlands, watersheds, and stream flows, and guard against wildfires, flooding, and erosion.

**Objective:**

2. Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.

**Policy:**

c. Improve the connection between urban environments and the natural landscape, and incorporate natural features of the land into urban design.

**Objective:**

3. Improve the stewardship of the natural environment.

**Policies:**

a. Improve communication, coordination, and collaboration among government agencies, nonprofit organizations, communities, individuals, and land owners that work for the protection of the natural environment.

b. Evaluate development to assess potential short-term and long-term impacts on land, air, aquatic, and marine environments.

## STRENGTHEN SOCIAL AND HEALTHCARE SERVICES

**Goal:** Health and social services in Maui County will fully and comprehensively serve all segments of the population.

**Objective:**

1. In cooperation with the Federal and State governments and nonprofit agencies, broaden access to social and healthcare services and expand options to improve the overall wellness of the people of Maui County.

**Policy:**

d. Encourage the expansion and improvement of local hospitals, facilitate the establishment of new healthcare facilities, and facilitate prompt and high-quality emergency- and urgent-care services for all.

**Objective:**

2. Encourage the Federal and State governments and the private sector to improve the quality and delivery of social and healthcare services.

**Policy:**

d. Encourage investment to improve the recruitment of medical professionals and the quality of medical facilities and equipment throughout Maui County.

## STRENGTHEN THE LOCAL ECONOMY

**Goal:** Maui County's economy will be diverse, sustainable, and supportive of community values.

**Objective:**

1. Promote an economic climate that will encourage diversification of the County's economic base and a sustainable rate of economic growth.

**Policies:**

a. Support economic decisions that create long-term benefits.

c. Invest in infrastructure, facilities, and programs that foster economic diversification.

h. Encourage businesses that promote the health and well-being of the residents, produce value-added products, and support community values.

**Objective:**

4. Expand economic sectors that increase living-wage job choices and are compatible with community values.

**Policies:**

i. Support emerging industries, including the following:

- Health and wellness industry;
- Sports and recreation industry;
- Film and entertainment industry;

- Arts and culture industry;
- Renewable-energy industry;
- Research and development industry;
- High-technology and knowledge-based industries;
- Education and training industry;
- Ecotourism industry; and
- Agritourism industry.

## DIVERSIFY TRANSPORTATION OPTIONS

**Goal:** Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.

**Objective:**

1. Provide an effective, affordable, and convenient ground-transportation system that is environmentally sustainable.

**Policies:**

a. Execute planning strategies to reduce traffic congestion.

d. Increase route and mode options in the ground-transportation network.

**Objective:**

5. Improve and expand the planning and management of transportation systems.

**Policies:**

a. Encourage progressive community design and development that will reduce transportation trips.

g. Utilize transportation-demand management as an integral part of transportation planning.

h. Accommodate the planting of street trees and other appropriate landscaping in all public rights-of-way.

## IMPROVE PHYSICAL INFRASTRUCTURE

**Goal:** Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.

**Objective:**

a. Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.

**Policies:**

a. Capitalize on existing infrastructure capacity as a priority over infrastructure expansion.

d. Promote land use patterns that can be provided with infrastructure and public facilities in a cost-effective manner.

## PROMOTE SUSTAINABLE LAND USE AND GROWTH MANAGEMENT

**Goal:** Community character, lifestyles, economies, and natural assets will be preserved by managing growth and using land in a sustainable manner.

**Objective:**

1. Improve land use management and implement a directed-growth strategy.

**Policies:**

b. Direct urban and rural growth to designated areas.

e. Encourage redevelopment and infill in existing communities on lands intended for urban use to protect productive farm land and open-space resources.

h. Direct new development in and around communities with existing infrastructure and service capacity, and protect natural, scenic, shoreline, and cultural resources.

**Objective:**

3. Design all developments to be in harmony with the environment and to protect each community's sense of place.

**Policies:**

f. Use trees and other forms of landscaping along rights-of-way and within parking lots to provide shade, beauty, urban-heat reduction, and separation of pedestrians from automobile traffic in accordance with community desires.

In summary, the proposed Maui Medical Plaza at Kanaha is consistent with the themes and principles of the Countywide Policy Plan.

## D. WAILUKU-KAHULUI COMMUNITY PLAN

The project site is located in the Wailuku-Kahului Community Plan region which is one (1) of nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plan, which has been designed to implement the Maui County General Plan within the specific region. Each Community Plan contains recommendations and standards which guide the sequencing, patterns, and characteristics of future development in each respective region.

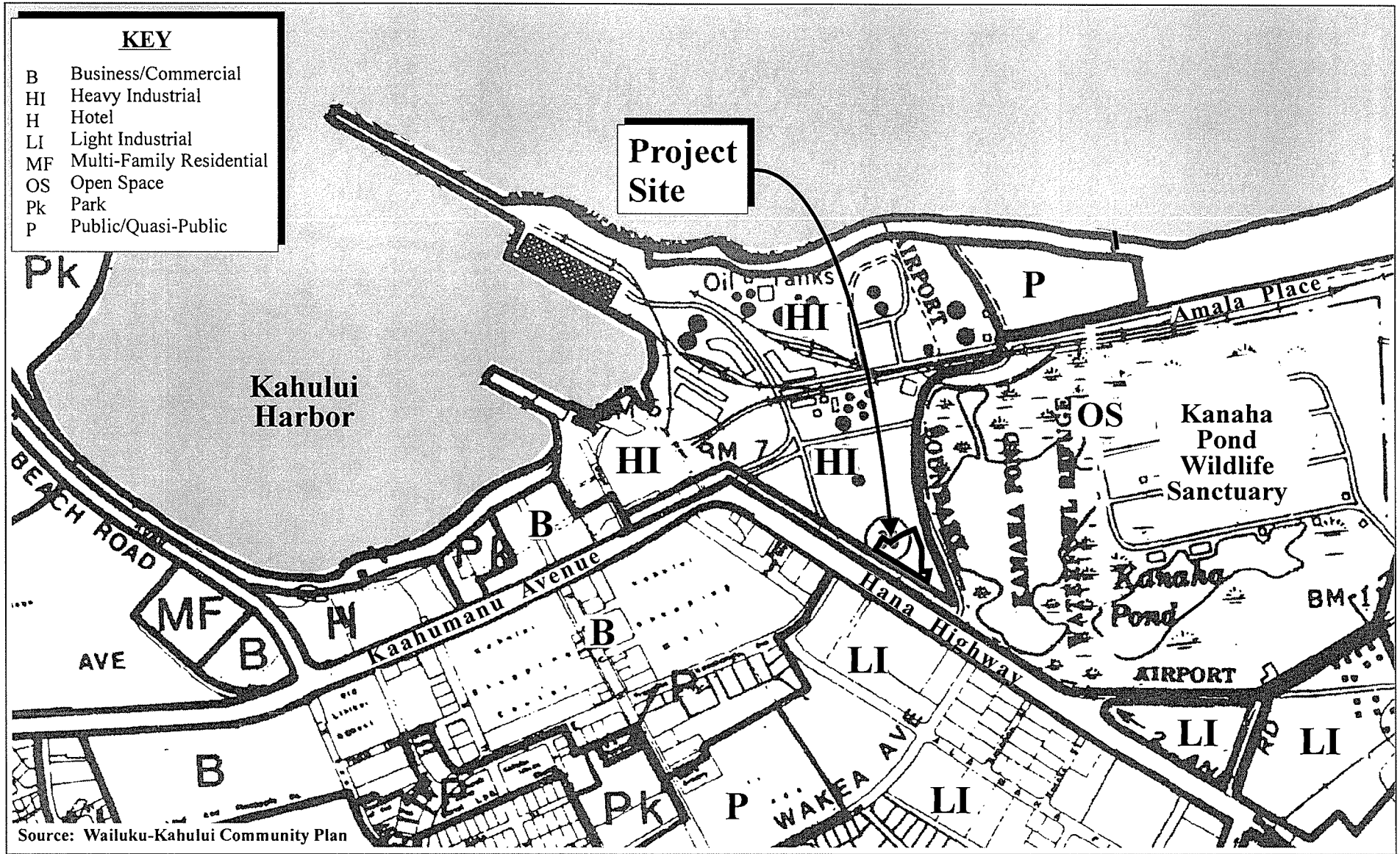
The Wailuku-Kahului Community Plan was adopted by the County of Maui through Ordinance No. 3061, which took effect on May 30, 2002. Land use guidelines are set forth by the existing Wailuku-Kahului Community Plan Land Use Map. As shown in **Figure 14**, the project site is designated for "Heavy Industrial" use by the Community Plan.

The proposed project is in conformance with the following goals, objectives, and policies of the Wailuku-Kahului Community Plan:

### ECONOMIC ACTIVITY

**Goal:**

A stable and viable economy that provides opportunities for growth and diversification to meet long-term community and regional needs and in a manner that promotes agricultural activity and preserves agricultural lands and open space resources.




Source: Wailuku-Kahului Community Plan

Figure 14

# Proposed Maui Medical Plaza Project

## Community Plan Land Use Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/CPLUD

**Objectives and Policies**

- Recognize the importance of small businesses to the region's economy.• Encourage the development of affordable business incubator spaces with public subsidies or incentives, as necessary, similar in concept to that of the Maui Research and Technology Park.

## ENVIRONMENT

**Goal:**

A clean and attractive physical and natural environment in which man-made developments or alterations to the natural environment relate to sound environmental and ecological practices, and important scenic and open space resources are maintained for public use and enjoyment.

**Objectives and Policies:**

- Protect nearshore waters by ensuring that discharges from waste disposal meet water quality standards. Continuous monitoring of existing and future waste disposal systems is necessary to ensure their efficient operation.

- Protect shoreline wetland resources and flood plain areas as valuable natural systems and open space resources. These natural systems are important for flood control, as habitat area for wildlife, and for various forms of recreation. Future development actions should emphasize flood prevention and protection of the natural landscape.

- Support energy conservation measures, including the use of solar heating and photovoltaic systems, in conjunction with urban uses.

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

## DRAINAGE

**Objectives and Policies:**

- Ensure that storm water runoff and siltation from proposed development will not adversely affect the marine environment and nearshore and offshore water quality. Minimize the increase in discharge of storm water runoff to coastal waters by preserving flood storage capacity in low-lying areas, and encouraging infiltration of runoff.

## ENERGY

### Objectives and Policies:

- Encourage energy efficient building design and site development practices.
- Support energy conservation measures, including the use of solar heating and photovoltaic systems, in conjunction with urban uses.
- Promote recycling programs to reduce solid waste disposal in landfills.

## URBAN DESIGN

### Goal:

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

### Objectives and Policies for the Wailuku-Kahului Region in General

- Enhance the appearance of major public roads and highways in the region.
- Maintain a design quality for commercial and public projects and large-scale master planned developments.
- Incorporate drought tolerant plant species and xeriscaping in future landscape planting.
- Use native Hawaiian plants for landscape planting in public projects to the extent practicable.
- Emphasize contrasting earth-tone color schemes for buildings and avoid bright or garish colors.

**Objectives and Policies for Kahului**

3. **Building Form and Character:** maintain compatible scale relationships between the existing low-scale character of the area, adjacent public uses and higher buildings.

   - The low-rise character of the central business area should be maintained. Higher building forms up to six stories should be sited in the central portion of commercial blocks.

4. **Landscape Character**:

   - A coordinated landscape theme should be established from the airport to Kahului, with landscape buffers established along Keolani Place, Hana Highway, and Kaahumanu Avenue.

   - Open parking areas should be landscaped to provide visual screening and shade.

   - The mature landscape character of Kahului's commercial areas should be preserved and incorporated into future development plans, subject to review by the County's Arborist Committee.

In summary, the proposed Maui Medical Plaza at Kanaha is an urban infill project and is consistent with the goals, objectives, and policies of the Wailuku-Kahului Community Plan.

## E. COUNTY ZONING

The project site is zoned for "M-2, Heavy Industrial" use by Maui County zoning. Pursuant to Maui County Code 19.26.020, permitted uses in the "M-2, Heavy Industrial" district include "any use permitted in the B-1, B-2, B-3, and M-1 district". As such, "clinics, medical or dental" are permitted in the "M-2 Heavy Industrial" district as they are a permitted use within the "B-2 Community Business District" pursuant to MCC 19.18.020. The proposed project is compatible with, and permitted within, the "M-2, Heavy Industrial" zoning district.

## F. COUNTY OF MAUI - SPECIAL MANAGEMENT AREA

The project site is located within the County of Maui's Special Management Area (SMA). See **Figure 15**. Pursuant to Chapter 205A, HRS, and the Rules and Regulations of the Maui Planning Commission, actions proposed within the SMA are evaluated with respect to SMA objectives, policies, and guidelines. This section addresses the project's relationship to applicable coastal zone management considerations, as set forth in Chapter 205A, HRS and the Rules and Regulations of the Maui Planning Commission.

### 1. Recreational Resources

**Objective:** Provide coastal recreational opportunities accessible to the public.

**Policies:**

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

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

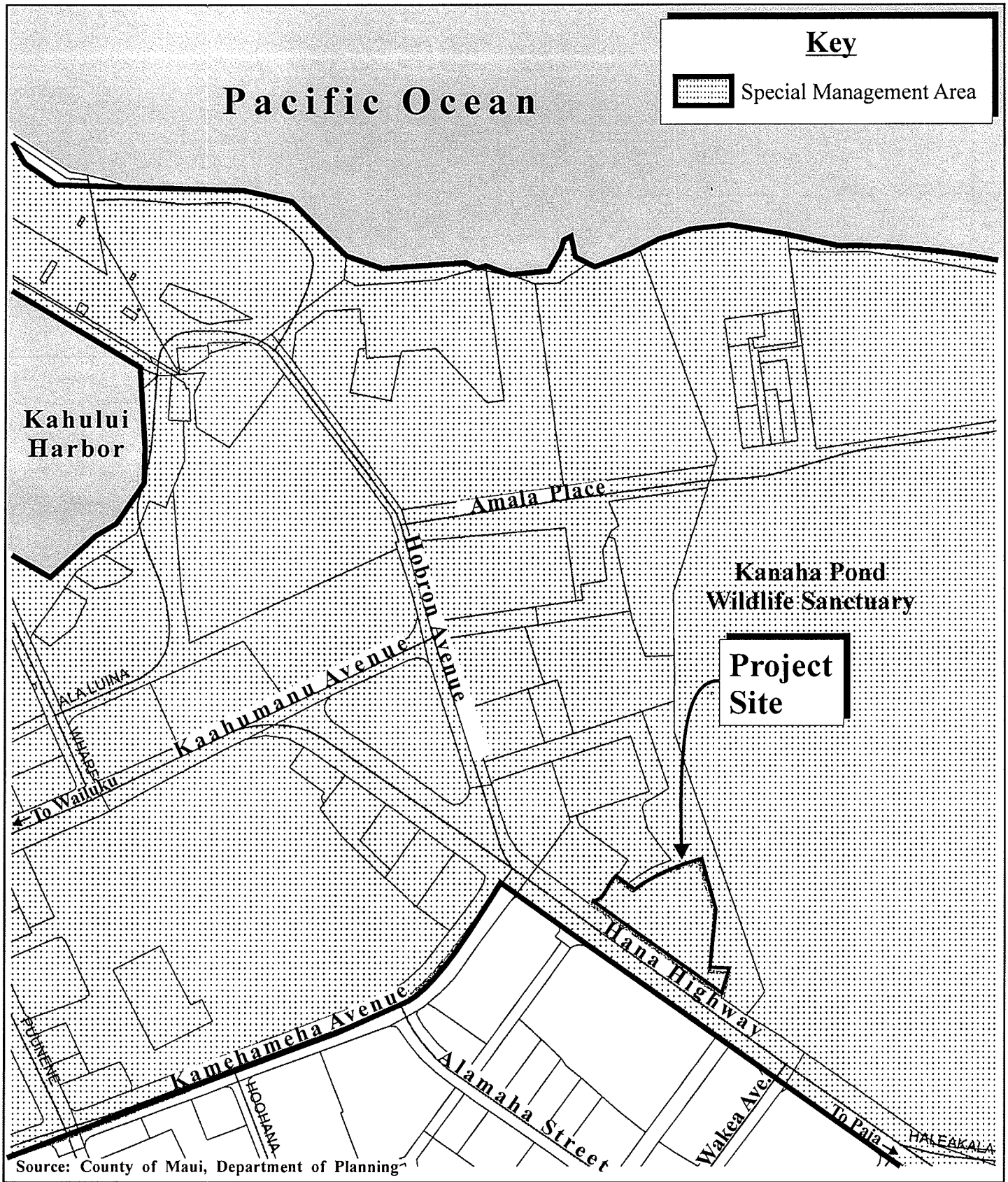
(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

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

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

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

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




Source: County of Maui, Department of Planning

Figure 15

# Proposed Maui Medical Plaza Project

## Special Management Area Map

NOT TO SCALE

Prepared for: Kanaha Professional Plaza, LLC

MUNEKIYO & HIRAGA, INC.

MauiMedPlaza/Kanaha/SMAmap

(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.

**Response:** The project site does not abut the shoreline and is located over 2,200 feet from the nearest area of coastline. The proposed action will not affect nearby coastal recreational opportunities such as those found at the nearby Kanaha Beach Park.

## 2. Historic Resources

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

**Policies:**

(A) Identify and analyze significant 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:** An archaeological assessment survey was completed for the project site and approved by the State Historic Preservation Division (SHPD) on July 13, 2008. Refer to **Appendix "D"** and **Appendix "D-1"**. An Archaeological Monitoring Plan (AMP) has also been prepared in order to identify, protect, and preserve historic resources during ground altering activities. The AMP was approved by SHPD on September 6, 2008. Refer to **Appendix "D-2"** and **Appendix "D-3"**. In accordance with Section 6E-43.6, Hawaii Revised Statutes and Chapter 13-300, Hawaii

Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR) and the Office of Hawaiian Affairs (OHA) will be contacted.

The Archaeological Assessment survey, which involved a full pedestrian survey, as well as subsurface testing, encountered no significant cultural remains within the project site. Given the previous ground disturbance in the area associated with the construction of the existing drainage control canals, an access road, and previous fill activities, adverse impacts to archaeological and cultural resources are not anticipated as a result of project implementation.

## 3. Scenic and Open Space Resources

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

**Policies:**

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

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

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

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

**Response:** The project site is located in the island's central urban core of Kahului, near the Kanaha Pond Wildlife Sanctuary. The project site is located inland of the coast and is not part of a scenic view corridor. The urban forms established by the proposed project plan will be buffered with landscaping to mitigate impacts on visual resources. The proposed project has been architecturally designed to ensure visual compatibility with surrounding urban land uses. Significant adverse impacts to scenic and open space resources are not anticipated as a result of project implementation. Refer to **Appendix "F"**.

## 4. Coastal Ecosystems

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

**Policies:**

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

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

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

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

(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

**Response:** The proposed project is not anticipated to result in significant adverse impacts to coastal ecosystems. The drainage system for the project will be designed to retain a minimum of all project-generated increases in runoff such that there will be no impacts on downstream properties or to the Kanaha Pond Wildlife Sanctuary. Applicable Best Management Practices (BMPs) and erosion-control measures will be implemented to mitigate runoff and minimize disruption of coastal water ecosystems during construction-related activities. The project will comply with all applicable County drainage provisions. Refer to **Appendix "H"**.

## 5. Economic Uses

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

**Policies:**

(A) Concentrate coastal dependent development in appropriate areas;

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

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

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

(ii) Adverse environmental effects are minimized; and

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

**Response:** The proposed Maui Medical Plaza at Kanaha project will have a positive impact on the economy in general. The proposed action will support short-term construction and construction-related jobs. In the long term, the medical facility will support the labor force of medical professionals and support staff while providing needed medical services for residents of the area. Workforce expenditures to support local suppliers of goods and services are also anticipated as a result of project implementation. The proposed action is designed to increase the availability of medical services on the island. It is anticipated that the proposed project will assist in the promotion of economic growth within the County of Maui, particularly through support for the expansion of the island's healthcare industry.

## 6. Coastal Hazards

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

**Policies:**

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

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

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

(D) Prevent coastal flooding from inland projects.

**Response:** The project site is located in Flood Zone X (unshaded), an area determined to be located outside the 0.2 percent annual chance flood plain. The proposed project will be designed in accordance with the Drainage Standards of the County of Maui to ensure that the project will not have an adverse impact on downstream and adjoining properties. Refer to **Appendix "H"**.

## 7. Managing Development

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

**Policies:**

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

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

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

**Response:** Opportunities for public understanding of the proposed project are provided for in accordance with Chapter 343, HRS notice and public review provisions. Opportunity for public review and participation will also be provided pursuant to the Special Management Area (SMA) Use Permit review and approval process. Compliance with these regulatory requirements advances the objective and policies for managing development.

## 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:** As discussed above, public awareness and participation in coastal management are facilitated through the EA and SMA Use Permit review and approval process. The proposed project is in alignment with the objective of public awareness, education, and participation. Letters have been received during the early phases of the planning and entitlement process for the project, copies of which are presented in **Appendix "J"**.

**9. Beach Protection**

**Objective:** Protect beaches for public use and recreation.

**Policies:**

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

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

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

**Response:** The proposed project is not located in proximity to shoreline areas, nor is it anticipated to impact shoreline activities or beach 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.

**Response:** The proposed project does not abut the shoreline and is not anticipated to impact marine or coastal resources in the Kahului area.

In addition to the foregoing objectives and policies, SMA permit review criteria pursuant to Act 244 (2005) provides that:

> *No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:*
>
> *(1) Directly illuminates the shoreline and ocean waters; or*
>
> *(2) Is directed to travel across property boundaries toward the shoreline and ocean waters.*

**Response:** Lighting design for the proposed project will specify the shielding of all lights and directional down lighting. The design considerations are anticipated to mitigate light pollution and prevent light from traveling across property boundaries toward the shoreline and ocean.

# IV. SUMMARY OF ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED

# IV. SUMMARY OF ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED

The implementation of the proposed Maui Medical Plaza at Kanaha project will result in short-term impacts occurring during the construction period, as described in Chapter II of this document. Potential effects include temporary noise and air quality impacts generated by construction activities. Noise impacts would arise from site preparation, heavy equipment usage, and other construction activities. Temporary air quality impacts would result from dust generated from construction activities, and exhaust emissions discharged by construction equipment.

The proposed project is not anticipated to create any long-term adverse environmental effects. Although the proposed action will involve the filling of a wetland area (0.94 acre in area), this onsite wetland area is located within a highly disturbed environment, due to previous impacts resulting from the filling of the Kanaha and Mauoni ponds during the dredging of Kahului Harbor in 1910, and from the construction of the adjacent drainage canals in the 1970s. As noted previously, a wetland mitigation plan for rehabilitation of five (5) acres of existing wetland at the Waihee Coastal Dunes and Wetland Refuge has been accepted by the Department of Army as adequate compensatory mitigation for the loss of wetland function resulting from the proposed project. Refer to **Appendix "B-2"**.

# V. ALTERNATIVES TO THE PROPOSED ACTION

# V. ALTERNATIVES TO THE PROPOSED ACTION

## A. NO ACTION ALTERNATIVE

Under the "no action" alternative, the site would not be developed for medical and related office space uses and the site would remain vacant and unoccupied. The "no action" alternative would not require a commitment of resources, nor would it result in short- and long- term adverse environmental effects associated with the proposed action. However, the "no action" alternative would not address the pressing need for additional medical facilities on Maui, nor would it satisfy the need for new office space for existing medical and healthcare professionals.

## B. DEFERRED ACTION ALTERNATIVE

A "deferred action" alternative would have similar consequences as the "no action" alternative in that the existing need for additional medical facilities and office space to support a growing population on the island would not be addressed.

## C. ALTERNATIVE SITE LOCATIONS

This alternative considers other locations for the proposed project. Over the course of project planning, the applicant investigated the feasibility of several other site locations. These alternative locations include the following:

- **140 South Puunene Avenue, Kahului:** The applicant contacted the State of Hawaii regarding the purchase of the old Maui Armory site in Kahului. However, the applicant was informed that the site was unavailable for purchase.

- **65 Kahului Beach Road, Kahului**: The applicant submitted an offer for the purchase of an approximately 5-acre property and site of a former Brewer chemical facility, but the owners were unwilling to sell.

The applicant also contacted other major landowners in the Central Maui area, including Maui Lani, Maui Land & Pineapple Company, Inc., Alexander & Baldwin, Inc., and The

Weinberg Foundation. However, lands owned by these landowners were either not available for sale or were not expected to acquire all necessary entitlements within the targeted implementation timeframe for the proposed facility.

The subject property was purchased by Kanaha Professional Plaza, LLC following a thorough evaluation of potential alternative site locations for the project. The subject property was selected as the preferred site for the proposed construction of the Maui Medical Plaza at Kanaha project as it was deemed most appropriate in terms of location, proximity to major access roads and residential areas and underlying land use designations.

## D. ALTERNATIVE DESIGN CONSIDERATIONS

Alternative design considerations were reviewed and evaluated as part of the process of developing the preliminary development plans for the project. While the current design proposed a six (6) story structure utilizes a staggered or stepped back design, early plans for the project envisioned a more traditional appearance for the medical plaza building. The staggered or stepped-back design (as reflected in the plans for the preferred alternative) was adopted to reduce the visual massing of the building, and, was the result of early feedback received during preliminary consultations with the County of Maui's, Urban Design Review Board (UDRB). Further review of the project's design features will be undertaken by the UDRB during the processing of the Special Management Area (SMA) Use Permit application for the project.

## E. PREFERRED ALTERNATIVE

The proposed project plans, as described in Chapter I and Chapter II of this report, were deemed most appropriate and beneficial to the community in the context of providing a new state-of-the-art venue for medical and healthcare services on the island. The proposed project would significantly improve the provision of such services on Maui Island, as the proposed Maui Medical Plaza at Kanaha will be a modern medical facility. The proposed project will provide large elevators to accommodate handicapped patients and employees, reinforced flooring to support heavy equipment, advanced electrical service to meet the energy requirements of high-technology equipment, fiber optic communications, and state-of-the-art air conditioning (HVAC) systems to ensure the health of those using the building. Implementation of the proposed design for the medical plaza in lieu of a more intensive industrial use is anticipated to enhance the architectural character of the harbor area in Kahului by providing a reasonable transition between the heavy industrial uses surrounding

the harbor and the Kanaha Pond Wildlife Sanctuary and outlying commercial facilities to the north of the project site. Given the foregoing considerations, Kanaha Professional Plaza, LLC has decided to proceed with the preferred alternative, as reflected in the plans presented in **Appendix "A"**.

# VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

# VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed Maui Medical Plaza at Kanaha project is anticipated to result in the irreversible and irretrievable commitment of land and fiscal resources. Land resources committed for the proposed project include a 0.94-acre wetland area located within the middle portion of the 2.5-acre project site. Studies have determined, however, that this wetland is highly disturbed and functionally separated from the larger Kanaha Pond wetland ecosystem, such that the project area wetland no longer provides a viable habitat for native waterbirds. As discussed previously, a wetland mitigation plan for rehabilitation of five (5) acres of existing wetland at the Waihee Coastal Dunes and Wetlands Refuge has been accepted by the Department of Army as adequate compensatory mitigation for the loss of wetland function resulting from the proposed project. Refer to **Appendix "B-2"**.

Other resource commitments include energy, labor, and material resources. Impacts relating to the use of these resources should be minimal, especially when weighed against the expected positive socio-economic benefits to be derived from the project, versus the consequences of taking no action.

In addition, the proposed project is not anticipated to require a substantial commitment of government services or facilities, nor is it anticipated to place additional demands on police, fire, medical, and social services.

# VII. SIGNIFICANCE CRITERIA ASSESSMENT

# VII. SIGNIFICANCE CRITERIA ASSESSMENT

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 on the environment. The following criteria and preliminary analysis are provided:

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

   As mentioned in Chapter II of this document, a Cultural Impact Assessment of the project site concluded that no significant impacts to cultural practices were anticipated, while an archaeological assessment survey of the project site concluded that no historic sites or properties would be affected. The archaeological assessment survey was approved by the State Historic Preservation Division (SHPD) on July 13, 2008. Refer to **Appendix "D-1"**. Flora and fauna observed on the property were limited to non-native, abundant species; therefore, the proposed project is not anticipated to have a significant adverse impact on biological resources in the area. Refer to **Appendix "C"**.

   With respect to the wetland within the project site, the natural groundwater drainage pattern of this wetland was drastically altered by the filling of these lands with dredged material from Kahului Harbor, and by the construction of the drainage canal network. As a result, this onsite wetland is absent of surface or ponded waters and does not connect to the adjacent drainage canal or the nearby Kanaha Pond Wildlife Sanctuary. Refer to **Appendix "B"**. Moreover, the subject property no longer presents a suitable open water habitat for native waterbirds, as dense brush covers the entire area. In effect, the proposed action is not anticipated to adversely impact the capacity of this wetland environment to serve as a habitat for native waterbirds. Notwithstanding, in the interest of compensating for the filling of this wetland, the applicant has coordinated with USACE to develop a wetland mitigation plan that proposes the rehabilitation of a 5-acre portion of another wetland, the Waihee Coastal Dunes and Wetland Refuge, which is located approximately 10 miles to the west of the project site in Waihee. Refer to **Appendix "B-1"**.

The proposed project, therefore, does not involve an irrevocable commitment to loss or destruction of any natural or cultural resources.

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

The proposed project will not curtail the range of beneficial uses of the environment. Development of detailed engineering and architectural plans will allow for the identification of applicable Best Management Practices (BMPs) to minimize any construction-related impacts. The project will provide medical services necessary to support Maui's growing resident and visitor populations at an urban infill location in close proximity to existing and future residential neighborhoods, employment centers, and infrastructure.

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

The proposed project does not conflict with the State's Environmental Policy and Guidelines as set forth in Chapter 344, Hawaii Revised Statutes (HRS). The proposed project is consistent with the property's underlying land use designations.

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

On a short-term basis, the project will support construction and construction-related employment, and will have a beneficial impact on the local economy during the period of construction. From a long-term perspective, area residents and business owners will benefit from the employment opportunities and professional medical services that will be provided at the proposed Maui Medical Plaza at Kanaha facility.

5. **Substantially affects public health.**

The proposed project is not anticipated to have any significant adverse impacts on public health. Rather, it is anticipated that the public's health and safety will be improved by the professional medical services that will be provided by the proposed facility.

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

The proposed project itself is not anticipated to add to resident population in the Wailuku-Kahului region; therefore, it is not expected to result in adverse secondary impacts associated with population growth. Necessary infrastructure systems and services are available to serve the project. Impacts upon other public services and facilities will be addressed with the applicable governmental agencies.

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

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

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

The proposed project is not anticipated to have a cumulative adverse impact on the environment, nor does it involve a commitment to larger actions. As previously noted, the proposed project is an urban infill project consistent with the property's underlying urban and heavy industrial land use designations. Due to its location within the central core of the Kahului urban area, infrastructure systems and services are available to serve the project. The development of a medical facility at the site is not anticipated to have a significant adverse impact on the physical environment.

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

A Biological Resources Survey of the project site concluded that flora and fauna within the property are limited to non-native, abundant species. Although the nearby Kanaha Pond Wildlife Sanctuary is home to species of native flora and avifauna, no species of native avifauna were found to be residing within the project site. Five (5) species of indigenous flora were observed within the project site, yet none of these species are listed as rare, threatened or endangered. The project site contains a 0.94-

acre area of wetland; however, this wetland was severely disturbed by previous actions on surrounding lands. This wetland has been functionally separated from the larger Kanaha Pond wetland ecosystem, such that the project site no longer serves as a waterbird habitat. As such, the proposed project is not anticipated to have significant negative impact on biological resources in the area. Refer to **Appendix "C"**.

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

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, and installation of dust screens will be implemented to minimize wind-blown emissions. In the short term, noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance, will be used during construction activities. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawaii, Department of Health Administrative Rules Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in Chapter 46. In the long term, the operation of the proposed medical facility is not anticipated to significantly impact ambient noise levels.

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

The site is situated inland of and approximately 2,200 feet from the shoreline and is not anticipated to have any adverse impact upon coastal waters or resources. The project site is situated within Flood Zone X (unshaded), an area determined to be outside the 0.2 percent annual chance flood plain. The property, however, is situated within a tsunami evacuation zone. The use of onsite detention basins will ensure that there are no project-related impacts on downstream properties or to wetland resources located within the Kanaha Pond Wildlife Sanctuary. Further appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the design process. During construction, recommended BMPs will be implemented for erosion and sedimentation control. Refer to **Appendix "I"**.

The 0.94-acre wetland area within the project site has been severely disturbed by previous actions in surrounding lands, such that this wetland provides minimal functional value in its current state. Nevertheless, in order to mitigate the filling of this wetland, offsite wetland mitigation will be conducted at the Waihee Coastal Dunes and Wetland Refuge. Mitigation work at the Refuge will involve the removal of invasive species and the reestablishment of native plants within a 5-acre area.

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

The proposed project is located within an industrial subdivision in the heart of Kahului's urban core. Approximate elevations on the site range from 6 feet above mean sea level (amsl) along its western boundary to 4.4 feet amsl at its northern boundary. The project site is not located within any previously identified scenic vistas or viewplanes. Landscaping will be implemented as part of the development improvements to ensure visual buffering and softening of the built landscape. Adverse impacts to scenic or open space resources and viewplanes are not anticipated to result from development of the proposed project. Refer to **Appendix "F"**.

13. **Requires substantial energy consumption.**

The proposed project will involve the commitment of fuel for construction equipment, vehicles, and machinery during construction and maintenance activities. Coordination with Maui Electric Company, Limited (MECO) will be undertaken during the electrical plans preparation phase of work to ensure all operational parameters are addressed for the proposed project. Where feasible, energy saving measures will be incorporated into the project design. The project's central location in Kahului is in close proximity to employment centers and will result in lower long-term transportation/fuel costs both during construction and across the operational phase of the project.

In summary, the project site is situated at a central location in Maui's commercial core. Located adjacent to Hana Highway, the project site offers convenient access in close proximity to residential neighborhoods and employment centers. Necessary infrastructure systems and services are also within close proximity, such that expansions to existing service limits will not be necessitated. Development of a medical facility at this urban infill site is not anticipated to have a significant adverse impact on the physical environment, and the proposed medical facility stands to provide a

wide range of economic, social welfare, and public health benefits to Maui residents. Based on the foregoing analysis provided in this Environmental Assessment (EA), the proposed Maui Medical Plaza at Kanaha project is anticipated to result in the issuance of a Finding of No Significant Impact (FONSI).

# VIII. LIST OF PERMITS AND APPROVALS

# VIII. LIST OF PERMITS AND APPROVALS

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

**A. Federal**

1. Section 404, Department of Army Permit

**B. State of Hawaii**

1. Section 401 Water Quality Certification
2. Coastal Zone Management Consistency Determination
3. National Pollutant Discharge Elimination System (NPDES) Permits, as applicable
4. Noise Permit, as applicable
5. Work to Perform in State Right-of-Way
6. Driveway Permits

**C. County of Maui**

1. Special Management Area (SMA) Use Permit
2. Work to Perform on County Roadway
3. Construction Permits (Building Permit, Grading Permit, etc.)

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

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

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

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

2. Ranae Ganske-Cerizo, Soil Conservationist
**Natural Resources Conservation Service**
**U.S. Department of Agriculture**
700 Hookele Street, Suite 202
Kahului, Hawaii 96732

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

4. Wayne Nastri, Regional Administrator
**U. S. Environmental Protection Agency**
Region 9
75 Hawthorne Street
San Francisco, California 94105

5. Dave Wesley, Deputy Regional Director
**U. S. Fish and Wildlife Service**
Pacific Region
911 NE 11th Avenue
Portland, Oregon 97232

6. Patrick Leonard
Field Supervisor
**U. S. Fish and Wildlife Service**
300 Ala Moana Blvd., Rm. 3-122
Box 50088
Honolulu, Hawaii 96813

7. Russ K. Saito, State Comptroller
**Department of Accounting and General Services**
1151 Punchbowl Street, #426
Honolulu, Hawaii 96813

8. Sandra Lee Kunimoto, Chair
**Department of Agriculture**
1428 South King Street
Honolulu, Hawaii 96814-2512

9. Theodore E. Liu, Director
State of Hawaii
**Department of Business, Economic Development & Tourism**
P.O. Box 2359
Honolulu, Hawaii 96804

10. Micah Kane, Chairman
**Department of Hawaiian Home Lands**
P. O. Box 1879
Honolulu, Hawaii 96805

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

12. Alec Wong, P.E., Chief
**Clean Water Branch**
State of Hawaii
**Department of Health**
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

13. Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawaii
**Department of Health**
54 High Street
Wailuku, Hawaii 96793

14. Laura Thielen, Chairperson
State of Hawaii
**Department of Land and Natural Resources**
P. O. Box 621
Honolulu, Hawaii 96809

15. Dr. Puaalaokalani Aiu, Administrator
State of Hawaii
**Department of Land and Natural Resources**
**State Historic Preservation Division**
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

16. Brennon Morioka, Director
State of Hawaii
**Department of Transportation**
869 Punchbowl Street
Honolulu, Hawaii 96813

cc: Fred Cajigal

17. Major General Robert G.S. Lee, Director
**Hawaii State Civil Defense**
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

18. Katherine Kealoha, Director
**Office Of Environmental Quality Control**
235 S. Beretania Street, Suite 702
Honolulu, Hawaii 96813

19. Clyde Nāmu'o, Administrator
**Office of Hawaiian Affairs**
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

20. Abbey Seth Mayer, Director
State of Hawaii
**Office of Planning**
P.O. Box 2359
Honolulu, Hawaii 96804

21. Charmaine Tavares, Mayor
County of Maui
200 South High Street
Wailuku, Hawaii 96793

22. Gen Iinuma, Administrator
**Maui Civil Defense Agency**
200 South High Street
Wailuku, Hawaii 96793

23. Jeffrey A. Murray, Fire Chief
County of Maui
**Department of Fire and Public Safety**
200 Dairy Road
Kahului, Hawaii 96732

24. Lori Tsuhako, Director
County of Maui
**Department of Housing and Human Concerns**
One Main Plaza
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

25. Tamara Horcajo, Director
County of Maui
**Department of Parks and Recreation**
700 Halia Nakoa Street, Unit 2
Wailuku, Hawaii 96793

26. Jeffrey Hunt, Director
County of Maui
**Department of Planning**
250 South High Street
Wailuku, Hawaii 96793

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

28. Milton Arakawa, Director
County of Maui
**Department of Public Works**
200 South High Street
Wailuku, Hawaii 96793

29. Cheryl Okuma, Director
County of Maui
**Department of Environmental Management**
One Main Plaza
2200 Main Street, Suite 175
Wailuku, Hawaii 96793

30. Donald Medeiros, Director
County of Maui
**Department of Transportation**
200 South High Street
Wailuku, Hawaii 96793

31. Jeffrey Eng, Director
County of Maui
**Department of Water Supply**
200 South High Street
Wailuku, Hawaii 96793

32. **Hawaiian Telcom**
60 South Church Street
Wailuku, Hawaii 96793

33. Greg Kauhi, Manager, Customer Operations
**Maui Electric Company, Ltd.**
P.O. Box 398
Kahului, Hawaii 96733

34. **Maui Memorial Medical Center**
221 Mahalani Street
Wailuku, Hawaii 96793

35. **Kahului Town Association**
P.O. Box 156
Kahului, Hawaii 96733-6656

FEB 1 9 2009

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
77 Ho'okele Street, Suite 202
Kahului, HI 96732
Phone 808-871-5500
Fax 808-873-6184

February 18, 2009

Ms. Rowena Dagdag-Andaya
Munekiyo & Hiraga Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Early Consultation for Proposed Maui Medical Plaza
TMK (2) 3-7-011:028, Kahului, Maui

Dear Ms. Dagdag-Andaya:

The proposed medical plaza and related parking structure are planned immediately adjacent to a *pristine* wetland, which is home to a variety of native Hawaiian and rare migratory birds. The .95-acre wetland proposed for filling is currently part of the larger network of small wetlands throughout the Wildlife Sanctuary. It is important that mitigation be adequate and as the Natural Resource Conservation Service currently holds a restoration agreement with the Department of Land and Natural Resources we would like to be privy to mitigation details within the sanctuary.

The height of the buildings also poses a concern. Although the land is zoned industrial and a medical plaza may be within the architectural character of the area, the proposed project would be much taller than any surrounding structures.

The heavy potential traffic and associated potential vehicle pollutants should also be addressed and must not be allowed to enter the wetland. We recommend that runoff be managed so that even during a heavy storm the threat of such a wetland impact is minimal.

During construction it is essential to install proper erosion control methods such as silt fences. Erosion should be managed and kept to a minimum. Further, as the adjacent sanctuary is prime nesting habitat for a variety of rare and endangered birds, we suggest timing heavy construction outside of the breeding season to prevent any chance of impact to roosting birds.

Thank you for the opportunity to comment. If you would like any further explanation don't hesitate to contact me at 871-5500 extension 107.

Thank you for the opportunity to comment.

Sincerely,

Ranae F. Ganske-Cerizo
District Conservationist

*Helping People Help the Land*

An Equal Opportunity Provider and Employer

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 16, 2010

Ranae F. Ganske-Cerizo, District Conservationist
**Natural Resources Conservation Service**
**United States Department of Agriculture**
77 Hookele Street, Suite 202
Kahului, Hawai`I 96732

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Ms. Ganske-Cerizo:

I am writing to you today, on behalf of Kanaha Professional Plaza, LLC, to thank you for your letter, dated February 18, 2009, responding to our early consultation request for the subject project. We offer the following information in response to the comments noted in your letter:

***WETLAND CONSIDERATIONS***

As part of the Section 404 permit process for the project, a wetland mitigation plan has been prepared to compensate for the loss of the 0.94 acre onsite wetland that will occur during construction of the project on the subject property. The scope of work presented in the plan involves the removal of invasive species and restoration of degraded wetland areas within the Waihee Refuge. The mitigation plan has been formulated in coordination with the U.S. Army Corps of Engineers (USACE), the Environmental Protection Agency (EPA), the U.S. Fish & Wildlife Service (USFWS), the Department of Land and Natural Resources (DLNR) and the Department of Health. The DA, by letter dated January 15, 2010, has confirmed that the mitigation plan is acceptable and that the scope of work set forth in the plan meets the compensatory requirements of Section 404. A copy of both the final wetland mitigation plan and the DA approval letter will be included in the Draft Environmental Assessment (EA) for the project.

## ***ARCHITECTURAL CONSIDERATIONS***

Your comment regarding the height of the proposed structures is noted. The project site is part of an industrial-zoned subdivision located in Kahului near the Kahului Harbor. The property is designated 'Urban' by the State Land Use Commission, 'Heavy Industrial' by the Wailuku-Kahului Community Plan and 'M-2, Heavy Industrial' by Maui County zoning. The medical plaza building is proposed as a six (6) story structure that utilizes a staggered or stepped-back design. Each story of the building will be surrounded by landscaped planters to complement the architectural elements of the structure. This design concept has been developed using comments that were received during pre-consultation presentations to the Maui County Urban Design Review Board (UDRB). Further review of the project's design features will be undertaken by the UDRB during the processing of the Special Management Area (SMA) Use Permit application. Implementation of a medical plaza in lieu of a more intensive industrial use is anticipated to enhance the architectural character of the harbor area in Kahului by providing a reasonable transition between the heavy industrial uses surrounding the harbor and the Kanaha Pond Wildlife Sanctuary to the north of the subject property. A view analysis will be provided in the Draft EA.

## ***DRAINAGE CONSIDERATIONS***

A comprehensive drainage system will be installed as part of the proposed project to mitigate drainage impacts resulting from implementation of the project. The drainage system will be designed to retain more than 100 percent of the project-generated increase in stormwater run-off from the site such that there will be no impacts on downstream properties or to Kanaha Pond Wildlife Sanctuary. The system will also be designed to utilize catch basin inserts and filters to aid the removal of pollutants from run-off entering the inlets. A Preliminary Engineering and Drainage Report is currently being prepared for the project, a copy of which will be provided in the Draft EA.

## ***CONSTRUCTION CONSIDERATIONS***

A program of Best Management Practices (BMPs), including sediment and erosion control measures, will be implemented during the project to mitigate construction-related impacts. A list of BMPs being considered for incorporation in this program will be included in the Draft EA. Coordination with the Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife will be undertaken by Kanaha Professional Plaza, LLC prior to project implementation to ensure that the potential for wildfowl disturbances within Kanaha Pond is minimized to a reasonably practicable level.

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

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

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
F:\DATA\MauiMedPlaza\Kanaha\NRCSresponse.ltr.doc

FEB 1 0 2009

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

BARBARA A. ANNIS
DEPUTY COMPTROLLER

(P)1041.9

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

FEB - 9 2009

Ms. Rowena Dagdag-Andaya, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

Subject: Early Consultation Request for Proposed Maui Medical Plaza at TMK (2)3-7-011:028, Kahului, Maui

Thank you for the opportunity to provide comments on the Early Consultation Request for the Proposed Maui Medical Plaza, Kahului, Maui. This project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

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

Sincerely,

RUSS K. SAITO
State Comptroller

5

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Russ K. Saito
State of Hawaii
**Department of Accounting and General Services**
P.O. Box 119
Honolulu, Hawai`i 96810

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Mr. Saito:

Thank you for your letter, dated February 9, 2009, providing early consultation comments on the subject project.

We note your comment that the subject project does not impact any of the Department of Accounting and General Services' projects or existing facilities.

We appreciate the input provided by your office. A copy of the Draft Environmental Assessment (EA) will be provided to you for review and comment.

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

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
F:\DATA\MauiMedPlaza\Kanaha\DAGS response.ltr.doc

FEB 1 0 2009

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

KAULANA H. PARK
DEPUTY TO THE CHAIRMAN

ROBERT J. HALL
EXECUTIVE ASSISTANT

**STATE OF HAWAI'I**
**DEPARTMENT OF HAWAIIAN HOME LANDS**
P.O. BOX 1879
HONOLULU, HAWAI'I 96805

February 9, 2009

Munekiyo & Hiraga, Inc.
Attn: Ms. Rowena Dagdag-Andaya
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

Subject: Early Consultation Request for Proposed Maui Medical Plaza at TMK: (2) 3-7-011:028, Kahului, Maui

Thank you for the opportunity to review the subject proposal. The Department of Hawaiian Home Lands has no comment to offer at this time. If you have any questions, please contact our Planning Office at 620-9480.

Aloha and Mahalo,

for Micah A. Kane, Chairman
Hawaiian Homes Commission

FEB 1 2 2009

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

02038CEC.09

February 10, 2009

Ms. Rowena M. Dagdag-Andaya
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

**Subject: Early Consultation Request**
**Proposed Maui Medical Plaza, Kahului, Island of Maui, Hawaii**
**File No. WQC 0000759/DA File No. POH-2006-531**

Reference is made to your letter, dated January 28, 2009, seeking early consultation comments in preparing the Draft Environmental Assessment (DEA) document for the subject project located at TMK: (2) 3-7-011:028.

According to your letter of January 28, 2009:

"Kanaha Professional Plaza, LLC ('applicant') proposes to build a professional medical plaza on a 2.5-acre parcel at Tax Map Key (TMK) (2) 3-7-011:028, Kahului, Maui, Hawai'i. See **Figure 1** and **Figure** 2. (SIC) The property is owned by Kanaha Professional Plaza, LLC and is located along Hana Highway in the vicinity of the Kahului Harbor Heavy Industrial area and the Kanaha Pond Wildlife Sanctuary. Access to the site is provided from Hana Highway.

The proposed medical plaza will be a six (6) story building with a total floor area of approximately 140,000 square feet; of which, about 100,000 square feet will be leaseable space for medical doctors and technicians. See **Figure** 3. The facility has been designed to accommodate physician offices, a pharmacy, radiology services, and administrative services. A five (5) level parking structure of approximately 100,000 square feet is proposed to be constructed adjacent to and behind the medical building, which will provide approximately 300 off-street parking stalls. The proposed footprint of all proposed structures is approximately 240,000 square feet. Related improvements include site grading and landscaping and the installation of underground utilities and driveway aprons.

The architectural character of the proposed medical plaza will maintain the urban design character established by surrounding land uses. The proposed project is intended to provide a contemporary medical facility where local health care professtonals can administer improved medical services to members of the community.. · .
The subject property is in the State Land Use "Urban" District, designated "Heavy Industrial" by the

Wailuku-Kahului Community Plan, and is designated "M-2 Heavy Industrial" by Maui County Zoning. The proposed action is consistent with the underlying land use designations. In addition, the property falls within the limits of the County's Special Management Area (SMA). An SMA Use Permit from the County of Maui will be necessary for the proposed project.

Construction of the proposed structures will involve the permanent filling of an approximately 0.95 acre (41,149 square feet) wetland located within the center of the subject property. See Figure 4. This wetland area has been determined as a jurisdictional water of the United States. As such, a Department of the Army (DA) permit will be required for the project and will be processed pursuant to Section 404 of the Clean Water Act.

Prior to issuance of the DA permit, a wetland mitigation plan to compensate for the loss of wetland area must also be reviewed and approved by the U.S. Army Corps of Engineers. As part of the DA permit process, the applicant is currently developing a draft wetland mitigation plan for offsite restoration activities within the neighboring State-owned Kanaha Pond Wildlife Sanctuary (TMK (2) 3-8-001:019) in consultation with the DA and the State Department of Land and Natural Resources, as well as other Federal, State and local agencies. In addition to the DA Permit, a Section 401 Water Quality Certification and Coastal Zone Management Program Consistency Determination will be required for the proposed action.

In as much as the proposed action involves driveway improvements on Hana Highway, a State of Hawai'i facility, and project related utility infrastructure connections across Hana Highway, an Environmental Assessment (EA) is being prepared in accordance with Chapter 343, Hawai'i Revised Statutes. It is anticipated that the Maui Planning Commission will be the Approving Agency for the EA..."

The Department of Health (DOH), Clean Water Branch (CWB), is providing the following general comments. Please note that our review is based solely on the information provided in your letter and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. The CWB recommends that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

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

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

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

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

2. Pursuant to Federal Water Pollution Control Act (commonly known as the "Clean Water Act" (CWA)), Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for this project. Messrs. Benjamin Brown and Robert McDaniel were informed (No. 12139CEC.08, dated December 29, 2008, copy enclosed) by the CWB of this requirement.

The Section 401 WQC Application Forms and Guidelines may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/wqc-index.html.

3. The Applicant is required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of potential discharges into Class A or Class 2 State waters, the Applicant may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

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

   b. Hydrotesting effluent.

   c. Construction site dewatering effluent.

   The Applicant must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

4. For types of wastewater discharges not listed in Item No. 3 above or wastewater discharging into Class 1 or Class AA waters, the Applicant may need to obtain an NPDES individual permit.

   Class 1 waters include, but is not limited to, all State waters in natural reserves, preserves, sanctuaries, and refuges established by the Department of Land and Natural Resources (DLNR) under Hawaii Revised Statutes (HRS), Chapter 195, or similar reserves for the protection of aquatic life established under HRS, Chapter 195.

   An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

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

6. A wetland mitigation/compensation plan will be required to mitigate the losses of wetlands function and acreages. On-site mitigation shall be required for wetlands function (i.e., storm water retention, filtration, sedimentation, nutrients, heavy metal, and petroleum product uptake, etc.) losses. Mitigation plan shall also include Best Management Practices measures designed and implemented to mitigate the potential post construction/operations related "increasing in loadings of pollutants of concerns." The DEA should properly discuss the address these issues.

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

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

Sincerely,

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

EC :np

Enclosure: December 29, 2008 letter (No. 12139CEC.08) to Mr. Benjamin Brown

c. Dr. Wendy Wiltse, PICO, EPA, Region 9 (w/o encl.) [via fax 541-2712 only]
Regulatory Branch, HED, COE (w/o encl.) [via fax 438-4060 only]
CZM, Office of Planning, DBEDT (w/o encl.) [via fax 587-2899 only]
CWRM, DLNR (w/o encl.) [via fax 587-0219 only]
EPO, DOH (w/o encl.) [via e-mail only]
Chief, DEHP, Maui (w/o encl.) [via fax (808) 984-8237 only]
Mr. Benjamin Brown (w/o encl.)
Mr. Robert T. McDaniel III, Maui Medical Plaza at Kanaha (w/o encl.)

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Alec Wong, P.E., Chief
**Attn: Edward Chen, Engineering Section**
Clean Water Branch
State of Hawai`i
Department of Health
P.O. Box 3378
Honolulu, Hawai`i 96801-3378

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawai`i (File No. WQC 0000759/DA File No. POH-2006-531)

Dear Mr. Wong:

Thank you for your letter dated February 10, 2009, responding to our Chapter 343, Hawai`i Revised Statutes (HRS) early consultation request for the subject project. On behalf of the applicant, Kanaha Professional Plaza, LLC, we offer the following responses to the comments noted in your letter:

- We note your comments that the proposed project must meet the criteria set forth in Sections 11-54-1.1 (Antidegradation Policy), 11-54-3 (Designated Uses) and 11-54-4 through 11-54-8 (Water Quality Criteria) of the Hawaii Administrative Rules (HAR).

- A Section 401 Water Quality Certification application has been prepared for the project in accordance with the requirements of the Federal Water Pollution Control Act. This application was submitted to the Clean Water Branch for processing on July 14, 2009.

- A National Pollutant Discharge Elimination System (NPDES) permit will be obtained for the project in accordance with applicable requirements of Section 11-55-38, HAR. A copy of the Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD) determination letter for the project will be submitted along with the Notice of Intent or NPDES permit application, as applicable.

- A wetland mitigation plan has been prepared and submitted to the Department of Army (DA) as part of the Section 404 DA permit process. The DA issued a letter on January 15, 2010 confirming that implementation of the scope of work set forth in the wetland mitigation plan will compensate for the loss of the 0.95-acre of wetlands that will result from construction of the Maui Medical Plaza on the subject property. A program of Best Management Practices (BMPs) will be implemented in conjunction with the invasive species removal and rehabilitation work as part of the wetland mitigation plan. A copy of the wetland mitigation plan will be included in the Draft Environmental Assessment (EA) along with a copy of the DA acceptance letter. The issuance of the DA permit will occur following completion of processing of the Section 401 Water Quality Certification and the Coastal Zone Management (CZM) Consistency applications by the Clean Water Branch and the Office of Planning, respectively.

- The project will comply with all applicable State Water Quality Standards as specified in Chapter 11-54, HAR.

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

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

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:lh
cc: Jim Buika, County of Maui, Department of Planning
Robert McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
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LINDA LINGLE
GOVERNOR OF HAWAII

FEB 13 2009

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

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

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

February 13, 2009

Ms. Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Ms. Dagdag-Andaya:

**Subject: Early Consultation Request for Proposed Maui Medical Plaza**
**TMK: (2) 3-7-0011:028**

Thank you for the opportunity to comment on the Proposed Maui Medical Plaza. The following comments are offered:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage may be required for this project. The Clean Water Branch should be contacted at 808 586-4309.

2. Army Corps of Engineers should be contacted at (808) 438-9258 to identify whether a Federal license or permit is required for this project. Pursuant to Section 401(a)(1) of the Federal water Pollution Act, a Section 401 Water Quality Certification maybe required.

3. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules (HAR), Chapter 11-46 "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work.

4. HAR, Chapter 11-46, sets maximum allowable sound levels from stationary equipment such as compressors and HVAC equipment. The attenuation of noise from these sources may depend on the location and placement of these types of equipment. This should be taken into consideration during the planning, design and construction of the building and installation of these types of equipment.

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

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

Sincerely,

Patti Kitkowski

Patti Kitkowski
Acting District Environmental Health Program Chief

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Patti Kitkowski, Acting District Environmental Health Program Chief
**Department of Health**
State of Hawai`i
54 High Street
Wailuku, Hawai`i 96793

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawai`i

Dear Ms. Kitkowski:

Thank you for your letter, dated February 13, 2009, providing early consultation comments on the subject project. On behalf of the applicant, Kanaha Professional Plaza, LLC, we would like to provide the following in response to your comments:

***Response to Comment No. 1***

We acknowledge your comment that a National Pollutant Discharge Elimination System (NPDES) permit may be required for the project. Your comments have been forwarded to the project engineer for appropriate action.

***Response to Comment No. 2***

The applicant is currently in coordination with the Department of Army (DA), the Department of Health (DOH), and the Office of Planning to address Federal permitting requirements for the proposed project. A DA Permit, Section 401 Water Quality Certification, and Coastal Zone Management Consistency Determination will need to be obtained from these respective agencies prior to project implementation. A list of Federal, State, and County permits required for the project will be included in the Draft Environmental Assessment (EA).



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

***Response to Comment No. 3***

The project will comply with applicable requirements of Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control". A copy of your comments has been forwarded to the project civil engineer for review and action should a noise permit need to be obtained prior to construction.

***Response to Comment No. 4***

We note your comments regarding HAR, Chapter 11-46 which sets maximum allowable sound levels from stationary equipment (including compressors and HVAC equipment). Opportunities for the attenuation of noise from these sources will be identified during the design and construction phase of the project.

Other standard comments listed on the DOH website will also be reviewed by the project design team and addressed, as applicable.

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

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

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
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FEB 2 0 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 18, 2009

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

Attention: Ms. Rowena M. Dagdag-Andaya, Planner

Ladies and Gentlemen:

Subject: Early Consultation Request for Proposed Maui Medical Plaza

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

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

Sincerely,

Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

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

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 4, 2009

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2009 FEB -6 A 10:00
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
~~Div. of Boating & Ocean Recreation~~
x Engineering Division
x ~~Div. of Forestry~~ & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –

FROM: for Morris M. Atta Charlene
SUBJECT: Early consultation request for Proposed Maui Medical Plaza
LOCATION: Kahului, Maui, TMK: (2) 3-7-11:28
APPLICANT: Munekiyo & Hiraga, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 15, 2009.

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

Attachments

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

Signed: [signature]
Date: 2/6/09

**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**ENGINEERING DIVISION**

**LD/MorrisAtta**
**Ref.:EarlyConMauiMedicalPlaza**
**Maui.445**

COMMENTS

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ___.

(X) Please note that the project site, according to the Flood Insurance Rate Map (FIRM), is **located in Flood Zone C. The National Flood Insurance Program does not have any regulations for developments within Zone C.**

( ) 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 Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

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

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments:_____

_____

( ) Other:_____

_____

Should you have any questions, please call Ms. Suzie S. Agraan of the Planning Branch at 587-0258.

Signed: _____
ERIC T. HIRANO, CHIEF ENGINEER

Date: 2/6/09

LINDA LINGLE
GOVERNOR OF HAWAII

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

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STATE OF HAWAII

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 4, 2009

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –

FROM: for Morris M. Atta Charlene
SUBJECT: Early consultation request for Proposed Maui Medical Plaza
LOCATION: Kahului, Maui, TMK: (2) 3-7-11:28
APPLICANT: Munekiyo & Hiraga, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 15, 2009.

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

Attachments

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

Signed: Paul J Conry
Date:

PAUL J. CONRY, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE
FEB 11 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL ST., ROOM 325
HONOLULU, HAWAII 96813
TEL (808) 587-0166 FAX (808) 587-0160

February 9, 2009

Mr. Peter A. Horovitz, Attorney At Law, LLLC
305 High Street, Suite 101
Wailuku, Maui, Hawaii 96793

Dear Mr. Horovitz:

RE: Your Facsimile Letter of January 20, 2009 on Proposed Action Affecting Kanaha Pond Wildlife Sanctuary Bearing TMK No. (2) 3-8-001-019.

Thank you for your letter requesting a determination from DLNR, Division of Forestry and Wildlife that an Environmental Assessment (EA) is not needed for the actions proposed by Maui Medical Plaza LLC as mitigation for filling the wetland area on Lot 8 of the Kanaha Industrial Subdivision.

The US Army Corps of Engineers (USACE) to our knowledge is currently in the process of determining whether the 0.95-acre jurisdictional wetlands on Lot 8 may be filled, and if the proposed mitigation plan is adequate for providing the legally necessary mitigation for the fill authorization. The Division of Forestry & Wildlife (DOFAW) has provided a letter (attached) to the USACE District Engineer on 14 January 2009 with our comments to the Public Notice by the USACE. To date we have not been contacted by the USACE with their response to our comments.

Furthermore, we have not seen a revised mitigation plan incorporating comments from agencies or USACE. Once we receive these comments and revised mitigation plan from USACE, we anticipate discussions to move forward with USACE on the mitigation proposals. It is premature to discuss an exemption for an EA requirement until the project details are identified. The Department will need to comply with chapter 343, HRS requirements for any mitigation work on State lands such as the Kanaha Pond Wildlife Sanctuary, which is zoned conservation. Depending on the scope of work, this could be addressed through the Division's approved exemption list or with an EA. Also, be aware that additional permits may be required such as a Conservation District Use Application from DLNR, Office of Conservation and Coastal Lands or a Habitat Conservation Plan requirement for endangered water birds from DLNR.

At this point, DOFAW has offered lands near Kanaha Pond as a potential site for the developer to propose and implement mitigation work. Initiation of the proposal is dependant on USACE authorization for the mitigation work and our review and acceptance of the final mitigation plan. We support the removal of the date palms and other invasive species followed by replanting of native wetland sedge species on 1.1 acres at KPWS. This idea was presented to USACE and EPA as a possible management resolution. We agree that this work will improve the habitat at KPWS and accomplish restoration work that we needed to complete at KPWS. However, we reserve final comments on the adequacy of the site, and the scope of the proposed mitigation, pending discussion with the USACE and USFWS on the completed mitigation plan. Please call Fern Duvall, Wildlife Biologist on Maui at 873-3502, if you have questions regarding the use of Kanaha Pond lands and other mitigation opportunities.

Sincerely Yours,

Paul J. Conry
Administrator

C: John Cumming, DOFAW Maui
Fern Duvall, DOFAW Maui
DLNR, OCCL

Attachment

LINDA LINGLE
GOVERNOR OF HAWAII

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813
TEL (808) 587-0166 FAX (808) 587-0160

January 14, 2009

District Engineer
U.S. Army Corps of Engineers
Building 230
Fort Shafter, Hawai'i 96858-5440

Reference: Public Notice No. POH-2006-531

Dear District Engineer,

Thank you for the opportunity to comment on the proposed construction of a new building at a vacant, undeveloped, 2.49-acre lot adjacent to the State of Hawai'i, Kanaha Pond Wildlife Sanctuary in Kahului, Maui. We have reviewed the information you provided and pertinent information in our files and do not support the development of this designated jurisdictional wetland unless adequately mitigated.

The proposed project lies adjacent to the boundary of the Kanaha Pond State Wildlife Sanctuary (KPWS), a National Natural Landmark established for the protection, management, and conservation of indigenous wildlife. KPWS is home to several endangered Hawaiian waterbirds and serves as an important foraging and loafing site for numerous waterfowl and shorebird species protected under the Migratory Bird Treaty Act. We have included a list of species that have been documented to use the project site or adjacent areas and that may be affected by the proposed project in Table 1.

Wetland habitats in the Hawaiian Islands are severely restricted as approximately 31 percent of coastal plain wetlands have been lost in Hawaii. The Recovery Plan for Endangered Hawaiian Waterbirds (Service 2005) lists loss of wetland habitat as a major threat to waterbird recovery. On the island of Maui, some of the largest concentrations of the endangered Hawaiian Coot and endangered Hawaiian Stilt occur adjacent to the proposed project at the KPWS. In addition, the endangered Hawaiian Duck is also known to forage and nest within the vicinity of the proposed Maui Medical Plaza at Kanaha project site.

The Division of Forestry and Wildlife strongly feels that the wetland status of this site should be valued and that no filling and construction be allowed. We encourage the Army to protect this wetland habitat from development, runoff, erosion, and fill. We highly recommend that the proposed wetland site receive the management necessary to eliminate invasive vegetation and restore the original water surface area.

The Department of Land and Natural Resources, Division of Forestry and Wildlife does not support construction of the Maui Medical Plaza at Kanaha as the Division does not support filling of a designated jurisdictional wetland unless adequately mitigated. Mitigation should include the creation of new wetlands to replace those that are taken. If a permit for fill and construction is issued by the Army, construction activities and lighting of the property could potentially impact the endangered species residing at KPWS. Such impacts to wildlife resources, which hold both biological and cultural significance to the people of Hawaii, will need to be addressed.

As currently described the proposed project may result in the take of State listed species. Because the proposed project may impact threatened and endangered species an "Incidental Take License" should be obtained from the State under Hawai'i Revised Statute 195D, and "Incidental Take Permit" from U.S. Fish & Wildlife under the Endangered Species Act. Issuance of these permits requires an approved habitat conservation plan (HCP) developed through consultation with the agencies and other appropriate parties.

Thank you for the opportunity to review and comment on the proposed project. If you have questions regarding this letter or need further assistance, please contact Fern Duvall, DOFAW Wildlife Biologist (phone: 808-873-3502).

Sincerely,

Paul J. Conry
Administrator

Cc: Fern Duvall, DOFAW
C: Norma Bustas



25

Table 1. Species List for Maui Medical Plaza at Kanaha. These species have been documented within the general project vicinity and could be affected by the proposed project.

| Common Name | Scientific Name | Status |
|---|---|---|
| **Birds** | | |
| Hawaiian stilt | *Himantopus mexicanus knudseni* | Endangered |
| Hawaiian coot | *Fulica alai* | Endangered |
| Hawaiian duck | *Anas wyvilliana* | Endangered |
| Wedge-tailed shearwater | *Puffinus pacificus* | MBTA |
| Hawaiian Owl | *Asio flammeus sandwichensis* | MBTA |
| Northern Shoveler | *Anas clypeata* | MBTA |
| Northern Pintail, koloa mapu | *Anas acuta* | MBTA |
| American wigeon | *Anas americana* | MBTA |
| Blue-winged Teal | *Anas discors* | MBTA |
| Green-winged Teal | *Anas crecca* | MBTA |
| Eurasian Wigeon | *Anas penelope* | MBTA |
| Lesser Scaup | *Aythya affinis* | MBTA |
| Bristle-thighed Curlew | *Numenius tahitiensis* | MBTA |
| Sanderling | *Calidris alba* | MBTA |
| Pacific golden Plover | *Pluvialis fulva* | MBTA |
| Black-bellied Plover | *Pluvialis squatarola* | MBTA |
| Semipalmated Plover | *Charadrius semipalmatus* | MBTA |
| Killdeer | *Charadrius vociferus* | MBTA |
| Greater Yellowlegs | *Tringa melanoleuca* | MBTA |
| Lesser Yellowlegs | *Tringa flavipes* | MBTA |
| Willet | *Caliptrophorus semipalmatus* | MBTA |
| Wandering Tattler | *Heteroscelus incanus* | MBTA |
| Bar-tailed Godwit | *Limosa lapponica* | MBTA |
| Ruddy Turnstone | *Arenaria interpres* | MBTA |
| Red Knot | *Calidris cantus* | MBTA |
| Semipalmated Plover | *Calidris pusilla* | MBTA |
| Western Sandpiper | *Calidris mauri* | MBTA |
| Rufous-necked Stint | *Calidris ruficollis* | MBTA |
| Least Sandpiper | *Calidris minutilla* | MBTA |
| Pectoral Sandpiper | *Calidris melanotos* | MBTA |
| Sharp-tailed Sandpiper | *Calidris acuminata* | MBTA |
| Dunlin | *Calidris alpina* | MBTA |
| Short-billed Dowitcher | *Limnodromus griseus* | MBTA |
| Long-billed Dowitcher | *Limnodromus scolopaceus* | MBTA |
| Common Snipe | *Capella gallinago* | MBTA |
| Wilson's Phalarope | *Phalaropus tricolor* | MBTA |
| Nothern Phalarope | *Phalaropus lobatus* | MBTA |
| Laughing Gull | *Larus atricilla* | MBTA |
| Franklin's Gull | *Larus pipixcan* | MBTA |
| Bonaparte's Gull | *Larus philadelphia* | MBTA |

| | | |
|---|---|---|
| Ring-billed Gull | *Larus delawarensis* | MBTA |
| Great Black-backed Gull | *Larus fuscus* | MBTA |
| Herring Gull | *Larus argentatus* | MBTA |
| Caspian Tern | *Sterna caspia* | MBTA |
| Royal Tern | *Sterna maximus* | MBTA |
| Common Tern | *Sterna hirundo* | MBTA |
| Grey-backed Tern | *Sterna lunata* | MBTA |
| Black-crowned Night Heron | *Nycticorax nycticorax* | MBTA |
| | | |
| **Invertebrates** | | |
| Blackburn Sphinx Moth | *Manduca blackburni.* | Endangered |
| Kahului Aweweo Long-horn Beetle | *Plagithmysus kahului* | Newly discovered, Rare |

FEB 27 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 25, 2009

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

Attention: Ms. Rowena M. Dagdag-Andaya, Planner

Ladies and Gentlemen:

Subject: Early Consultation Request for Proposed Maui Medical Plaza

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

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene E. Unoki

for Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

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

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LAND DIVISION
2009 FEB 19 P 3:11
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES: 2075

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| DIRECTOR | |
| COMM. FISH. | |
| AQ RES/ENV | |
| AQ REC | |
| PLANNER | |
| STAFF SVCS | |
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| Return to: | |
| No. Copies | |
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SH

February 4, 2009

MEMORANDUM

TO: **DLNR ~~Agencies~~:**
x Div. of Aquatic Resources
__ ~~Div. of Boating~~ & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
__ Div. of State Parks
__ Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__ Land Division –

RECEIVED
FEB 5 2009
AQUATIC RESOURCES

FROM: Morris M. Atta
SUBJECT: Early consultation request for Proposed Maui Medical Plaza
LOCATION: Kahului, Maui, TMK: (2) 3-7-11:28
APPLICANT: Munekiyo & Hiraga, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 15, 2009.

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

Attachments

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

Signed:
Date: 2/18/09

LINDA LINGLE
GOVERNOR OF HAWAII

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

AQUATIC RESOURCES: 2075

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|---|---|
| DIRECTOR | |
| COMM. FISH. | |
| AQ RES/ENV | |
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| PLANNER | |
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**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 4, 2009

RECEIVED
FEB 5 2009
AQUATIC RESOURCES

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –

FROM: Morris M. Atta
SUBJECT: Early consultation request for Proposed Maui Medical Plaza
LOCATION: Kahului, Maui, TMK: (2) 3-7-11:28
APPLICANT: Munekiyo & Hiraga, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 15, 2009.

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

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached. (Previous)

Signed: Skippy Hau
Date: 2/18/09

RECEIVED
Maui
FEB 17 2009
Div. of Aquatic Resources

DIVISION OF AQUATIC RESOURCES - MAUI
DEPARTMENT OF LAND & NATURAL RESOURCES
130 Mahalani Street
Wailuku, Hawaiÿi 96793
January 6, 2009

To: Alton Miyasaka, Aquatic Biologist

From: Skippy Hau, Aquatic Biologist

Subject: Lot 8 wetland TMK (2) 3-7- :028 Kahului Maui
POH – 2006-531
(Respond by Jan. 16, 2009 USACOE Honolulu District)

In past surveys, we've documented an assortment of introduced fish species including topminnows, guppies, & "armored catfish" in the Kahului-Kanaha area.

The armored catfish (over ten-inches in total length) was first reported in the canal next to the Kahului Safeway. I captured several to confirm their presence and eventually observed several in the "drainage canal" adjoining Kanaha Pond. There is "no separation" of the pond from other drainage areas so Kanaha Pond would be susceptible to intentional or accidental species introductions. At the time, they appeared to have excaped from the shallow drainage canals and survived in the deeper cold water of the Pond.

There has been no current survey of aquatic species (including invertebrates) for this specific location. We appear to be experiencing a third year of below average rainfall. Any mitigation projects to increase flood storage capacity, the establishment of native plant species, and stability to the wetland ecosystem for native organisms would be a significant improvement.

I hope this project might provide a better transition between the building structure and the natural wetland areas. Have the planners considered the impact of shadows that occur in the late afternoon on the native ecosystem? Selective planting of vegetation areas could help.

Have existing stilt areas been identified or the possibility of improving areas for bird nesting and foraging? The wetland could be showcased and be a unique highlight for this project rather than an encroachment of development on the aquatic habitat.

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 16, 2010

Morris M. Atta, Administrator
**Department of Land and Natural Resources**
**Land Division**
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawaii

Dear Mr. Atta:

I am writing to you today, on behalf of Kanaha Professional Plaza, LLC, to thank you for your letters, dated February 18, 2009 and February 25, 2009, providing early consultation comments on the subject project from the Engineering Division, Division of Forestry and Wildlife and Division of Aquatic Resources. We offer the following information in response to the comments noted. Our responses have been arranged according to the division from which they were received:

***ENGINEERING DIVISION***

1. We acknowledge the information provided on the Flood Insurance Rate Map (FIRM) designation for the subject property. The FIRM maps for Maui County have been recently updated and now utilize Flood Zone X to designate areas subject to minimal flooding. As such, the most recent flood zone designation (Flood Zone X) will be used in the Draft Environmental Assessment (EA).

***DIVISION OF FORESTRY AND WILDLIFE***

1. We thank you for providing copies of the correspondence that was previously issued by your office during the Section 404 compensatory mitigation process for the project. A wetland mitigation plan has been prepared by Penny Levin, Conservation Planner, in coordination with Federal and State agencies, including the Department of Land and Natural Resources (DLNR), to compensate for the loss of 0.94-acre of degraded wetland that will result from the implementation of the Maui Medical Plaza project. This plan, involving the rehabilitation of a 5-acre portion of wetland in the Waihee Coastal Dunes and Wetlands Refuge, was formally accepted by the U.S. Army Corps of Engineers (USACE) on January 15, 2010. Issuance of the Department of Army (DA) Permit for the wetland mitigation work will occur following receipt of a Section 401 Water Quality Certification (from the Department of Health) and a Coastal Zone Management Consistency Determination (from the Office of Planning). We are attaching a letter from Penny Levin summarizing the process that was undertaken in the formulation and acceptance of this plan. See **Exhibit "A"**. A copy of the final wetland mitigation plan and USACE acceptance letter will be included in the Draft EA for the project.

***DIVISION OF AQUATIC RESOURCES***

1. We note the comments provided regarding the introduced fish species that have been documented in the Kahului-Kanaha region as a result of past surveys. We also note that there have been no surveys completed to assess fish populations in the drainage canal that lies between the subject property and the Kanaha Pond Wildlife Sanctuary. There are no improvements to the drainage canal (which is not owned by Kanaha Professional Plaza, LLC) being proposed as part of the Maui Medical Plaza project. A comprehensive drainage system has been designed to retain project-related increases in drainage flows across the property, as well as existing offsite run-off entering the property from Hana Highway. Implementation of this drainage system will improve existing drainage conditions in the area and will ensure that there are no impacts on downstream properties (including the drainage canal and nearby Kanaha Pond) generated by the proposed project. A description of the proposed drainage system and associated capacities will be provided in the Draft EA, as well as a copy of the Preliminary Drainage Report for the project.

2. We note your comment regarding the effect of late-afternoon shadows cast by the proposed Maui Medical Plaza building. The subject property is separated from the Kanaha Pond Wildlife Sanctuary by the drainage canal referenced in the foregoing response. It is estimated that there will be a minimum of 100 feet of separation provided for between the proposed Maui Medical Plaza structures and the nearest point of natural wetland areas within Kanaha Pond. This compares to setback distances of less than 20 feet for certain already-developed structures on other lots within the Kahului Industrial Subdivision. Given the degree of separation provided, the overall availability of sunlight at other times of the day and the low stature of vegetation in the areas near the property, the proposed project is not expected to significantly impact eco-system function of the natural wetland areas within Kanaha Pond.

3. We note your comments regarding the assessment of avi-fauna on the subject property. A Biological Resources Survey of the subject property has been completed as part of the planning process for the proposed project. Though a few Hawaiian stilts were observed flying overhead during the survey, none of the birds were seen to land on the property. The results of this survey will be included in the Draft EA, as well as a copy of the survey itself.

   As noted previously, a wetland mitigation plan has been prepared in coordination with Federal and State agencies, including DLNR, to compensate for the loss of 0.94-acre of degraded wetland that will result from the implementation of the Maui Medical Plaza project. This plan, involving the rehabilitation of a 5-acre portion of wetland in the Waihee Coastal Dunes and Wetlands Refuge, was formally accepted by the U.S. Army Corps of Engineers (USACE) on January 15, 2010. Refer to **Exhibit "A"**.

Implementation of the proposed Maui Medical Plaza on the last remaining undeveloped lot of the Kahului Industrial subdivision is anticipated to provide a reasonable transition between heavy industrial uses located towards Kahului Harbor and the nearby Kanaha Pond Wildlife Sanctuary. A preliminary landscaping plan has been developed for the project with the objective in mind of complementing the natural wetland habitats provided within the Kanaha Pond. The preliminary landscaping plan, a copy of which will be included in the Draft EA, will seek to utilize, where possible, area-appropriate native and drought-tolerant species of landscaping. These landscaping selections will also assist in reducing the amount of potable water use that will be required by the project for irrigation purposes. A viewing platform is also envisioned as part of the project which would be available to patrons and employees of the medical plaza, as well as members of the public. This facility is intended to promote educational awareness of the habitats within the nearby Kanaha Pond. The precise location of the proposed viewing platform in the context of the overall project will be discussed in the Draft EA.

We appreciate the input provided by your department. A copy of the Draft EA will be provided to you for review and comment. Should you have any questions or require additional information, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Attachment
cc: James Buika, County of Maui, Department of Planning
Robert T. McDaniel, Kanaha Professional Plaza
F:\DATA\MauiMedPlaza\Kanaha\DLNR Attaresponse.ltr.doc

APR 30 2010

To: Mark Alexander Roy, AICP, LEED AP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793
Tel: (808) 244-2015
Fax: (808) 244-8729
Email: mark@mhplanning.com

From: Penny Levin
224 Ainahou Place
Wailuku, Hawai'i 96793
Tel: (808) 285-3947 (c)
Email: pennysfh@hawaii.rr.com

RE: Status Update - Section 401 Water Quality Certification Application for Proposed Maui Medical Plaza Project and Related Documents

22 April 2010

Aloha Mr. Roy;

The proposed Maui Medical Plaza at Kanahā (MMPK) development site located at TMK (2) 3-7-11:028 (Lot 8) is zoned M-2 (heavy industrial; Section 19.26.020 Maui County Code). Approximately 0.94 acre of the uneven, triangle-shaped 2.5 acre parcel was determined to be a severely disturbed jurisdictional wetland of low biological/ecological value based on existing conditions, historic records of fill including by the U.S. Army Corps of Engineers (US-ACE), agency site reviews and determinations (US-ACE JD 25 April 2008, found in Appendix D of the original draft mitigation plan). The jurisdictional wetland is located largely in the center of the property making a loss unavoidable.

A wetland mitigation plan was required by the US-ACE to mitigate the loss (fill) of the degraded wetland on the development site. A preferred mitigation site was selected immediately adjacent to the development parcel within the Kanahā Pond Wildlife Sanctuary (KPWS) with the assistance and support of the Hawai'i Department of Land and Natural Resources – Division of Forestry and Wildlife and the US-ACE. The original draft wetland mitigation plan for the MMPK was submitted for review to the US-ACE, along with numerous county, state and federal agencies in July 2009. A 1:5 exchange was accepted by the Corps, pending the Section 401 permit.

In November 2009, the Federal Aviation Administration (FAA) determined that mitigation within Kanahā Pond would present an increased flight hazard risk to Kahului Airport due to a potential increase in local wetland waterbird populations. They concluded that it was "desirable that any wetland mitigation plan for MMPK be conducted outside the 5 statute mile separation distance from the PHOG [from the airport] due to the likelihood of increase [sic] populations of endangered waterbirds and migratory waterfowl that could occur from improvements to existing wetlands at KPWS"

EXHIBIT A

if the exchange was greater than 1:1, thereby ruling out any wetland mitigation within close proximity to the MMPK parcel. This determination made it necessary for MMPK to seek an alternative mitigation site.

No available or appropriate alternatives that could meet the 1:5 criteria set by the US-ACE were found within the drainage or watershed. Due to these circumstances, the Corps allowed for an out-of-watershed mitigation site.

In January 2010, the US-ACE accepted a five acre mitigation within the Waihe'e Coastal Dunes and Wetland Refuge (TMK (2) 3-2-10:1 and 2), a 275 acre parcel located in Waihe'e ahupua'a about 10 miles from the MMPK parcel. The Refuge is owned by the Maui Coastal Land Trust. The mitigation will consist of removal of invasive tree, shrub, vine and tall grass species on five acres (one upland acre to increase hydrologic flows to the wetland and four lowland acres within the wetland). Outplanting of native species will occur within the four lowland acres. The one acre upland site will be maintained to prevent re-encroachment by invasive species. Costs associated with implementation of these actions will be paid for by MMPK, including survey and marking of the designated five acres. The five acres will be maintained by MMPK in perpetuity.

The current status of permits for the MMPK Alternate Mitigation Plan is as follows:

- The US-ACE issued an acceptance of the alternative site plan pending receipt of an amended Section 106 letter from SHPD and a Section 401 determination.
- The Hawai'i State Historic Preservation Office has amended its acceptance of the MCLT mitigation plan (Section 106) to include the MMPK action at the site (January 22, 2010).
- The plan received concurrence from the DA and an SMA has been issued by the Maui Department of Planning (March 15, 2010).
- The original Section 401 Water Quality Certification and CZM application is currently being revised for resubmittal to the Hawai'i Department of Health Clean Water Branch.

Upon receipt of the Section 401 determination from the DOH-CWB, the US-ACE will issue a final determination letter for the MMPK Alternate Mitigation Plan and the Section 404 permit.

Should you have any questions, please feel free to call me at 285-3947.

Sincerely,

Penny Levin
Conservation Planner

LINDA LINGLE
GOVERNOR

MAR 0 3 2009

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:
DIR 0177
STP 8.3144

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

February 27, 2009

Ms. Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

Subject: Early Consultation Request for Draft Environmental Assessment (DEA)
Maui Medical Plaza
Kahului, Maui, Hawaii
TMK: (2) 3-7-011:028

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands that the proposed project involves the construction of a professional medical plaza on a 2.5-acre parcel. The project includes a six (6) story building with a total floor area of 140,000 square feet, a five (5) level parking structure with 300 parking stalls and two accesses to Hana Highway.

This project may generate adverse impacts to the State highway, Hana Highway, and to Kahului Airport. DOT has previously provided comments to the U.S. Army Corps of Engineers regarding the wetland permit action (DOT letter STP 8.3097, dated 1/26/09) and also to the traffic consultant, Mr. Philip Rowell, in response to an early consultation request for a traffic impact analysis report (TIAR) (DOT letters STP 8.2795, dated 3/7/08 and HWY-PS 2.7531, dated 4/7/08). Copies of these letters are attached. All prior DOT comments remain valid and should be addressed in the DEA.

In addition to the above comments, the applicant should also address the following comments in the DEA and continue consultation with the DOT Highways Division Planning Branch, telephone number (808) 587-1830, and the Highways Division Maui District Office, telephone number (808) 873-3538.

1. Please ensure that the TIAR includes proper documentation and all appropriate supporting data (traffic counts), proper disclosure and documentation of assumptions and calculations and analyses (capacity analyses, traffic signal warrants, etc.).

2. DOT is opposed to the location of the proposed driveway at the eastern side of the property. DOT plans to widen Hana Highway to six (6) lanes. The acceleration lane from Haleakala Highway will likely extend onto Hana Highway past the location of this proposed driveway. This would create operational problems for vehicles accessing and exiting this driveway and would also create conflicts with the highway right-of-way.

3. DOT also has concerns regarding the proposed access to Hana Highway at the western corner of the property. To improve circulation and enhance emergency vehicle response, the applicant should consider an alternative project access from Hobron Avenue. There is an existing back road connecting to Hobron Avenue that could be used as a shared project access road. The applicant would need to coordinate this shared use with the owners of adjacent projects, Kitagawa Automotive Recycling Project and Maui Oil Company Car Wash and Terminal Facility, and the Highways Division Maui District Office.

4. DOT concurs with the County of Maui, Department of Transportation comments in its letter to you dated 2/17/09, regarding the increased interest for MAUI BUS riders to access the area and the need to coordinate the placement of bus stop pull-offs and shelters on either side of Hana Highway.

DOT appreciates the opportunity to provide comments. If there are any other questions, please contact Mr. David Shimokawa of the Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

Francis Paul Keeno

for BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation

Attachments: STP 8.3097, dtd. 1/26/09
STP 8.2795, dtd. 3/07/08
HWY-PS 2.7531, dtd. 4/07/08

STP (ET)

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

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

IN REPLY REFER TO:

DIR 1815
STP 8.3097

January 26, 2009

District Engineer
U.S. Army Corps of Engineers (USACE)
Building 230
Fort Shafter, Hawaii 96858-5440

Dear District Engineer:

Subject: Maui Medical Plaza at Kanaha, LLC
U.S. Army Corps of Engineers Permit

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands this permitting action is in regard to the applicant's request to permanently fill in 0.95 acres of U.S. jurisdictional wetlands, known as the Lot 8 wetland, and to discharge fill material regulated under Section 404 of the Clean Water Act.

No action regarding the wetland should adversely impact DOT transportation facilities. Specifically, filling in the wetland should not alter the area drainage system capacity such that there is an impact to the State highway, Hana Highway. No additional storm water or discharge from the project site will be allowed to flow onto the State highway right-of-way.

DOT concerns for project-generated transportation impacts were submitted to the project traffic consultant, Phillip Rowell & Associates. Please contact Mr. David Shimokawa of the Statewide Transportation Planning Office at (808) 587-2356 if you wish to discuss these impacts or if there are any additional questions.

Very truly yours,

BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation

ET:km
bc: HWY-P, -M, AIR-EP, STP(ET)

40

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

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

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

IN REPLY REFER TO:

HWY-PS
2.7531

April 7, 2008

Mr. Phillip Rowell, P.E.
Principal
Phillip Rowell and Associates
47-273 'D' Hui Iwa Street
Kaneohe, Hawaii 96744

Dear Mr. Rowell:

Subject: Proposed Maui Medical Plaza and Related Improvements at
51 Hana Highway
Maui, Wailuku District, Kahului, TMK: (2) 3-7-011:028

Thank you for your letter requesting our preliminary comments regarding the access plan for the proposed Maui Medical Plaza which fronts Hana Highway in Kahului. We have the following comments:

1. The location and design of the project access and the internal traffic circulation within the project should be well-planned in such a way that it will not create vehicle back-up onto Hana Highway, as well as to minimize conflicting traffic vehicular movements at adjacent property's accesses with Hana Highway.

2. Hana Highway in this area is functionally classified as a principal arterial highway, and it is intended to move traffic efficiently between populated regions. To preserve capacity and safety, the number of access points along Hana Highway must be limited/minimized.

3. We suggest that you consult our Highways Division, Traffic Branch regarding design standards and specifications for commercial access driveways fronting our State Highways.

4. The Traffic Impact Analysis Report (TIAR) should include worksheets and discussions on (a) sight distance requirements at the access (entrance/exit) driveways (b) deceleration lane requirements, etc.

5. We have future plans to widen Hana Highway/Kaahumanu Avenue to Dairy Road from four to six lanes. There is also a future bikeway on this segment of Hana Highway.

6. We suggest that the applicant/developer contact our Highways Division, Right-of-Way Branch at (808) 692-7325 to verify existing vehicle permitted access location, if any, and to discuss access requirements before planning any development of the property.

7. The "Grant of Limited Vehicle Access Rights" document should state that further development of the sites requiring intensification of use or widening will require re-evaluation by the Highways Division and may require additional improvements or value appraisal for consideration.

8. All requests for future use of State lands will require a review of Chapter 343 HRS prior to any approvals.

9. Applicant/developer shall consult/coordinate with our Highways Division, Maui District Office for any additional roadway issues and concerns caused by the proposed project.

If there are any questions, please contact Ken Tatsuguchi, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
INTERIM DIRECTOR

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

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

IN REPLY REFER TO:

STP 8.2795

March 7, 2008

Rec'd 4-19-08
PJR

Mr. Phillip Rowell, P.E.
Principal
Phillip Rowell & Associates
47-273 'D' Hui Iwa Street
Kaneohe, Hawaii 96744

Dear Mr. Rowell:

Subject: Kanaha Professional Plaza LLC (Maui Medical Plaza)
Traffic Impact Analysis Report (TIAR) – Pre-Assessment Consultation
TMK: 3-7-011: 028

Thank you for requesting the Department of Transportation's (DOT) preliminary review of the proposed access plan for a new six-story medical building (including a 370-stall parking garage). DOT's comments are as follows:

1. The applicant must coordinate and consult with the DOT Highways Division Highways Maui District Office on the project's driveway accesses to Hana Highway. These two accesses must satisfy State highway standards and requirements including any applicable environmental assessment. Preliminary concerns regarding the project accesses include:

    a. Exhibit "C" shows the layout of the accesses to and from the parking garage and Hana Highway. The driveway exit located on the west corner of the subject property shows a driveway to an adjoining lot. More information should be provided regarding its impact on traffic exiting the subject project.

    b. Additional information regarding the use and operation of the second driveway access to Hana Highway, located on the Kanaha Pond side of the property, should also be provided.

2. Construction plans for any work by the applicant within, adjoining or affecting the State highway must be in accordance with Hawaii State highway and AASHTO standards, including ADA requirements, and be submitted to the DOT Highways Division, through the Maui District Office, for review and approval. This shall include appropriate construction and environmental permits, e.g. NPDES, including any applicable permits from the DOT Highways Division. No additional storm water discharge will be allowed onto the highway right-of-way and highway improvements required for this application should be provided at no cost to the State.

3. The TIAR being prepared by the applicant should reflect the impacts from the subject project, any cumulative impacts due to the addition of project traffic to traffic in the area, and all required mitigation measures.

4. The applicant may need to submit a completed Federal Aviation Administration (FAA) Form 7460-1 (Notice of Proposed Construction or Alternation) to the FAA Maui Airport District Office for review, with copies to our Airports Planning Section and Airports Maui District Manager. The FAA will determine if any construction work, materials or improvements will create interference (e.g. light reflection emissions, etc.) with aircraft flights.

We appreciate the opportunity to provide DOT's initial comments. The DOT looks forward to receiving full plans and associated documents on the proposed medical facility for further review and comments.

Very truly yours,

BRENNON T. MORIOKA, PH.D., P.E.
Interim Director of Transportation

c: Jeffrey Hunt, Maui Planning Department

02-17-09P02:25 CSMD

State of Hawaii
Department of Transportation
**MEMORANDUM**

DIR 0177
HWY-PS
2.0865

**TO:** STP **DATE:** February 13, 2009

**FROM:** HWY-P, Ken Tatsuguchi

**SUBJECT:** Early Consultation for Draft Environmental Assessment (Draft EA)
Maui Medical Plaza (Kanaha Professional Plaza, LLC), 51 Hana Highway
Maui, Wailuku District, Kahului, TMK: (2) 3-7-011:28

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Please incorporate prior comments provided as appropriate. We also request that the applicant be advised that the Traffic Impact Analysis Report (TIAR) to be prepared for the subject project must include proper documentation as well as all appropriate supporting data (traffic count), proper disclosure and documentation of assumptions, and calculations and analyses (capacity analyses, traffic signal warrants, etc.).

c: HWY-M, HWY-PS (09-042)

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Brennon T. Morioka, Ph.D., P.E., Director
**Department of Transportation**
State of Hawaii
869 Punchbowl Street
Honolulu, Hawai`i 96813

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawaii (DIR 0177, STP 8.3144)

Dear Mr. Morioka:

I am writing to you today, on behalf of Kanaha Professional Plaza, LLC, to thank you for your letter, dated February 27, 2009, providing early consultation comments on the subject project.

We acknowledge receipt of the previous correspondence (HWY-PS 2.0865, STP 8.3097, HWY-PS 2.7531 and STP 8.2795) noted in your letter providing preliminary comments on the draft Traffic Impact Analysis Report (TIAR) that was prepared for the project in 2008 by Phillip Rowell & Associates. Since issuance of these comments, AECOM has been retained by Kanaha Professional Plaza, LLC to prepare a revised TIAR which addresses the traffic-related comments noted in this earlier correspondence. A revised TIAR was prepared for the project and submitted to the Department of Transportation (Department) for review on September 17, 2009. See **Exhibit "A"**. Following review by the Department, a final TIAR was prepared responding to additional comments and input received from the various divisions in your office (including HWY-DT, HWY-D, HWY-RM and HYW-M). The final TIAR was submitted to your office (along with a request for vehicle access rights for the two (2) proposed project driveways) on February 23, 2010 for review and approval. See **Exhibit "B"**. On March 18, 2010, the Department issued a conditional approval of vehicle access rights for the two (2) project driveways. This conditional approval was executed by Kanaha Professional Plaza, LLC on March 25, 2010 and a copy of the signed letter was returned to your office for your files. See **Exhibit "C"**. Kanaha Professional Plaza, LLC will be working in coordination with your office to address compliance with the twelve (12) conditions that were attached to the approval of vehicle access rights for the project.

In regards to your comment in STP 8.3097 (letter dated January 26, 2009), a wetland mitigation plan has been accepted by the U.S. Army Corps of Engineers to compensate for the loss of 0.94 acre of degraded onsite wetland that will result from implementation of the proposed project. This mitigation action will involve the rehabilitation of five (5) acres of wetland at the Waihee Coastal Dunes & Wetland Refuge located approximately ten (10) miles from the project. We note your comment stating that no additional storm water from the project site will be allowed to flow onto the State-owned Hana Highway right-of-way. A drainage system has been designed for the project to retain all project-related increases in run-off, as well as offsite run-off currently entering the property from Hana Highway. A description of the proposed drainage system will be included in the Draft Environmental Assessment (EA), as well as a copy of the Preliminary Drainage Report.

In regards to your Comment No. 4 in STP 8.2795 (letter dated March 7, 2008), Federal Aviation Administration (FAA) Form 7460-1 (Notice of Proposed Construction or Alternation) was submitted to the FAA. A Determination of No Hazard to Air Navigation was issued for the project on July 30, 2009, a copy of which is provided as **Exhibit "D"**.

A copy of the Draft EA for the project will be provided to your office for review and comment. Should you have any questions or require additional information, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Attachment
cc: James Buika, County of Maui, Department of Planning
Robert T. McDaniel, Kanaha Professional Plaza
Lloyd Lee and Warren Yamamoto, AECOM
F:\DATA\MauiMedPlaza\Kanaha\SDOTresponse.022709.ltr.doc

AECOM

**AECOM Pacific, Inc.**
841 Bishop Street, Suite 1900, Honolulu, Hawaii 96813
T 808 521.3051 F 808 524.0246 www.aecom.com

September 17, 2009

Mr. Ferdinand Cajigal, District Engineer
State of Hawaii, DOT, Highways Division, Maui District
650 Palapala Drive
Kahului, Maui, Hawaii 96732

Dear Mr. Cajigal:

SUBJECT: **REQUEST FOR APPROVAL OF VEHICULAR ACCESS FROM HANA HIGHWAY FOR "MAUI MEDICAL PLAZA AT KANAHA", TMK (2) 3-7-011-028**

AECOM Pacific, Inc. was hired by Maui Medical Plaza Group to conduct a Traffic Impact Analysis Report (TIAR), and process a request for the granting of approval for vehicular accesses from the project site onto Hana Highway.

Attached are three (3) copies of the Final "TIAR for Maui Medical Plaza at Kanaha", dated August 2009 for your review and comments.

Also attached are the exhibits for your review and granting of approval for these vehicular accesses from the project site. Please note that the existing entry vehicular access would remain in the same location and the traffic movements would remain the same. Exiting vehicles from this access would be limited to "right-turn ONLY". Some road improvements to this access are planned to improve entry and exit movements.

The second requested vehicular access is a new access. This new access will also be limited to "right-turn ONLY' to improve the "level of service" at the existing access for project generated traffic.

The attached exhibits are:

Exhibit "A": HDOT Right-of-Way Map showing location of the existing and The proposed new access [three (3) copies]

Exhibit "B": HDOT Existing Signing and Pavement Marking Plan [three (3) copies]

Exhibit "C": Maui Medical Site Plan showing proposed road improvements on-site and on Hana Highway [three (3) copies]

EXHIBIT A

Exhibit "D": Maui Medical Site Plan Showing Road Improvements On Hana Highway between Kamehameha Avenue and Wakea Avenue [three (3) copies]

The proposed Maui Medical Plaza facility is a much needed medical facility to serve the Maui community..

I would be happy to meet with you to discuss this request. You may contact me at 808-345-7744.

I would also like to meet with your Oahu staff to enhance the review and approval of our request. I would appreciate a list of agencies, names, and contact numbers of persons who would be involved in this review and approval process.

Your continued understanding and processing of our request are appreciated.

Thank you.

Sincerely.

Lloyd P.C.W. Lee, ~~Sr., P.E.~~
Senior Project Manager
AECOM Pacific, Inc.

Encls.

cc: Bob McDaniel w/encls.
AECOM Pacific, Inc. w/encls.

ll:mauimedicalplazaHDOT

AECOM
100 Pauahi Street
Suite 207
Hilo, HI 96720
www.aecom.com

808 961 2776 tel
808 935 5934 fax

February23, 2010

Mr. Ferdinand Cajigal
District Engineer, Maui
Company State of Hawaii, Department of Transportation, Highways Division, Maui
650 Palapala Drive
Kahului, Maui, Hawaii 96732

Dear Mr. Cajigal:

**Subject: REQUEST FOR APPROVALA OF VEHICULAR ACCESS FROM HANA HIGHWAY FOR "MAUI MEDICAL PLAZA AT KANAHA", TMK (2) 3-7-011-028**

This is the second letter requesting the granting of approval for two (2) vehicular accesses from Hana Highway for subject project. The first request was sent to you on September 17, 2009 which was forwarded to your Oahu HDOT offices for review and comments (HWY-M 2.479-09, dated September 28, 2009).

Comments were received by HWY-D, HWY-DT, HWY-M, and HWY-RM, and these comments were sent to me on October 4, 2009 (refer to Exhibit "A").

HWY-DT Comments:

1. Closing of the left-turn lane and the median opening at the project's entrance driveway upon completion of the HDOT's signalization of the Hana Highway/Wakea Avenue intersection is acceptable;
2. U-turn analysis completed and included in Final TIAR. Construction of separate storage lane (refer to Figure 9) will mitigate backups on Hana Highway as recommended;
3. Construction of an additional right-turn lane that will provide double right-turn movements from Kamehameha Avenue onto Hana Highway (refer to Figure 8) will improve the LOS. Refer to the Final TIAR for other recommended alternatives to mitigate this concern;
4. Exiting motorists from the existing project driveway will be restricted from entering the left-turn lane on Hana Highway (refer to Figure 2);
5. Shuttle drop-offs and pick-ups are planned to be done on-site and not on Hana Highway. County Transportation Department requested a "bus stop" be installed fronting the project on Hana Highway (refer to Figure 2);
6. The project will construct the HDOT planned "third lane" on Hana Highway along the project frontage including a separate "decel/acel" lane. The proposed weaving area of the project traffic will occur in this new "third lane" which is separated from the two (2) lanes on Hana Highway. The traffic entering the project will be allowed to exit using the existing vehicular access or the new access driveways (refer to site plan, Figure no. 2).

EXHIBIT B

HWY-D Comments:

1. Discussions were held with HDOT HWY-M and –D to address the proposed widening of Hana Highway from two (2) to three (3) lanes. The proposed construction of the new third lane

on Hana Highway addresses this concern.
HWY-D did not have additional concerns.

HWY-RM Comments:

1. Enclosed are the "original" and three (3) copies of the executed "Grant of Limited Vehicle Access Rights" agreements for the two (2) project vehicular access as requested. These access agreements were prepared in accordance with your recommended formats;
2. "No considerations will be assessed since there's no access control." We agree and thank you for your determination;
3. The existing project driveway does serve other commercial complexes. The commercial center owners have an existing "access agreement" with the Maui Medical Plaza. There is no a concern.

HWY-M Comments:

1. HWY-M comments to follow. We have not received any comments from you since October 2009; but, we will address your concerns if you have any. Please send your comments ASAP.

Three (3) copies of the revised Final TIAR are also attached that addresses all HDOT concerns.

Based on the above responses, we respectively request that these two (2) vehicular access openings onto Hana Highway be approved.

Your earliest approval is appreciated.

Sincerely,

Lloyd P.C.W. Lee, Sr., P.E.
Senior Project Manager, AECOM Pacific, Inc.

Lpl:Maui Medical Plaza 2

Encls.

Cc: Maui Medical Plaza (Robert McDaniel) w/encls.

To: Lloyd Lee 10/4/09

From: F Cajigal

Per your request (HWY-M 2,479-09, dated September 28, 2009), we have the following comments on the August 2009 Traffic Impact Analysis Report:

HWY-1

1. With signalization of Wakea Street next year, left-turn movement into project access should be closed as recommended in the study.

2. Need u-turn analysis for motorists making u-turns on Hana Highway north of the Hana Highway / Kamehameha Avenue intersection. Queuing analysis is needed to determine adequacy of storage lane lengths. Backups onto Hana Highway will have a detrimental effect on traffic.

3. Level-of-Service for the intersection of Hana Highway and Kamehameha Avenue is very poor and requires mitigation. The analysis shows LOS "F" operations. Queuing analysis is needed as well.

4. It appears that it would be very difficult for motorists exiting the project to cross over three lanes to get into the left-turn lanes to turn into Kamehameha Avenue.

5. Shuttle drop-offs and pick-ups should be done on site and not on Hana Highway.

6. The site plan appears to facilitate project roadway circulation using the weaving lane in State ROW. Project circulation should be kept on site.

HWY-D

* MSF Hana Hwy widen, Resurfacing Ave to Vic. Airport-Amala Road 2013 STIP

HWY-D - My main comment is Accom should be aware of above State DOT Project 10/2/09 and coordinate accordingly. Gm can't comment much since we have no plans/dwgs for our project yet.

HWY-RM's comments are:

HWY-R

1) Kanaha Professional Plaza LLC must execute a "Grant of Limited Vehicle Access Rights" document for both access points and restrict all other vehicle access rights along the remainder of the property's Hana Highway frontage.

2) No consideration will be assessed since there's no access control.

3) The existing northwest roadway access accommodates the abutting commercial complex. Is this a concern?

Mike do you have anything to add?

Please let me know if you have any questions.

Thank You,

HWY-M comments to follow?

EXHIBIT A

LINDA LINGLE
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 668A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SERVICE, ROOM 688

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 602

MOTOR VEHICLE SAFETY OFFICE, ROOM 511

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD, ROOM 691
KAPOLEI, HAWAII 96707

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:

HWY-RM
3.87594

RECEIVED
MAR 22 2010
By

March 18, 2010

Mr. Lloyd P.C.W. Lee, Sr., P.E.
Senior Project Manager
AECOM Pacific, Inc.
100 Pauahi Street, Suite 207
Hilo, Hawaii 96720

Dear Mr. Lee:

SUBJECT: HALEAKALA ROAD AND PAIA SPUR
HAWAII PROJECT NO. DA-NC 8(1)
KAHULUI TOWN TO KAUNOA SCHOOL
TMK: (2) 3-7-11: 028
REQUEST FOR VEHICLE ACCESS RIGHTS:
MAUI MEDICAL PLAZA AT KANAHA

We have conceptually approved your request and shall continue to process your request subject to the following conditions:

1. Kanaha Professional Plaza, LLC (KPP) shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments.

2. All improvements (driveways/sidewalks, etc.) must comply with current Americans with Disabilities Act (ADA) requirements. The driveway layout must conform to Department of Transportation standards for residential driveways.

3. KPP must execute a "Grant of Limited Vehicle Access Rights" document whereby you are granted access for your proposed use and all other rights of vehicle access are restricted along the remainder of the property's Hana Highway frontage.

4. KPP must submit an updated title search for their property, TMK: (2) 3-7-11: 028 to show status of title.

5. KPP shall be responsible for all costs associated with the stipulated highway improvements for the access location.

6. Please provide proof of H.R.S. Chapter 343-5 compliance (E.A. or E.I.S. documentation) when submitting your application for Permit to Perform Work upon State Highways.

EXHIBIT C

7. The requested access shall be granted for the proposed use. Any future increase in density of the lot by an owner, via CPR or the subdivision of the existing/proposed lots, shall require the owner to obtain the use of additional access rights to Hana Highway.

8. KPP must submit two (2) copies of metes and bounds description of the subject area along with a parcel map, which will be used as Exhibits to the document.

9. KPP must submit four (4) sets of construction plans to our Maui Permit Engineer, at our Maui District Office, 650 Palapala Drive, Kahului, Hawaii 96732, for review and approval.

10. KPP shall defend, hold harmless and indemnify the State, from and against all claims or demands for bodily injury, property damage and/or death.

11. KPP shall be responsible for all documentation and recording fees incurred for the requested access.

12. The Highways Division reserves the right to add or impose additional conditions as necessary to mitigate adverse impacts to the State.

If KPP is agreeable to the foregoing conditions, please sign the acceptance portion of this letter and return it to our office. If we do not receive the signed acceptance portion within thirty (30) days from the date of this letter, we will assume you are no longer interested in pursuing the matter.

If you have any questions, please call me at 692-7338.

Very truly yours,

Jaime K. Yamashiro

JAIME K. YAMASHIRO
Right-of-Way Agent
Property Management Section

**ACCEPTANCE:**

Kanaha Professional Plaza, LLC accepts all terms and conditions as set forth in the Department of Transportation letter (ref. HWY-RM 3.87594) dated March 18, 2010.

Date: 3.25.2010

Print Name: Robert T. McDaniel III

Its: Member

Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2009-AWP-2731-OE

Issued Date: 07/30/2009

Robert McDaniel
Maui Medical Plaza
350 Hukilike Street
Suite D
Kahului, HI 96732

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

| | |
|---|---|
| Structure: | Building / Maui Medical Plaza |
| Location: | Kahului, HI |
| Latitude: | 20-53-16.48N NAD 83 |
| Longitude: | 156-27-27.45W |
| Heights: | 93 feet above ground level (AGL)<br>101 feet above mean sea level (AMSL) |

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking and/or lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory circular 70/7460-1 K Change 2.

This determination expires on 01/30/2011 unless:

(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.



EXHIBIT D

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

A copy of this determination will be forwarded to the Federal Communications Commission if the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (310) 725-6558. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2009-AWP-2731-OE.

**Signature Control No: 637154-117327128** ( DNE )
LaDonna James
Technician

MAR 1 0 2009

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.3153

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

March 5, 2009

Ms. Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

Subject: Early Consultation Request for Draft Environmental Assessment (DEA)
Maui Medical Plaza
Kahului, Maui, Hawaii
TMK: (2) 3-7-011: 028

The State Department of Transportation (DOT) recently commented on the subject project in its letter STP 8.3144 dated 2/27/09. The following supplemental comments regarding Kahului Airport and its operations should also be addressed in the preparation of DEA.

1. Please note that DOT's letter, STP 8.2795 dated 3/7/08, stated that the Federal Aviation Administration (FAA) Form 7460-1 should be submitted to the "FAA Maui Airport District Office." This is an error. The form should be submitted to the FAA Airport District Office in Honolulu. If not already filed, this should be done soon.

2. Due to the development's close proximity to Kahului Airport, DOT recommends that the office building be designed to attenuate airport-related noise.

3. Routine maintenance work to the main runway, Runway 2/20, is usually scheduled for after-business hours. However, when airport runway improvements and repair projects for Runway 2/20 require its closure, flights are required to use Runway 5/23 instead. This will result in an increase in overflights and aircraft noise over the project area.

DOT appreciates the opportunity to provide these supplemental comments. If there are any other questions, please contact Mr. David Shimokawa of the Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

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

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawaii (STP 8.3153)

Dear Mr. Morioka:

Thank you for your letter, dated March 5, 2009, providing early consultation comments on the subject project. On behalf of the applicant, Kanaha Professional Plaza, LLC, we would like to provide the following in response to your comments:

***Response to Comment No. 1***

We note your correction that the Federal Aviation Administration (FAA) Form 7460-1 should be submitted to the FAA Airport District Office in Honolulu rather than the FAA Maui Airport District Office (as noted in your letter dated March 7, 2008).

***Response to Comment No. 2***

We note your recommendation that the office building be designed to attenuate airport-related noise due to the development's close proximity to Kahului Airport. Applicable design elements will be incorporated into the construction plans for the project to ensure that interior noise levels within the proposed structures are maintained at acceptable levels.

***Response to Comment No. 3***

We note your comment that in the event of closure of the main airport runway (Runway 5/20), aircraft will be required to use Runway 5/23 and that use of this runway may result in an increase in aircraft noise over downtown Kahului.

We appreciate the input provided by your office. A copy of the Draft Environmental Assessment (EA) will be provided to you for review and comment.

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

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Harrison Fagg, Harrison G. Fagg & Associates
Lloyd Lee and Warren Yamamoto, AECOM
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LINDA LINGLE
GOVERNOR

MAJOR GENERAL ROBERT G. F. LEE
DIRECTOR OF CIVIL DEFENSE

EDWARD T. TEIXEIRA
VICE DIRECTOR OF CIVIL DEFENSE

FEB 0 6 2009

PHONE (808) 733-4300
FAX (808) 733-4287

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

February 5, 2009

Ms. Rowena Dagdag-Andaya
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

Early Consultation Request for Proposed Maui Medical Plaza

Thank you for the opportunity to comment on this development. After review of the letter and maps you have sent for this project, we have no early consultation comments to make. The proposed area falls within coverage arcs of existing warning sirens. We will anticipate reviewing the Environmental Assessment when it is completed and make any appropriate comments at that time.

If you have any questions please call Ms. Havinne Okamura, Hazard Mitigation Planner, at (808) 733-4300, extension 556.

Sincerely,

EDWARD T. TEIXEIRA
Vice Director of Civil Defense

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Edward Teixeira, Vice Director
State of Hawai`i
**Department of Defense**
3949 Diamond Head Road
Honolulu, Hawai`i 96816

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Mr. Teixeira:

Thank you for your letter, dated February 5, 2009, providing early consultation comments on the subject project.

We note your comment that the subject property falls within coverage arcs of existing warning sirens.

We appreciate the input provided by your office. A copy of the Draft Environmental Assessment (EA) for the project will be provided to you for review and comment.

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

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
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MAR 1 0 2009

PHONE (808) 594-1888

FAX (808) 594-1865

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

HRD09/3558C

March 4, 2009

Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

**RE: Request for comments on the Maui Medical Plaza, Kanahā, Island of Maui,Tax Map Key (2) 3-7-11:028.**

Aloha e Rowena Dagadag-Andaya,

The Office of Hawaiian Affairs (OHA) is in receipt of the above-mentioned letter dated January 28, 2009. OHA has reviewed the project and offers the following comments.

From our May 1, 2008 comment letter for this project we noted that it is our understanding that archaeological studies have found no archaeological or cultural sites on the subject parcel. OHA continues to seek assurances that these archaeological surveys have been conducted pursuant to applicable Hawai'i Administrative Rules and submitted to the Department of Land and Natural Resources-Historic Preservation Division for review and approval.

We further seek assurances that should cultural sites or iwi kūpuna be identified during ground altering activities, all work will immediately cease and the appropriate agencies notified pursuant to applicable laws.

OHA also expresses some concern over impacts to the nearby Kanahā Pond Wildlife Sanctuary and loss of wetland habitat that this project proposes. OHA is keen to review the flora and fauna surveys, associated mitigations including best management practices and wetland mitigation plan.

Also, since this project is in a special management area with nearby bird habitat, we recommend that the applicant consult with the U.S. Fish and Wildlife Service regarding building

design to minimize impacts to wildlife being particularly aware of lighting impacts. We also recommend that the applicant use native or endemic plants that are accustomed to the area for any landscaping.

Thank you for the opportunity to comment. If you have further questions, please contact Grant Arnold by phone at (808) 594-0263 or e-mail him at granta@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: OHA Maui CRC

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Clyde Nāmu`o, Administrator
**Office of Hawaiian Affairs**
State of Hawai`i
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai`i 96813

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Mr. Nāmu`o:

Thank you for your letter, dated March 4, 2009, providing early consultation comments on the subject project. On behalf of the applicant, Kanaha Professional Plaza, LLC, we would like to provide the following in response to your comments:

***Response to Comments Regarding Archaeological Studies***

An Archaeological Assessment Survey for the property was prepared by Xamanek Researches, LLC in May 2007 (and revised in June 2008). The survey report was conducted pursuant to applicable Hawaii Administrative Rules (HAR) and was approved by the Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD) on July 13, 2008. An Archaeological Monitoring Plan has also been reviewed and approved for the project by SHPD.

***Response to Comments Regarding Iwi Kupuna and Native Hawaiian Cultural or Traditional Deposits***

As you have noted, should iwi kupuna and/or Native Hawaiian cultural or traditional deposits be inadvertently discovered during project construction, work will cease in the area of the find and the SHPD and OHA will be contacted to establish the appropriate level of mitigation.

***Response to Comments Regarding Impacts to Kanaha Pond Wildlife Sanctuary***

We note your comments concerning the proximity of the subject property to the Kanaha Pond Wildlife Sanctuary and the loss of onsite wetland habitat that will result from project construction. Furthermore, a wetland mitigation plan has been prepared for the project in consultation with applicable Federal and State agencies. This plan was accepted by the Department of Army (U.S. Army Corps of Engineers, DA) on January 15, 2010 as part of the Section 404 DA Permit review process. The applicant is committed to working with the Department of Land and Natural Resources (DLNR), and other applicable agencies to ensure that the Kanaha Pond and its wildlife habitats are not adversely impacted as a result of project implementation. A copy of the flora/fauna survey for the property will be included in the Draft Environmental Assessment (EA) along with a list of applicable Best Management Practices (BMP) that will be implemented during project construction.

***Response to Comments Regarding Project Lighting***

Consultation with the U.S. Fish and Wildlife Service (USFWS) has been undertaken by the applicant and included in the plans for the project. The proposed project's lighting design will specify the shielding of all lights and directional down lighting. This design consideration is intended to mitigate light pollution and prevent lighting from traveling across property boundaries, thereby minimizing impacts to wildlife.

***Response to Comments Regarding Use of Native or Endemic Plants***

Native or Polynesian introduced plants will be utilized for the proposed project where both locally available and feasible.

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

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

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Erik Fredericksen, Xamanek Researches, LLC
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FEB 1 2 2009

LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
MARK K. ANDERSON
DEPUTY DIRECTOR
ABBEY SETH MAYER
DIRECTOR
OFFICE OF PLANNING

# DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

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

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

Ref. No.: P-12427

February 10, 2009

Ms. Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

Subject: Early Consultation for Proposed Maui Medical Plaza
TMK: (2)3-7-011:028, Wailuku, Maui, Hawaii

Thank you for the opportunity to review and comment upon the Maui Medical Plaza early consultation document. Construction of the proposed structure will involve the permanent filling of approximately 0.95 acres of wetland within the center of the subject property. We understand that the following approvals and reviews are required for the proposed project:

1. Department of the Army (DA) permit processed pursuant to Section 404 of the Clean Water Act;
2. Wetland Mitigation Plan reviewed and approved by the U.S. Army Corps of Engineers;
3. Section 401 Water Quality Certification;
4. Coastal Zone Management Program Consistency Determination; and
5. Special Management Area (SMA) Use Permit from the County of Maui

With the understanding that the above stated approvals and reviews will be conducted along with the preparation of an Environmental Assessment in accordance with Chapter 343, Hawaii Revised Statutes, the Office of Planning has no comments at this time. In so stating, the Office offers no judgment of either the adequacy of the document/application itself or the merits of the proposed project.

If you have any questions, please contact Debra Mendes of our Land Use Division at 587-2840.

Sincerely,

Abbey Seth Mayer
Director

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Abbey Seth Mayer, Director
**Attention: Debra Mendes, Land Use Division**
**Office of Planning**
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawai`i 96804

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawaii

Dear Mr. Mayer:

I am writing to you today, on behalf of Kanaha Professional Plaza, LLC, to thank you for your letter, dated February 10, 2009, providing early consultation comments on the subject project.

We note the information provided regarding the regulatory approvals that will be required for the project.

A copy of the Draft Environmental Assessment will be provided to you for review and comment. Should you have any questions or require additional information, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
cc: James Buika, County of Maui, Department of Planning
Robert T. McDaniel, Kanaha Professional Plaza
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CHARMAINE TAVARES
MAYOR

FEB 19 2009

200 South High Street
Wailuku, Hawaii 96793-2155
Telephone (808) 270-7855
Fax (808) 270-7870
e-mail: mayors.office@mauicounty.gov

OFFICE OF THE MAYOR
County of Maui

February 13, 2009

Mrs. Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 105
Wailuku, Hawaii 96793

Dear Mrs. Dagdag-Andaya:

**SUBJECT: PRE-CONSULTATION COMMENTS REGARDING THE PROPOSED MAUI MEDICAL PLAZA, LOCATED AT KAHULUI, MAUI, HAWAII, TMK: (2) 3-7-011:028 (EAC 2009/0007)**

The Mayor's Office and the County of Maui Department of Planning (Department) both reviewed your letter dated January 28, 2009, requesting pre-consultation comments in preparation of the Draft Environmental Assessment for the subject project. Thank you for the opportunity to respond to your proposed project at this early date.

The Mayor's Office and the Department understand that the proposed project is to build a six (6)-story medical plaza of approximately 140,000 square feet with an additional adjacent five (5)-story parking structure of approximately 100,000 square feet, to accommodate approximately 300 off-street parking stalls. The structure footprint will be approximately 240,000 square feet. The location of the project is located along and makai of the Hana Highway in the vicinity of the Kahului Harbor Heavy Industrial area and the Kanaha Pond State Wildlife Sanctuary (Wildlife Sanctuary). The Wildlife Sanctuary is a wetlands and a famous waterfowl sanctuary, home to two (2) endangered Hawaiian species, the coot and stilt (http://en.wikipedia.org/wiki/Kanaha_Pond). It was designated a National Natural Landmark in 1971. The National Natural Landmark program recognizes and encourages the conservation of outstanding examples of the United States' natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership (http://en.wikipedia.org/wiki/National_Natural_Landmark).

On behalf of the Department, we have the following comments regarding the development of the Environmental Assessment (EA) at this time:

1. The project must comply with Chapter 343, Hawaii Revised Statutes (HRS), and is subject to an EA. The Maui Planning Commission is anticipated to be the Accepting Authority for the EA;

2. Understand and document potential impacts from this project on the sensitive wetlands environment by researching and documenting all past Environmental Assessments and research reports for the Wildlife Sanctuary that may provide pertinent and relevant content and bear on this proposed project. Provide mitigation alternatives to protect the endangered species that depend on the Wildlife Sanctuary;

3. The use of the project is expected to be medical professionals including doctors and technicians. Please document the expected uses at the facility that may require the application, storage, and disposal of materials classified as hazardous materials and biological wastes. Provide mitigation alternatives designed to eliminate or minimize hazardous waste, hazardous materials, and petroleum products from entering the Wildlife Sanctuary and all waters. Outline plans to properly dispose of these materials and safeguard the environment from contamination;

4. Consider implementing educational materials and educational programs to educate the citizens of Maui and visitors about the Wildlife Sanctuary. Consider a viewing station at the medical plaza for viewing the Wildlife Sanctuary;

5. The location of the six (6)-story structure and five (5)-story parking lot are expected to significantly impact the views to and along the ocean and the Wildlife Sanctuary, as well as impact the views of the mountain landscapes, located north and south of the project. Provide a comprehensive View Plane Analysis with mitigation alternatives to minimize view plane impacts and to maximize views;

6. The height of the structure may impact airport and airplane traffic operations. Please coordinate with the State Department of Transportation regarding potential impacts, potential restrictions, and proper mitigation alternatives;

7. The proposed project is expected to impact traffic in the vicinity. Provide a comprehensive traffic impact analysis including cumulative impacts to the area, which include traffic impacts caused by the Super Ferry and other known, permitted, proposed, significant developments impacting the traffic in the area;

8. Ensure that the project will meet County of Maui parking code requirements;

9. Provide the public the opportunity to understand and comment on the project. Document all public meetings and community meetings, and document answers to all significant inquiries about the project;

10. Coordinate input from other medical facilities in the area;

In addition, the project is located in the Special Management Area (SMA) and is subject to a SMA Assessment:

11. Upon submission of the required SMA Use Permit Application, the Department will confirm that the property is located in the State Land Use "Urban" District, Wailuku-Kahului Community Plan "Heavy Industrial" designation, and is zoned "M-2 Heavy Industrial". Document that the proposed project meets the intent of the Wailuku-Kahului Community Plan; and

12. Once the SMA Use Permit is submitted for review by the Applicant to the Department, and the Application is deemed complete, the Department will transmit the Application to local, State, and Federal agencies for further comment and review. The Applicant is required to address all agency comments and concerns.

If you require further clarification, please contact Staff Planner Jim Buika via email at james.buika@mauicounty.gov or by phone at 270-6271.

Sincerely,

HONORABLE CHARMAINE TAVARES
Mayor, County of Maui

xc: Jeffrey S. Hunt, AICP, Planning Director
Clayton I Yoshida, AICP, Planning Program Administrator
Aaron H. Shinmoto, PE, Planning Program Administrator (2)
John Summers, AICP, Planning Program Administrator
Milton Arakawa, Department of Public Works
James A. Buika, Staff Planner
EAC File
General File

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MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Honorable Mayor Charmaine Tavares
**Office of the Mayor**
County of Maui
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawaii

Dear Mayor Tavares:

I am writing to you today, on behalf of Kanaha Professional Plaza, LLC, to thank you for your letter, dated February 13, 2009, providing early consultation comments on the subject project from both your office and the Department of Planning (Department). We offer the following information in response to the comments noted, of which have been arranged in the same order as they appear in your letter:

1. An Environmental Assessment (EA) is currently being prepared in compliance with Chapter 343, Hawaii Revised Statutes. We note that the approving agency for the EA document will be the Maui Planning Commission.

2. A description of the Kanaha Pond Wildlife Sanctuary will be included in the Surrounding Land Uses section of the Draft EA. In regards to wetland environments directly impacted by the project, there is a degraded 0.94-acre area of existing wetland located within the middle of the subject property which is separated from the Kanaha Pond wetland by the drainage canal which traverses the industrial/commercial areas of downtown Kahului. To compensate for the loss of the 0.94-acre onsite wetland that will result with construction of the Maui Medical Plaza at Kanaha, a wetland mitigation plan has been prepared for the project as part of the Department of the Army's (DA) Section 404 review process. This wetland mitigation plan proposes rehabilitation of 5-acres of wetland at the Waihee Coastal Dunes and Wetland Refuge, a preserve area under the management of the Maui Coastal Land Trust. By letter dated January 15, 2010, the DA formally accepted the mitigation plan as adequate compensatory

mitigation to address the loss of wetlands that will result from the subject project. A copy of the wetland mitigation plan and DA acceptance letter will be included in the Draft EA.

3. Potential facility uses that may require the application, storage, and disposal of materials classified as hazardous materials and biological wastes include:

- General and Specialized Medical Practice
- Laboratory Services
- Pharmacy
- Clinical Research
- Imaging
- Outpatient Surgery

It is anticipated that the majority of the space will be designed for physician offices, which will not require special environmental applications. The separate medical practices within the new facility that require tailored storage, disposal, environmental protection, and utilization will contract with a certified regulated medical waste disposal provider either individually or collectively to remove and process these items. These private companies provide specially designed receptacles for use in each room of an office. It is anticipated that each practice that warrants this service will contract with a private disposal company for pick-up and processing of their "sharps" material and bio-hazardous waste. Independent medical practices throughout Maui also state that they contract with private medical waste companies for effective management of hazardous waste disposal in compliance with Federal regulations including EPA, DOT and OSHA rules. This information will be included in the Solid Waste Section of the Draft EA.

4. Kanaha Professional Plaza, LLC recognizes the value and importance of the Kanaha Wildlife Sanctuary and, as such, has incorporated a viewing platform into the plans for the proposed project. This facility (and signage, as appropriate) will encourage educational awareness of the ecosystems and species present within the sanctuary and will be available for use by both patients and medical employees, as well as by members of the general public. A copy of the plans for the proposed viewing platform will be included in the Draft EA.

5. Your comment regarding the height of the proposed structures is noted. The project site is part of an industrial-zoned subdivision located in Kahului near the Kahului Harbor. The property is designated 'Urban' by the State Land Use Commission, 'Heavy Industrial' by the Wailuku-Kahului Community Plan and 'M-2, Heavy Industrial' by Maui County zoning. The medical plaza building is proposed to be a six (6) story structure that utilizes a staggered or stepped-back design. The building stories will be surrounded by landscaped planters to complement the architectural elements of the structure. The design concept has been refined using comments that were received during pre-consultation presentations to the Maui County Urban Design Review Board (UDRB). Further review of the project's design features will be undertaken by the UDRB during the processing of the Special Management Area (SMA) Use Permit application.

   Implementation of a medical plaza in lieu of a more intensive industrial use is anticipated to enhance the architectural character of the harbor area in Kahului by providing a reasonable transition between the heavy industrial uses surrounding the harbor and the Kanaha Pond Wildlife Sanctuary to the north of the subject property. As requested, a view analysis showing the proposed facility in relation to surrounding land uses will be provided in the Draft EA.

6. Kanaha Professional Plaza, LLC has and will continue coordination with the State of Hawaii, Department of Transportation to identify airport/airplane-related approvals that may be necessary for the proposed project.

7. A Traffic Impact Analysis Report will be completed for the proposed project and included in the Draft EA.

8. The proposed project has been designed to meet all applicable County Code parking requirements.

9. Opportunity for public review and comment on the project will be provided by both the Chapter 343 EA preparation process and the SMA Use Permit review process, the latter of which will include a public hearing before the Maui Planning Commission.

10. A copy of the Draft EA will be provided to the Maui Memorial Medical Center, Kaiser Permanente (Wailuku/Kahului clinics) and Maui Medical Group to request input on the proposed project.

11. We acknowledge that the Department will confirm the land use designation for the property at the time the SMA Use Permit application or the project is submitted for processing. The application will include an analysis of the project in the context of the Wailuku-Kahului Community Plan.

12. We acknowledge that the SMA Use Permit application will be transmitted to local, State and Federal agencies for review and comment once it has been reviewed and deemed complete by the Department. We further acknowledge that all substantial comments received during this review process will be required to be responded to by Kanaha Professional Plaza, LLC.

We appreciate the input provided by your office and the Department. Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
cc: Kathleen Aoki, County of Maui, Department of Planning
Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel, Kanaha Professional Plaza
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DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

CHARMAINE TAVARES
Mayor

LORI TSUHAKO
Director

JO-ANN T. RIDAO
Deputy Director

2200 MAIN STREET • SUITE 546 • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165
MAILING ADDRESS: 200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • EMAIL director.hhc@mauicounty.gov

February 5, 2009

Ms. Rowena Dagdag-Andaya
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

**SUBJECT: EARLY CONSULTATION REQUEST FOR PROPOSED MAUI MEDICAL PLAZA AT TMK (2) 3-7-011:028, KAHULUI, MAUI**

The Department has reviewed the Early Consultation Request for the above subject project. Based on our review, we have determined that this project is not subject to Chapter 2.96, Maui County Code. At the present time, the Department has no additional comments to offer.

Please call Mr. Oshiro of our Housing Division at 270-7355 if you have any questions.

Sincerely,

Lori Tsuhako

LORI TSUHAKO, LSW, ACSW
Director of Housing and Human Concerns

xc: Housing Division

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Lori Tsuhako, Director
**Department of Housing and Human Concerns**
2200 Main Street, Suite 546
Wailuku, Hawai`i 96793

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Ms. Tsuhako:

Thank you for your letter, dated February 5, 2009, providing early consultation comments on the subject project.

We note your comment that the subject project is not subject to Chapter 2.96, Maui County Code.

We appreciate the input provided by your office. A copy of the Draft Environmental Assessment will be provided to you for review and comment. Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
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FEB 1 3 2009

CHARMAINE TAVARES
Mayor

TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

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

# DEPARTMENT OF PARKS & RECREATION

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

February 6, 2009

Ms. Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Dagdag-Andaya:

**SUBJECT: Early Consultation Request for Proposed Maui Medical Plaza at TMK (2) 3-7-011:028, Kahului, Maui**

The proposed project as described, will not trigger park dedication requirements unless it involves the development of residential units.

Thank you for the opportunity to review and comment on this matter. Please feel free to contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development at 270-7931 should you have any other questions.

Sincerely,

TAMARA HORCAJO
Director, Parks & Recreation

cc: Patrick Matsui, Chief of Parks Planning and Development

TH:PM:do

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Tamara Horcajo, Director
**Department of Parks and Recreation**
700 Hali`a Nakoa Street, Unit 2
Wailuku, Hawai`i 96793

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Ms. Horcajo:

Thank you for your letter, dated February 6, 2009, providing early consultation comments on the subject project.

We note your comment that the subject project will not trigger park dedication requirements. We also note that the proposed plans do not include residential units.

We appreciate the input provided by your office. A copy of the Draft Environmental Assessment will be provided to you for review and comment.

Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
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FEB 1 3 2009

# POLICE DEPARTMENT
COUNTY OF MAUI


**CHARMAINE TAVARES**
MAYOR

OUR REFERENCE
YOUR REFERENCE

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

**THOMAS M. PHILLIPS**
CHIEF OF POLICE

**GARY A. YABUTA**
DEPUTY CHIEF OF POLICE


February 6, 2009

Ms. Rowena Dagdag-Andaya
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Dagdag-Andaya:

SUBJECT: Early Consultation Request for Proposed Maui Medical Plaza at TMK (2) 3-7-011:028

Thank you for your letter of January 28, 2009, requesting comments on the above subject.

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

Very truly yours,

AC Wayne T. Ribao

Assistant Chief Wayne T. Ribao
for: Thomas M. Phillips
Chief of Police

c: Jeffrey Hunt, Planning Department

COPY

TO : THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI CONCUR W/ SGT. ORIKASA'S REVIEW. AC Wayne Ritter 02/06/09

VIA : CHANNELS

FROM : STEPHEN ORIKASA, ADMINISTRATIVE SERGEANT, WAILUKU PATROL DIVISION

SUBJECT : RESPONSE TO A REQUEST FOR EARLY CONSULTATION COMMENTS REGARDING THE PROPOSED MAUI MEDICAL PLAZA, KAHULUI

This communication is submitted as a response to a request for early consultation comments by Munekiyo & Hiraga, Inc., Planner, Rowena Dagdag-Andaya, regarding the proposed Maui Medical Plaza at TMK (2) 3-7-011:028, Kahului, Maui.

RESPONSE:

In review of the submitted documents, the focus from the police perspective would be upon the safety of vehicular and pedestrian movement impacted by the project area.

Adequate sight distance needs to be maintained for vehicular ingress and egress movement within the development itself and at the driveway from Hana Highway. Integrated with this would be pedestrian walkways or corridors to ensure the safety of pedestrian movement.

A consideration during the design phase is to implement the concepts and strategies of Crime Prevention Through Environmental Design

During the construction phases extreme efforts should be made to minimize noise, dust & debris so not to inhibit those whose health and well being may be affected. Adequate traffic control devices and personnel should also be utilized to minimize the impact of heavy equipment and vehicles traveling in and out of the area.

CONCLUSION:

There are no objections to the progression of the project at this time. Although, it is of utmost importance to be cognizant of, and immediately address, any health and safety impacts, directly and indirectly, which may arise.

Respectfully submitted for your review and approval.

Stephen T. Orikasa E#716
Administrative Sergeant/Wailuku Patrol Division
02/04/09 @ 0830 Hours

No further comments.
Thomas Phillips
02/04/09 @ 1005 hrs.

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Gary Yabuta, Chief
**Police Department**
County of Maui
55 Mahalani Street
Wailuku, Hawai`i 96793

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Chief Yabuta:

Thank you for your Department's letter, dated February 6, 2009, providing early consultation comments on the subject project. On behalf of the applicant, Kanaha Professional Plaza, LLC, we would like to provide the following in response to your comments:

***Response to Comment Regarding Sight Distance, Vehicular and Pedestrian Movement***

We note your comments regarding the need for adequate sight distance for vehicular ingress and egress movements within the development and at the driveways from Hana Highway. The circulation plan for the project has been developed in accordance with applicable requirements regarding vehicle and pedestrian safety. Walkways will be integrated within the development to ensure the safety of pedestrian movements within the property.

***Response to Comment Regarding Crime Prevention Through Environmental Design***

The principles of Crime Prevention Through Environmental Design (CPTED) will be reviewed by the design team to ensure that a safe atmosphere is created within the subject project and that opportunities for criminal activities are minimized.

***Response to Comment Regarding Noise, Dust and Debris during Construction***

Short-term noise and air impacts may result from construction-related activities for the project. Appropriate Best Management Practices (BMPs) will be utilized to minimize negative impacts related to noise levels and air quality. Additionally, the applicant will comply with applicable Department of Health (DOH) air and noise quality requirements during construction.

***Response to Comment Regarding Traffic Control Devices During Construction***

Traffic control devices and personnel will be utilized, as appropriate, during construction to minimize the impact of heavy equipment and vehicles traveling in and out of the project site.

We acknowledge your comment that there are no objections to the progression of the project at this time.

We appreciate the input provided by your department. A copy of the Draft Environmental Assessment will be provided to you for review and comment.

Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
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FEB 2 4 2009

CHARMAINE TAVARES
Mayor

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

MICHAEL M. MIYAMOTO
Deputy Director

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


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

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

COUNTY OF MAUI
**DEPARTMENT OF PUBLIC WORKS**
200 SOUTH HIGH STREET, ROOM NO. 434
WAILUKU, MAUI, HAWAII 96793

February 11, 2009

Ms. Rowena Dagdag-Andaya
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Ms. Dagdag-Andaya:

**SUBJECT: EARLY CONSULTATION REQUEST FOR PROPOSED MAUI MEDICAL PLAZA; TMK (2) 3-7-011:028**

We received your early consultation request and offer the following comments:

1. The wetland mitigation plan also needs to consider the overall drainage impact of filling the existing wetland area. This is a redirection of a drainage storage area. Underground retention will be severely limited given the saturated nature of the surrounding soil.

2. A building permit was applied for and building code comments were provided to the building permit applicant on February 19, 2008.

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

Sincerely,

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

MMA:MMM:ls
xc: Highways Division
Engineering Division
S:\LUCA\CZM\Prop_Maui_Medical_Plaza_erly_37011028_ls.wpd

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

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

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawai`i

Dear Mr. Arakawa:

Thank you for your letter, dated February 11, 2009, providing early consultation comments on the subject project. On behalf of the applicant, Kanaha Professional Plaza, LLC, we would like to provide the following in response to your comments:

***Response to Comment No. 1***

As construction of the project will involve the permanent filling of an approximately 0.94 acre wetland area, a Department of the Army (DA) permit will be required for the project. A wetland mitigation plan has been prepared for the project and was approved by the U.S. Army Corps of Engineers on January 15, 2010. A copy of both the Wetland Mitigation Plan and the DA acceptance letter will be included in the Draft Environmental Assessment (EA) for the project.

An engineered drainage system will be constructed as part of the proposed project to offset the loss of natural drainage functions within the subject property. This drainage system will be designed in accordance with applicable County Code requirements. This system will retain all project-generated increases in storm runoff, such that there will be no impacts on downstream properties or the Kanaha Pond Wildlife Sanctuary. A copy of the Preliminary Drainage Report for the project will also be included in the Draft EA.

***Response to Comment No. 2***

We confirm your comments that an application for building permit was submitted and that building code comments were provided to the building permit applicant on February 19, 2008.

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

Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
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FEB 1 9 2009

CHARMAINE TAVARES
MAYOR

DON A. MEDEIROS
Director
WAYNE A. BOTEILHO
Deputy Director
Telephone (808) 270-7511
Facsimile (808) 270-7505

DEPARTMENT OF TRANSPORTATION

COUNTY OF MAUI
200 South High Street
Wailuku, Hawaii, USA 96793-2155

February 17, 2009

Mrs. Rowena M. Dagdag-Andaya
Munekiyo & Hiraga Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Subject: Proposed Maui Medical Plaza Project

Dear Mrs. Dagdag-Andaya,

Thank you for the opportunity to comment on this project. This medical facility will definitely attract many bus riders. The MAUI BUS operates four (4) routes each day past your proposed facility serving Upcountry, Haiku and Kahului. We strongly suggest you work with HDOT to determine the best location for bus stops on both sides of Hana Highway. Due to the high volume of traffic on Hana Highway, a bus pull-off on both sides of Hana Highway will be needed. We have developed a County Bus Stop Plan, which is available on the County website. We are in the process of developing bus stop shelters to comply with federal ADA regulations as well as state and county laws.

Please feel free to contact Mr. Jim Oster for any information you may require as you move forward on this project.

Sincerely,

Don Medeiros
Director

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Don Medeiros, Director
**Department of Transportation**
County of Maui
200 South High Street
Wailuku, Hawai`i 96793

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2) 3-7-011:028, Kahului, Maui, Hawai`i

Dear Mr. Medeiros:

Thank you for your letter, dated February 17, 2009, providing early consultation comments on the subject project.

The applicant, Kanaha Professional Plaza, LLC, is currently working with the State of Hawaii, Department of Transportation to determine the most appropriate location for a bus stop along Hana Highway. Coordination with your office will take place once a suitable location has been identified to review operational and design requirements for the new bus stop in the context of the County Bus Stop Plan.

We appreciate the input provided by your office. A copy of the Draft Environmental Assessment will be provided to you for review and comment.

Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
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MAR 0 6 2009

CHARMAINE TAVARES
Mayor

JEFFREY K. ENG
Director

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

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

February 27, 2009

Ms. Rowena Dagdag-Andaya
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Re: TMK: (2) 3-7-011:028
Project Name: Early Consultation Request for Proposed Maui Medical Plaza

Dear Ms. Dagdag-Andaya:

Thank you for the opportunity to comment on this Early Consultation for the Draft Environmental Assessment (DEA).

**Source Availability and Consumption**
The DEA should identify sources and potable and non-potable demand for the proposed expansion. The project area is served by the Central Maui System. The main sources of water for the Central system are the designated Iao aquifer, Waihee aquifer, the Iao tunnel and the Iao-Waikapu Ditch. New source development projects include Maui Lani Wells, Waikapu South Well and Waiale Surface Water Treatment Plant. According to system standards, anticipated demand is approximately 15,000 - 19,600 gpd. There is currently no additional source available according to system standards on the Central Maui System. The Department may delay issuance of meters until new sources are on line. The Department will not issue temporary construction meters for Central Maui projects.

**Protection of Water Resources**
The proposed project is immediately adjacent to Kanaha Pond, designated in 1952 as the first State Wildlife Sanctuary. It is one of Maui's last remaining coastal wetland systems, and the only one still intact on the North Shore. Coastal wetlands are key elements in important and severely diminished ecosystems in Hawaii. Among the functions they serve are preventing coastal pollution, filtering storm water before it enters the ocean, and helping to prevent salt water intrusion to aquifers.

The Kanaha Pond Wildlife Sanctuary serves as a core wetland habitat for native and federally endangered birds including the koloa maoli or Hawaiian duck *(Anas wyvilliana),* the ae'o or Hawaiian stilt, *(Himantopis mexicanus knudseni)* and the alae ke'oke'o or Hawaiian coot, *(Fulica americana alai).* Core wetlands are areas that provide suitable habitat essential to maximize

productivity and survival of endangered waterbirds. On Maui, the largest concentrations of stilts and coots occur at Kanaha and Kealia Ponds and the few Hawaiian duck population left occur primarily at Kanaha Pond. The prevailing cause of the decline of endangered Hawaiian waterbirds is loss of wetland habitat, and the largest threat to wetlands is development.

**System Infrastructure**
A 16 inch and an 8 inch water lines border the southwestern side of the parcel across from Hana Highway. An 8 inch waterline is on part of the west side of the lot. There are three fire hydrants within 250 feet. The applicant will be required to provide for water service and fire protection in accordance with system standards. Fire flow and domestic calculations will be required in the building permit process. An approved backflow preventer will be required if not already installed on site.

**Conservation**
To alleviate demand on the Central system, please find attached a conservation checklist for commercial buildings, and our planting brochure. We recommend that the following conservation measures be included in the project design and noted in the DEA:
Use Non-potable Water: Use brackish or reclaimed water for landscaping and other non-potable purposes when available. Reclaimed water or brackish water should be used for dust control and landscaping during construction.
Use Climate-adapted Plants: We recommend limiting turf areas and using native climate-adapted plants for all landscaping. The project is located in Plant Zone 5. Native plants adapted to the area conserve water and protect the watershed from degradation due to invasive alien species.
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.
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. Owners should establish a regular maintenance program.
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, water closets, and hose bibs.
Prevent Over-Watering By Automated Systems: Provide rain-sensors on all automated irrigation controllers. Check and reset controllers at least once a month to reflect the monthly changes in evapo-transpiration rates at the site. As an alternative, provide the more automated, soil-moisture sensors on controllers.

**Pollution Prevention**
In order to protect ground and surface water sources, Best Management Practices (BMPs) designed to minimize infiltration and runoff from construction should be implemented during construction. The mitigation measures below should be included in the DEA and be implemented during construction:

1. Prevent cement products, oil, fuel and other toxic substances from falling or dripping on the ground as this can cause them to leach into the nearby wetland. Store them in proper containers on non-porous surfaces and protect from the elements.

2. Retain ground cover until the last possible date.
3. 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.
4. Avoid fertilizers and biocides, or apply only during periods of low rainfall to minimize chemical run-off.
5. Keep run-off on site.

Should you have any questions, please contact our Water Resources and Planning Division at 808-244-8550.

Sincerely,

Jeffrey K. Eng, Director

mlb/elk
cc: applicant, engineering division
Attachments: Plant Brochure: "Saving Water in the Yard"; Checklist of Water Conservation Ideas for Commercial Buildings"

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

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

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawai`i

Dear Mr. Eng:

Thank you for your letter, dated February 27, 2009, providing early consultation comments on the subject project. On behalf of the applicant, Kanaha Professional Plaza, LLC, we would like to provide the following in response to your comments:

***Response to Comment Regarding Source Availability and Consumption***

We note your comment that the project area is served by the Central Maui System and the system's main sources of water. The Draft Environmental Assessment (EA) will discuss source and water demand for the proposed project.

***Response to Comment Regarding Protection of Water Resources***

We note your comments regarding Kanaha Pond Wildlife Sanctuary. The applicant recognizes the importance of the sanctuary as a habitat and breeding area for endangered Hawaiian birds and that wetlands are important elements of Hawaii's ecosystems. A wetland mitigation plan has been prepared in conjunction with the proposed project to compensate for the loss of the 0.94-acre area of wetlands within the subject property. This wetland mitigation plan was accepted as adequate mitigation by the Department of Army (DA) on January 15, 2010. A copy of the wetland mitigation plan and the DA acceptance letter will be included in the Draft EA.

The applicant is committed to working with the Department of Land and Natural Resources and other applicable agencies to ensure that the Kanaha Pond and its wildlife habitats are not adversely impacted as a result of project implementation. In addition to the Draft EA and Special Management Area (SMA) Use Permit application being prepared for the project, a Department of Army Permit, a Section 401 Water Quality Certification, and a Coastal Zone Management Consistency Determination will be processed for the project.

***Response to Comment Regarding System Infrastructure***

We note your comments regarding the availability of system infrastructure within and in vicinity of the project site. Water service and fire protection for the project will be provided in accordance with system standards. Fire flow and domestic calculations have been submitted to the Department as part of the building permit process for the project.

***Response to Comment Regarding Conservation***

We note your comments regarding water conservation measures including the use of non-potable water, use of climate-adapted plants, elimination of single-pass cooling, maintenance of fixtures to prevent leaks, utilization of low-flow fixtures and devices, and the prevention of over-watering by automated systems. This information will be included in the Draft EA and reviewed as part of the design and construction phase for the project.

***Response to Comment Regarding Pollution Prevention Measures***

Best Management Practices (BMPs) as required by State and County rules and regulations will be implemented for the proposed project during construction. A list of these BMP measures being considered for project implementation will be provided in the Draft EA.

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

Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel III, Kanaha Professional Plaza, LLC
Stacy Otomo, Otomo Engineering, Inc.
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FEB 0 4 2009

Hawaiian Telcom

February 2, 2009

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

ATTN: Rowena Dagdag-Andaya, Planner

SUBJECT: Proposed Maui Medical Plaza
TMK: (2) 3-7-011:028, Kahului

Dear Rowena,

Thank you for allowing us to review and comment on the Early Consultation Request for the Draft Environmental Assessment (EA) / Special Management Area (SMA) Permit for the subject project. Your plans have been received and put on file.

Hawaiian Telcom, Inc. has no comment, nor do we require any additional information at this time.

We look forward to receiving the EA / SMA Documents. Should you require further assistance, please call Tom Hutchison at 242-5107.

Sincerely,

Stephanie B. Viela

for: Lynette Yoshida
Network Engineering Manager

LY/TH/sbv

CC: Engineer
BICS File # 0901-013 (3030)

Hi

96

**Maui Electric Company, Ltd.** • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

FEB 0 5 2009

February 4, 2009

Mrs. Rowena Dagdag-Andaya, Planner
Munekiyo and Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Maui, Hawaii, 96793

Dear Mrs. Dagdag-Andaya,

Subject: Maui Medical Plaza
Early Consultation Request
Hana Highway
Kahului, Maui, Hawaii
TMK: (2) 3-7-011: 028

Thank you for allowing us to comment on the Draft Environmental Assessment (EA) for the subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) may be requiring access and electrical easements for our facilities to serve the subject project site. We highly encourage the customer's electrical consultant to submit electrical drawings and a project time schedule as soon as practical so that service can be provided on a timely basis. The existing area is currently served from our Kanaha Substation. Since this substation is nearly filled to capacity, the addition of this project's anticipated electrical load demand will have a substantial impact to our system. Therefore, in addition to an electrical line extension, other upgrades may be necessary to accommodate project of this size. MECO will need to perform a load study pending the receipt of the customer's demand load requirements which may include the need for facility upgrades.

In addition, we suggest that the developer and/or their consultant make contact with Ray Cibulskis of our Demand Side Management (DSM) group at 872-3226 to review potential energy conservation and efficiency opportunities for their project.

Should you have any questions or concerns, please call me at 871-2340.

Sincerely,

Ray Okazaki
Staff Engineer

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

May 14, 2010

Ray Okazaki
**Maui Electric Company, Ltd.**
P.O. Box 398
Kahului, Hawai`i 96733

SUBJECT: Preparation of Draft Environmental Assessment for the Proposed Maui Medical Plaza Project and Related Improvements at TMK (2)3-7-011:028, Kahului, Maui, Hawai`i

Dear Mr. Okazaki:

Thank you for your letter, dated February 4, 2009, providing early consultation comments on the subject project.

We note your comments regarding Maui Electric Company's (MECO) potential need for access and electrical easements for the project, the capacity of the Kanaha Substation, and the proposed project's electrical load demand. Your comments have been forwarded to the project's electrical engineer for review and action as appropriate. As soon as practicable, the project's electrical consultant will contact your office to discuss the project's electrical demand requirements and submit plans and a project time schedule. The applicant will also be coordinating with your Demand Side Management (DSM) group, as necessary, to review potential energy conservation and efficiency opportunities for the project.

We appreciate the input provided by your office. A copy of the Draft Environmental Assessment (EA) will be provided to you for review and comment.

Should you have any questions or require additional information, please do not hesitate to contact me at 244-2015.

Very truly yours,

Mark Alexander Roy, AICP
Project Manager

MAR:tn
Cc: Jim Buika, County of Maui, Department of Planning
Robert T. McDaniel, Kanaha Professional Plaza, LLC
Harrison Fagg, Harrison G. Fagg & Associates
Don Suzuki, Morikawa & Associates
F:\DATA\MauiMedPlaza\Kanaha\MECO response.ltr.doc

# X. REFERENCES

# X. REFERENCES


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County of Maui, Department of Planning, Socio-Economic Forecast, The Economic Projections for the Maui County General Plan 2030, June 2006.

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Wiles, Greg, Isles Short About 500 Doctors, Study Says. *The Honolulu Advertiser*, March 28, 2010.

# APPENDIX A.

# Preliminary Development and Landscaping Plans

LOT 7

LOT 6

LOT 5

TRUE NORTH

SCALE: 1 IN. = 20 FT.

APPROXIMATE LIMIT OF WATER FRONT

KANAHA POND

EXISTING DRAINAGE EASEMENT

343°29'30"

144.77

252.00'

CONCRETE CURB

46.79

243.45'

65.45

STA. 0+88.32
END DRIVEWAY "C"

DUMPSTER

TRASH ENCLOSURE (SEE ARCH. PLANS FOR DET.)

ACCESS EASEMENT J

EMERGENCY GENERATOR

9.08' 8'-6"

18'-0" (TYP.)

17.58'

9.08' 10.16' 8'-6"

1.51'

29.25'

9.08' 5 STALLS @ 8'-6"=42'-6"

5.99'

16'-0" (TYP.)

8 COMPACT STALLS @ 7'-6"=60'-0"

12.64' 12.64'

11 STALLS @ 8'-6"=93'-6"

8'-6" 9'-0" 8'-6" 12.75'

CONC. CURB (SEE DET. SHT. C-6.1)

1.75'

8.58' 18'-6" 18'-6" 8'-6" 8'-6" 8'-6" 8'-6"

52.83'

119°01'59"
21.57

152°24'28"
33.01

STA. 2+47.05
END DRWY. "C"

℄ CURVE DATA
Δ = 66°44'54"
R = 30.00
T = 19.79
C = 33.01
L = 34.95

DRIVEWAY "C"

211.50'

197.25'

MEDICAL PLAZA

10 FT. WIDE ADA RAMP (SEE DPW DET. R-25 REV.)

STA. 0+66.12 (DRIVEWAY "A")
STA. 0+00 (DRIVEWAY "B")
INTERSECTION

CONC. CURB (SEE DET. SHT. C-6.1)

20 FT. SETBACK LINE

BUS STOP SIGN

℄ CURVE DATA
Δ = 30°38'07"
R = 49.95
T = 13.68
C = 26.39
L = 26.71

℄ CURVE DATA
Δ = 41°11'10"
R = 27.00
T = 10.11
C = 18.99
L = 19.41

PC STA. 0+22.57

PT STA. 0+49.28

PT STA. 0+79.41

201°05'57"
26.39

216'25"
3.16

237°00'35"
18.99

CHANNEL FEN

73.29

213°44'30"

16.27

100.40

595.21

126'25"

P/P #18

P/P #19

BUS STOP

ROADWAY EASEMENT T

STA. 1+23.90
END DRIVEWAY "A"

ACCESS EASEMENT H

306'25"

84.41

235'30"

BOLLARDS

STEEL PLATE COVER

86.00

TAPER LAST 4'-0" OF CONC. CURB @ 1/4"/FT.

"A"

"B"

DRIVEWAY "A"

DRIVEWAY

EXT'G WATERLINE EASEMENT (15 FT. WIDE)

PARKING OF VEHICLES EASEMENT D

EXT'G DRAINAGE EASEMENT (40 FT. WIDE)

216'25"

EXT'G ROADWAY EASEMENT B (80 FT. WIDE)

126'25"

R=30.00

FOR LEASE SIGNS

26'-2" 42'-3"

STOP SIGN

R=30'

CRUISE SHIP SIGN

30 MPH SIGN

DO NOT ENTER SIGN

HANA HIGHWAY

DWS

YS

WS

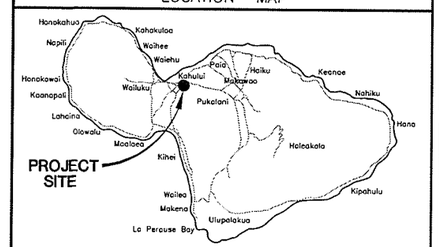
EAC

OHE

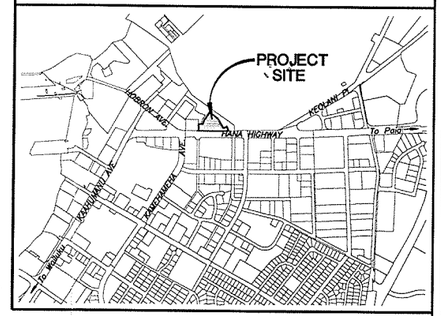
EWG

SITE PLAN
SCALE: 1 IN. = 20 FT.

## LOCATION MAP




## VICINITY MAP




APPROVED BY

DIRECTOR, DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL MANAGEMENT
COUNTY OF MAUI — DATE

DIRECTOR, DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI — DATE
(APPROVAL LIMITED TO IMPROVEMENTS TO BE DEDICATED TO THE DEPARTMENT OF WATER SUPPLY)

CHIEF, HIGHWAYS DIVISION
STATE DEPARTMENT OF TRANSPORTATION — DATE
(APPROVAL GRANTED FOR WORK WITHIN THE STATE HIGHWAY RIGHT-OF-WAY ONLY)
APPROVAL LETTER NO. HWY-M_____ DATED _____
ID NO. _____


OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032
FAX: (808) 242-5779


STACY A. OTOMO
LICENSED PROFESSIONAL ENGINEER
No. 5115-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION, ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

Stacy A Otomo — 4-27-10
SIGNATURE — DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

# MAUI MEDICAL PLAZA

TMK: (2) 3-7-11: 28
KAHULUI, MAUI, HAWAII

SITE PLAN

| REVISION | DATE | NOTE |
|---|---|---|
| | | |
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| | |
|---|---|
| DESIGNED BY: | S.A.O. |
| DRAWN BY: | L.C.O. |
| PROJECT NO.: | 2006-52 |
| DRAWING NAME: | SITE-00 |
| DATE: | 4-27-10 (PERMIT SUBMITTAL) |

SHEET NO.
C-1.1
OF SHEETS

1 A4.1 SOUTH ELEVATION
3/32" = 1'-0"




2 A4.1 NORTH ELEVATION
3/32" = 1'-0"

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 18-11-1(7) OF THE MAMA ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.)

SIGNATURE 4-30-08 EXPIRATION DATE OF THE LICENCE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

LICENSED PROFESSIONAL ARCHITECT No. 5769 HARRISON G. FAGG HAWAII USA

PERMIT SUBMITTAL

HARRISON G FAGG & ASSOCIATES - ARCHITECTS & ENGINEERS
JACK CLARK - SHERRIL F. BURKE - MICHAEL J. BURKE - JEFFREY WINKLER • MEMBER OF THE AMERICAN INSTITUTE OF ARCHITECTS
800 GRANITE TOWER, BILLINGS, MONTANA 59101 - PH (406) 248-7811 - FAX (406) 259-9278 - Email HGFA@hgfa.net

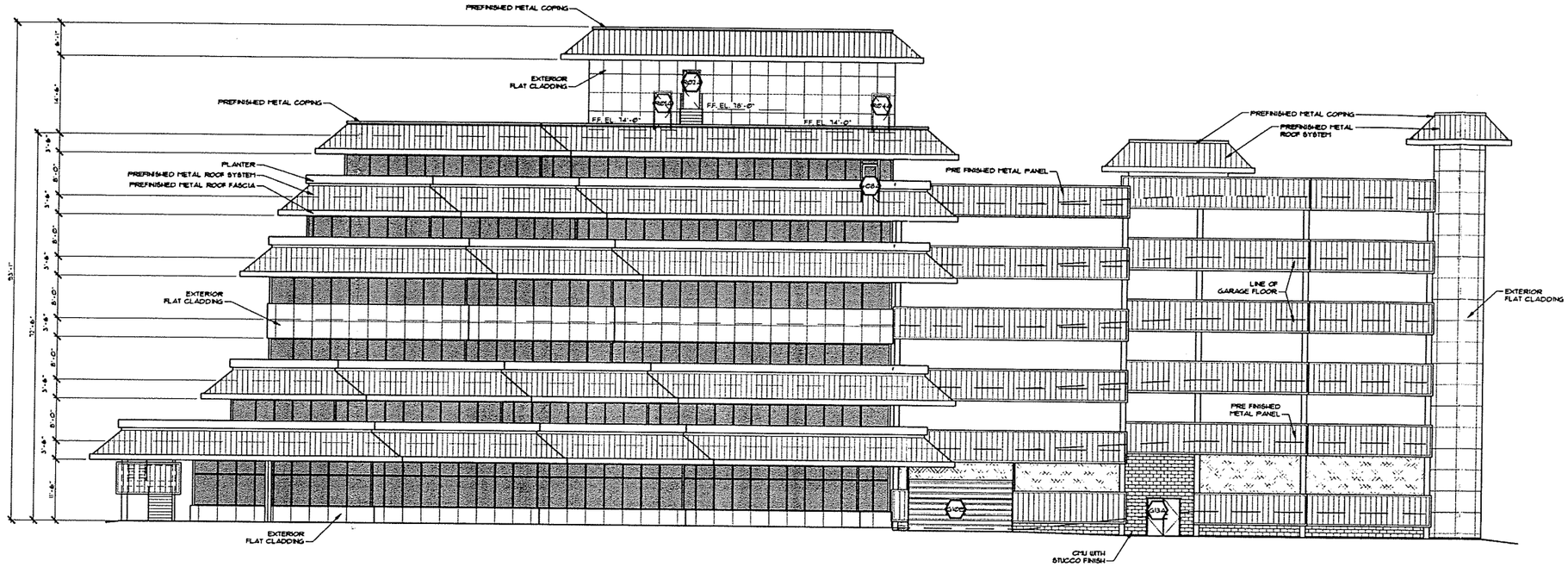
HGFA ARCHITECTS

| | |
|---|---|
| DRAWN BY | JC |
| JOB NO. | 2837 |
| CHECKED BY | HGF |
| DATE | 8-20-07 |

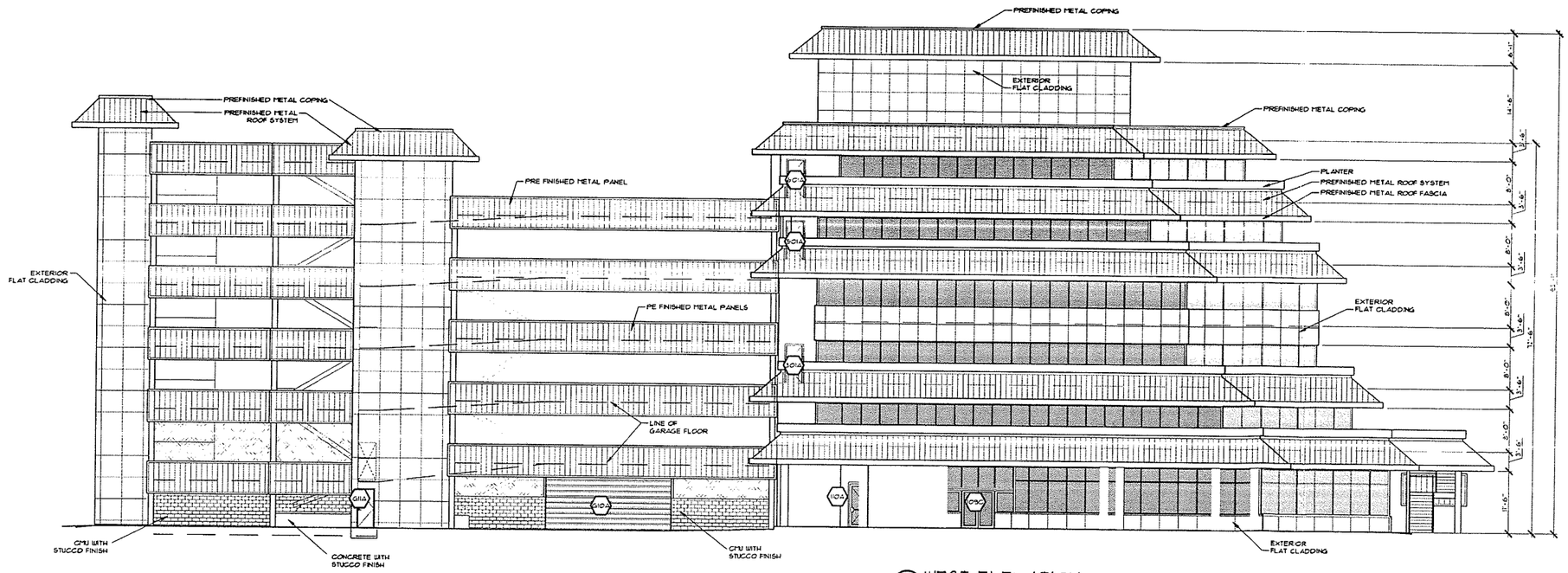
JOB TITLE
MAUI MEDICAL PLAZA

DRAWING TITLE
NORTH & SOUTH ELEVATIONS

SHEET
A4.1
OF




1 A4.2 EAST ELEVATION
3/32" = 1'-0"




2 A4.2 WEST ELEVATION
3/32" = 1'-0"

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-115-2 OF THE MAWH ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS.)

SIGNATURE 4-30-08 EXPIRATION DATE OF THE LICENSE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

HAWAII, USA
LICENSED PROFESSIONAL ARCHITECT
No. 5769
HARRISON G. FAGG, AIA

PERMIT SUBMITTAL

HARRISON G FAGG & ASSOCIATES - ARCHITECTS & ENGINEERS

JACK CLARK - SHERRIL F. BURKE - MICHAEL J. BURKE - JEFFREY WINKLER • MEMBER OF THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN BY JC | JOB NO. 2637 | DRAWING TITLE EAST & WEST ELEVATIONS

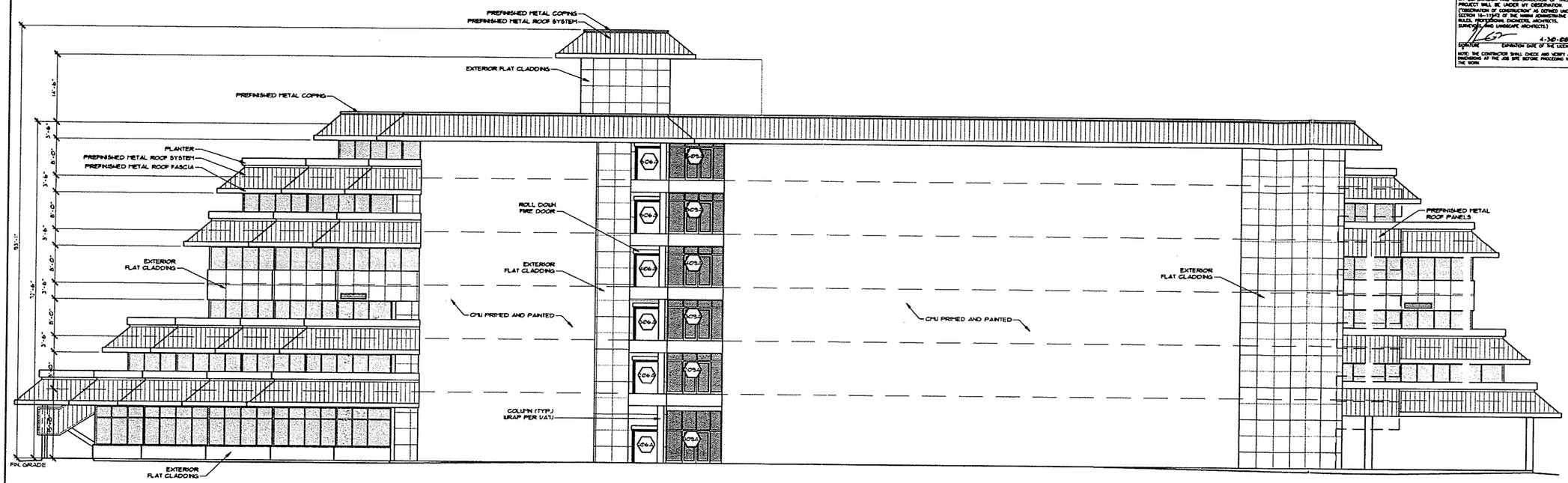
CHECKED BY HGF | DATE 8-20-07

HGFA ARCHITECTS

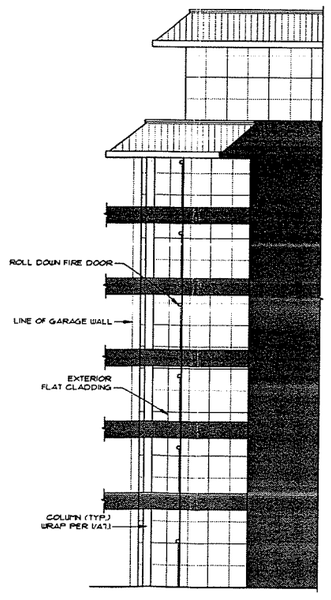
800 GRANITE TOWER, BILLINGS, MONTANA 59101 - PH (406) 248-7811 - FAX (406) 259-9278 - Email HGFA@hgfa.net

JOB TITLE MAUI MEDICAL PLAZA

SHEET A4.2 OF




1 A4.3 NORTH OFFICE BUILDING ELEVATION
3/32" = 1'-0"




2 A4.3 WEST OFFICE BUILDING ELEVATION (AT GARAGE ENTRY / SERVICE ELEVATOR)
3/32" = 1'-0"

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-11.1043 OF THE MONTANA ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS.)

4-30-08
EXPIRATION DATE/RENEWAL DATE OF THIS LICENCE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

HAWAII, USA
LICENSED PROFESSIONAL ARCHITECT
No. 5769
HARRISON G. FAGG

PERMIT SUBMITTAL

HARRISON G FAGG & ASSOCIATES - ARCHITECTS & ENGINEERS

JACK CLARK - SHERRIL F. BURKE - MICHAEL J. BURKE - JEFFREY WINKLER • MEMBER OF THE AMERICAN INSTITUTE OF ARCHITECTS

| | |
|---|---|
| DRAWN BY JC | JOB NO. 2637 |
| CHECKED BY HGF | DATE 8-20-07 |

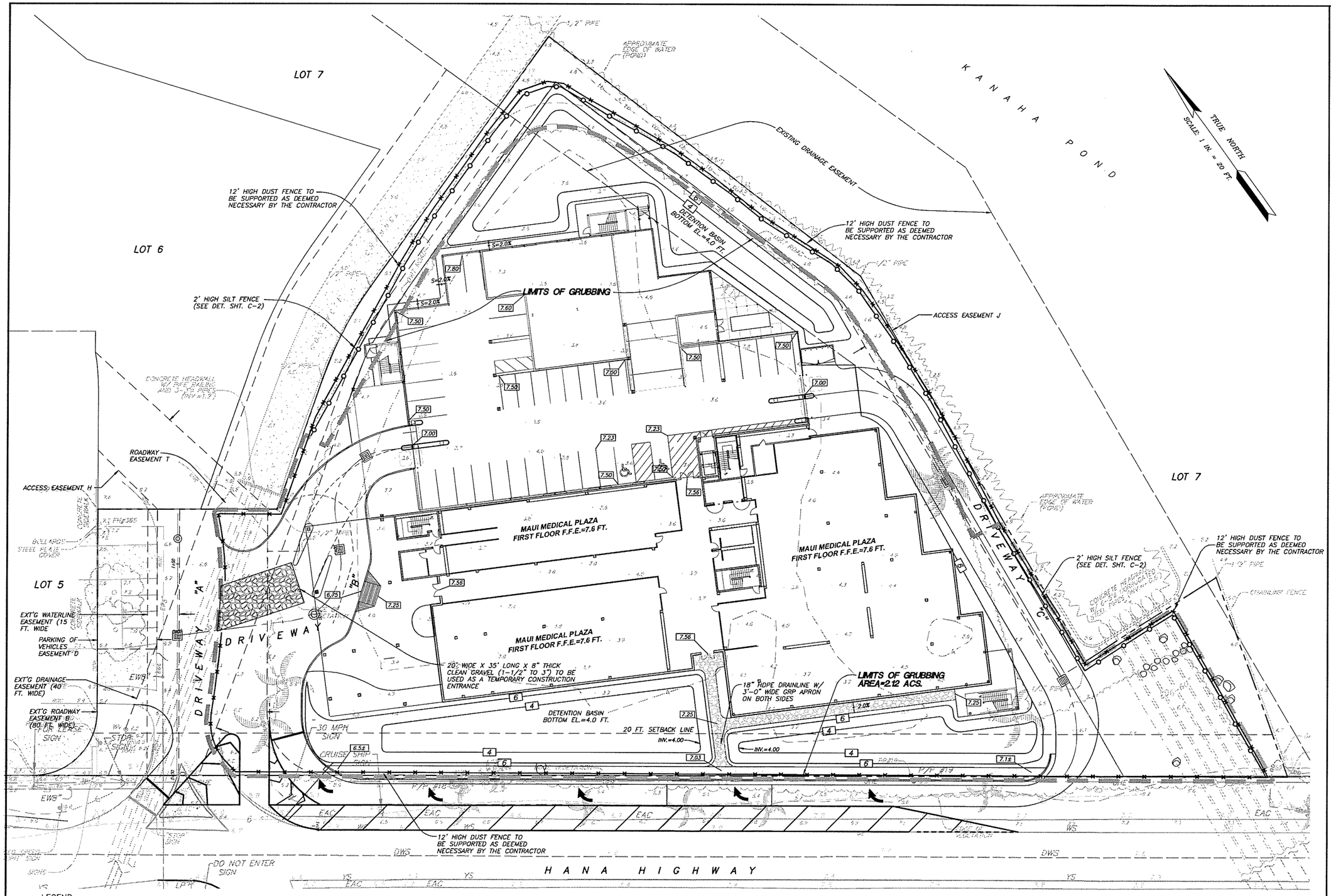
DRAWING TITLE
NORTH ELEVATION

JOB TITLE
MAUI MEDICAL PLAZA

800 GRANITE TOWER, BILLINGS, MONTANA 59101 - PH (406) 248-7811 - FAX (406) 259-9278 - Email HGFA@hgfa.net

HGFA ARCHITECTS

SHEET
A4.3
OF




LEGEND:

- EXISTING GRADE SPOT ELEVATION
- EXISTING CONTOUR LINE
- FINISH GRADE CONTOUR LINE
- DIRECTION OF EXISTING ONSITE RUNOFF
- 12' HIGH DUST FENCE
- 2' HIGH SILT FENCE
- TEMPORARY CONSTRUCTION ACCESS

GRADING & BMP PLAN
SCALE: 1 IN. = 20 FT.

APPROXIMATE EARTHWORK QUANTITIES

THE EARTHWORK QUANTITIES SHOWN HEREIN ARE FOR SECURING THE GRADING PERMIT ONLY. THE CONTRACTOR SHALL VERIFY THE QUANTITIES AND COMPLETE THE GRADING AS SHOWN ON THE PLAN.

CLEARING AND GRUBBING = 2.12 ACRES±
EMBANKMENT = 6,456 C.Y.
EXCAVATION = 144 C.Y.


OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
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FAX: (808) 242-5779


STACY A. OTOMO
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No. 5115-C
HAWAII, U.S.A.

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Stacy A. Otomo — 4-27-10
SIGNATURE — DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

# MAUI MEDICAL PLAZA

TMK: (2) 3-7-11: 28
KAHULUI, MAUI, HAWAII

GRADING & BMP PLAN

| REVISION | DATE | NOTE |
|---|---|---|
| 1 | | |
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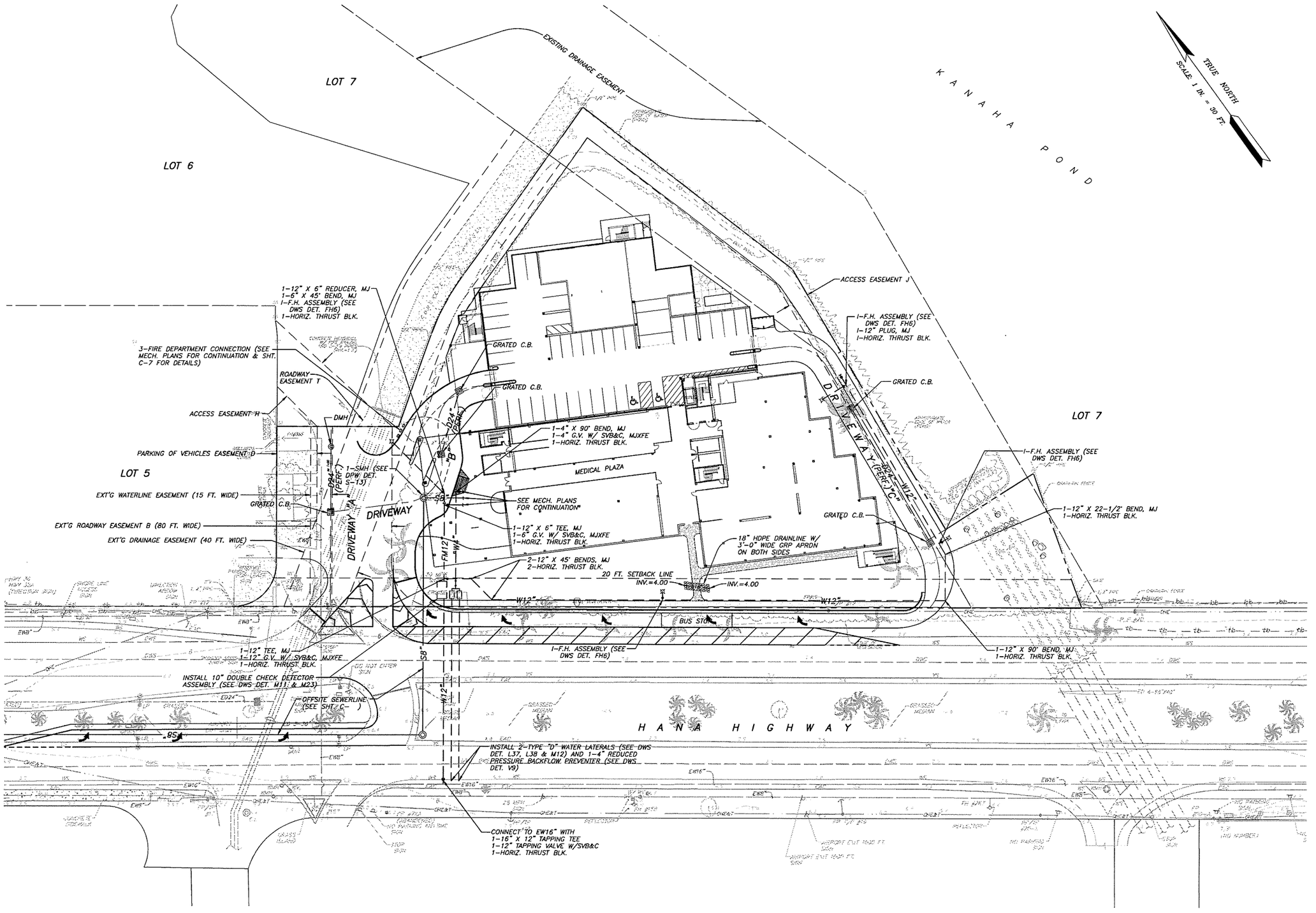
| 7 | | |

| | |
|---|---|
| DESIGNED BY: | S.A.O. |
| DRAWN BY: | L.C.O. |
| PROJECT NO.: | 2006-52 |
| DRAWING NAME: | GRAD-00 |
| DATE: | 4-27-10 (PERMIT SUBMITTAL) |

SHEET NO.
C-2.1
OF SHEETS




UTILITY PLAN
SCALE: 1 IN. = 30 FT.

OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
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Stacy A. Otomo 4-27-10
SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

# MAUI MEDICAL PLAZA

TMK: (2) 3-7-11: 28
KAHULUI, MAUI, HAWAII

UTILITY PLAN

| REVISION | DATE | NOTE |
|---|---|---|
| 1 | | |
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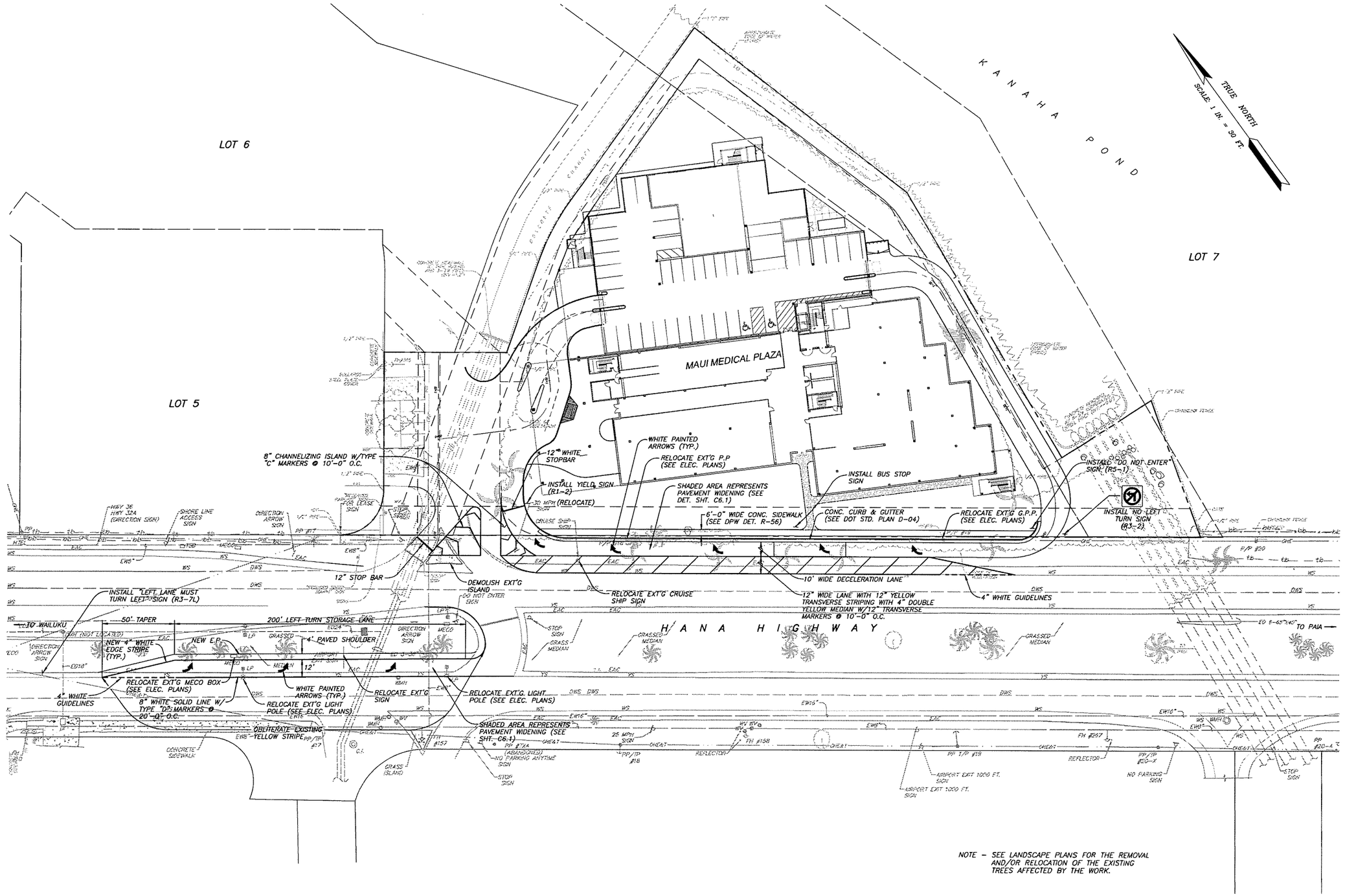
|---|---|
| DESIGNED BY: | S.A.O. |
| DRAWN BY: | L.C.O. |
| PROJECT NO.: | 2006-52 |
| DRAWING NAME: | UTIL-00 |
| DATE: | 4-27-10 (PERMIT SUBMITTAL) |

SHEET NO.
C-3.1
OF SHEETS




NOTE - SEE LANDSCAPE PLANS FOR THE REMOVAL AND/OR RELOCATION OF THE EXISTING TREES AFFECTED BY THE WORK.

HANA HIGHWAY WIDENING & STRIPING PLAN
SCALE: 1 IN. = 30 FT.


OTOMO
ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
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FAX: (808) 242-5779


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No. 5115-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND DIRECTION OF THE PROJECT WILL BE UNDER MY OBSERVATION, TO THE EXTENT I SHALL DEEM NECESSARY, UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

Stacy A. Otomo 4-27-10
SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

# MAUI MEDICAL PLAZA

TMK: (2) 3-7-11: 28

KAHULUI, MAUI, HAWAII

HANA HIGHWAY WIDENING & STRIPING PLAN

| REVISION | DATE | NOTE |
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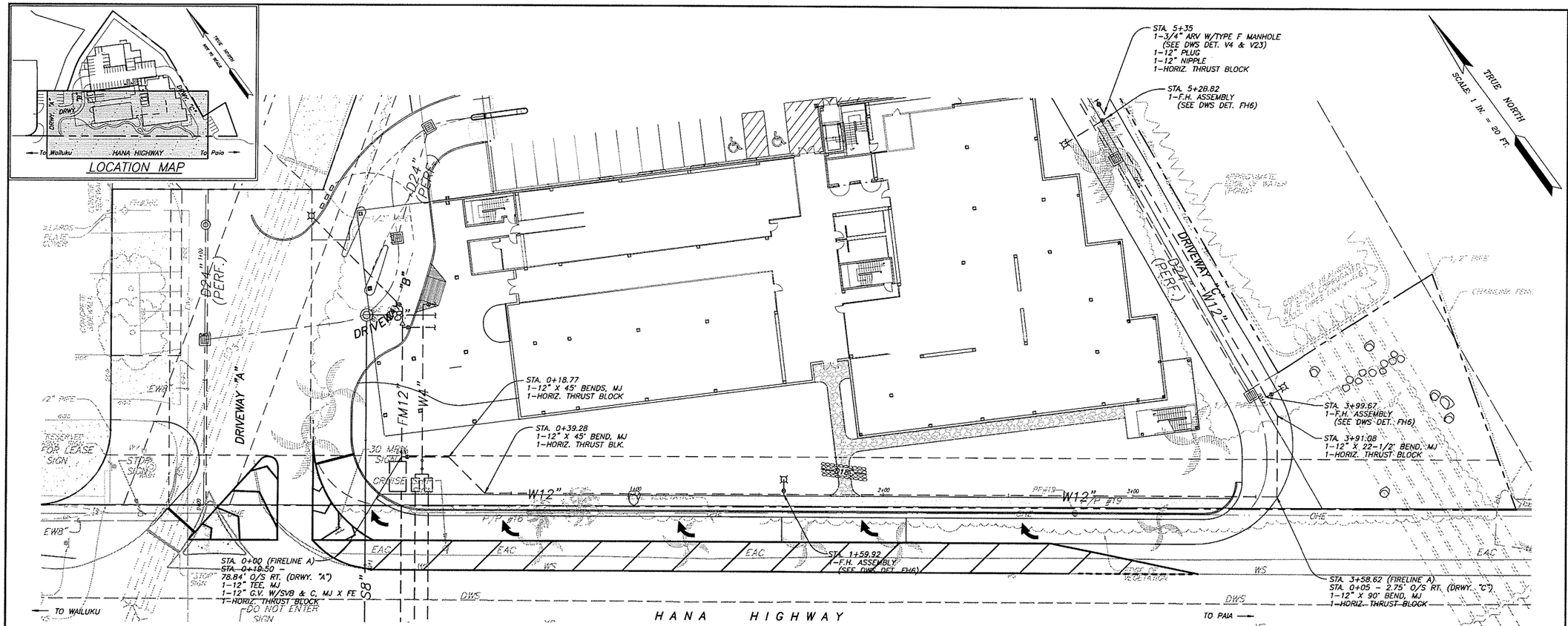
|---|---|
| DESIGNED BY: | S.A.O. |
| DRAWN BY: | L.C.O. |
| PROJECT NO.: | 2006-52 |
| DRAWING NAME: | STRIPE-00 |
| DATE: | 4-27-10 (PERMIT SUBMITTAL) |

SHEET NO.

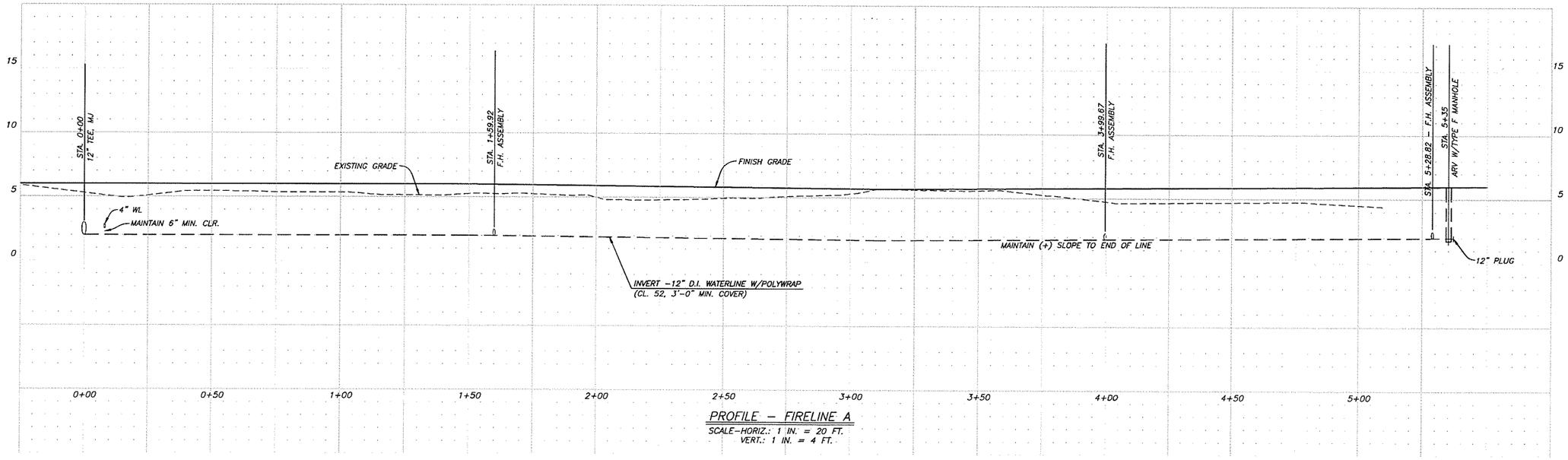
C-4.1

OF SHEETS

LOCATION MAP




PLAN – FIRELINE A
SCALE: 1 IN. = 20 FT.




PROFILE – FIRELINE A
SCALE-HORIZ.: 1 IN. = 20 FT.
VERT.: 1 IN. = 4 FT.

OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
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FAX: (808) 242-5779

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HAWAII, U.S.A.

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Stacy A. Otomo — 4-27-10
SIGNATURE — DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

# MAUI MEDICAL PLAZA

TMK: (2) 3-7-11: 28

KAHULUI, MAUI, HAWAII

PLAN & PROFILE – FIRELINE A

| REVISION | DATE | NOTE |
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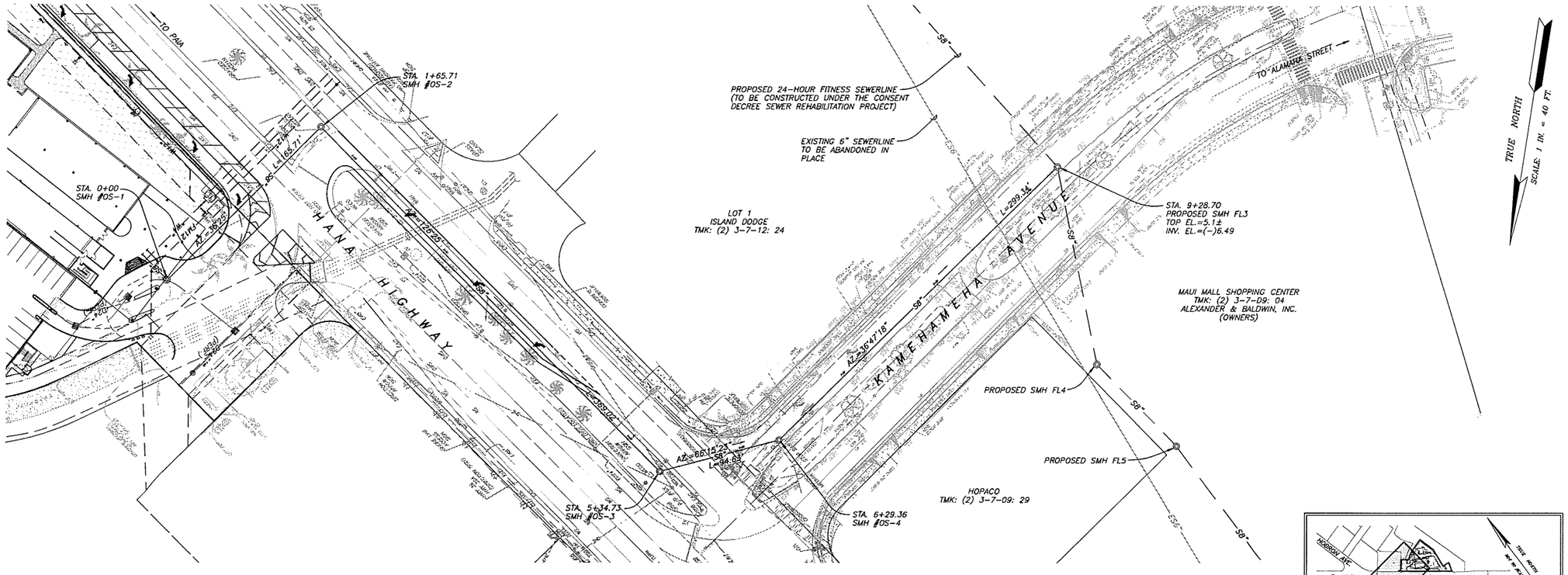
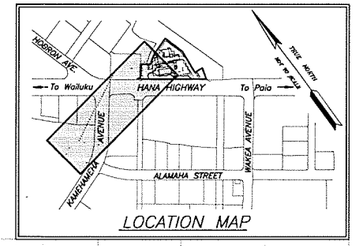
|---|---|
| DESIGNED BY: | S.A.D. |
| DRAWN BY: | L.C.O. |
| PROJECT NO.: | 2006-52 |
| DRAWING NAME: | PP-FL-A |
| DATE: | 4-27-10 (PERMIT SUBMITTAL) |

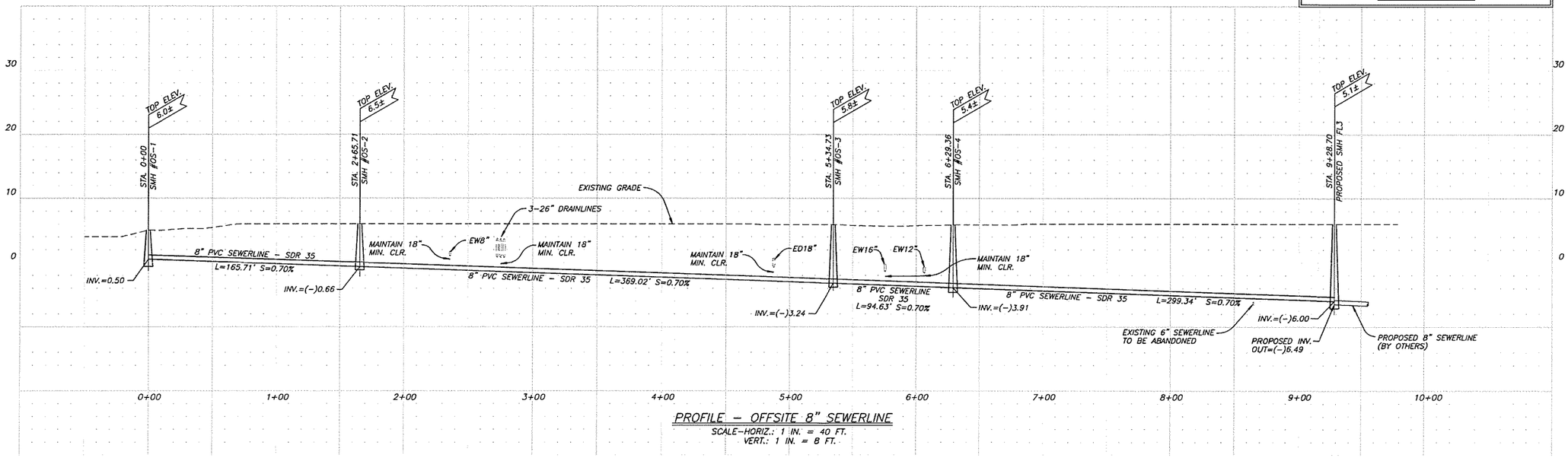
SHEET NO.
C-5.1
OF SHEETS




## PLAN – OFFSITE 8" SEWERLINE

SCALE: 1 IN. = 40 FT.




## PROFILE – OFFSITE 8" SEWERLINE

SCALE–HORIZ.: 1 IN. = 40 FT.
VERT.: 1 IN. = 8 FT.

OTOMO ENGINEERING, INC.
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LICENSED PROFESSIONAL ENGINEER
No. 5115-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATIVE CONTROL/RESPONSIBLE CHARGE AS DEFINED UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

Stacy A. Otomo — 4-27-10
SIGNATURE — DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

# MAUI MEDICAL PLAZA

TMK: (2) 3-7-11: 28

KAHULUI, MAUI, HAWAII

PLAN & PROFILE – OFFSITE 8" SEWERLINE

| REVISION | DATE | NOTE |
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|---|---|
| DESIGNED BY: | S.A.O. |
| DRAWN BY: | L.C.O. |
| PROJECT NO.: | 2006-52 |
| DRAWING NAME: | PP-SL |
| DATE: | 4-27-10 (PERMIT SUBMITTAL) |

SHEET NO.

C-5.2

OF SHEETS

WWW.LANDSCAPEARCHITECT.NET

Sporobolus virginicus
'AKI'AKI
6,200 SF | GRASS PAVER 2 SYSTEM
INSTALL PER MANUFACTURE
SEE DETAIL 9, SHEET LP-9

Cocos nucifera
32 | NIU (COCONUT PALM)
FIELD STOCK
SEE PLAN FOR TRUNK HT

Neoregelia kahekai
300 | NAUPAKA
3 GAL, 3' HT MIN 2'-0" O.C.
MAINTAIN AT 5' HT
2" LAYER CINDER BELOW

Poydras odorata
20 | ALAHE'E
15 GAL 4'-6" HT

LF | TREX HEADER
DASHED LINE SYMBOL
SEE DETAIL 5, SHEET LP-9

Native Hawaiian Sugar Cane
6 | KO - VARIETIES
25 GAL. 6' HT

2,000 SF | BLACK CINDER - 3/4" DIA.
MAINTENANCE STRIP
3" LAYER OVER FILTER FABRIC

Cordyline fruticosa
95 | TI - VARIETIES
3 GAL

Pritchardia munroi
15 | LOULU SP.
FIELD STOCK
SEE PLAN FOR TRUNK HT

Vitex rotundifolia
12 | POHINAHINA
5 GAL.

Musa x paradisiaca
6 | MAFA (BANANA)
25 GAL

AREA C

AREA A

AREA B

18 | Schedea globosa
15 GAL
SEE PLAN FOR HTS

2 EXISTING TREES
TO REMAIN

Cordia subcordata
7 | KOU - NATIVE
25 GAL. 8' HT
WITH ROOT BARRIER

1 | ART SCULPTURE
TO BE SELECTED BY OWNER

25 | NATIVE TARO VARIETIES
15 GAL IN POTS

5 | 8' TEAK BENCHES
TO BE SELECTED BY OWNER
SEE INDIGO EXPORTS IN KIHEI

ACCENT FIELD ROCK BOULDERS
2'-3'-4' DIAMETER

Gardenia brighamii
43 | NANU - HAWAIIAN GARDENIA
15 GAL. 3' HT MIN

Sida fallax
20 | 'ILIMA
3 GAL. 2' HT

TAHITIAN GARDENIA
Gardenia taitensis

Pandanus tectorius
9 | HALA
25 GAL. 4'-6' HT

Hibiscus arnottianus punaluuensis
43 | NATIVE WHITE HIBISCUS
15 GAL. 3' HT MIN

Osteomeles anthyllidifolia
9 | ULEI
15 GAL. 8' HT
W/ ROOT BARRIER

CRUSHED GRAVEL IN PAVERS
FOR EDUCATIONAL PARKING

ART-NATURAL THEME
TO BE SELECTED BY OWNER

EDUCATIONAL AND
OBSERVATION STRUCTURE
SEE DETAIL 8, SHEET LP9
SEE ARCHITECTURAL DWGS

Thespesia populnea
4 | MILO
25 GAL. 8' HT.

## HARDSCAPE LEGEND

| SYM. | TYPE | SIZE | QTY. | NOTES |
|---|---|---|---|---|
| | BLACK RIVER ROCK 2" OVER FILTER FABRIC | 1"-3" | #### S.F. | - |
| | GRASS PAVER 2 | PLASTIC | #### S.F. | - |
| | QUARTZITE PAVING RANDUM PATTERN | 2' X 2' | #### S.F. | - |
| | SCULPTURE SELECTED BY OWNER | 3/4" | #### E.A. | - |
| | ACCENT BOULDERS | 1-3' DIA. | #### E.A. | - |
| | TREX PLASTIC HEADER | - | #### L.F. | - |
| | LANDSCAPE MOUNDING 2' INTERVALS | 1' HT. | #### C.Y. | - |
| | STEPPING STONES | 18" DIA | #### E.A. | - |

## GROUND COVER LEGEND

| SYM. | COMMON/ BOTANICAL | SIZE | QTY. | NOTES |
|---|---|---|---|---|
| | 'UKI 'UKI<br>Dianella sandwicensis | 1 GAL | 00 | PLANT 12" O.C. |
| | BACOPA<br>Bacopa monnieri | 4" POTS | 00 | PLANT 12" O.C. |
| | HINAHINA<br>Heliotropium anomalum | 4" POTS | 00 | PLANT 12" O.C. |
| | NEHE<br>Lipochaeta integrifolia | 4" POTS | 00 | PLANT 12" O.C. |
| | 'ILIE'E PLUMBAGO<br>Plumbago zeylanica | 1 GAL | 00 | PLANT 18" O.C. |
| | 'ILIMA PAPA<br>Sida fallax | 4" POTS | 00 | PLANT 18" O.C. |
| | HINAHINA<br>Heliotropium anomalum | 1 GAL | 00 | PLANT 12" O.C. |
| | NATIVE RED HIBISCUS<br>Kokio keluaii | 1 GAL | 00 | PLANT 12" O.C. |
| | LAUA'E FERN<br>Phymatosorus grossus | 4" POTS | 00 | PLANT 12" O.C. |
| | KUPUKUPU FERN<br>Nephrolepis exaltata | 4" POTS | 00 | PLANT 12" O.C. |
| | PA'UOHI'AKA<br>Jacquemontia ovalifolia | 4" POTS | 00 | PLANT 12" O.C. |
| | PORTULACA<br>Portulaca grandiflora | 4" POTS | 00 | PLANT 12" O.C. |
| | AKIA<br>Wikstroemia uva-ursi | 1 GAL | 00 | PLANT 18" O.C. |


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BRYAN P. MAXWELL
LICENSED PROFESSIONAL LANDSCAPE ARCHITECT
No. LA 0901
HAWAII, USA

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE USED BY ME OR UNDER OBSERVATION OF CONSTRUCTION AS DEFINED IN SECTION 13-11-2, OF THE HAWAII ADMINISTRATIVE RULES, DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS, STATE OF HAWAII, RELATING TO ENGINEERS, ARCHITECTS, LAND SURVEYORS, AND LANDSCAPE ARCHITECTS.

SIGNATURE

PREPARED FOR:

MAUI
MEDICAL
PLAZA
151 HANA HIGHWAY
KAHULUI, MAUI, HAWAII
T.M.K. (2) 3-7-011:028

SHEET TITLE

LANDSCAPE
PLANTING PLAN
SITE

REVISIONS

| NO | DESCRIPTION | DATE | BY |
|---|---|---|---|
| | | | |

| JOB NUMBER | DATE |
|---|---|
| 3945 | 5 MAY 2010 |
| DESIGNED BY | CHECKED BY |
| BPM | BPM |

SHEET SCALE
1"=20'

LP-1

# APPENDIX B.

# Jurisdictional Determination Letter from Department of the Army, U.S. Army Corps of Engineers

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

REPLY TO
ATTENTION OF:

April 25, 2008

Regulatory Branch

**File Number POH-2006-531**

Mr. Robert McDaniel III
Maui Medical Plaza at Kanaha
350 Hukilike Street, Suite D
Kahului, HI 96732

Dear Mr. McDaniel:

This letter responds to your jurisdictional determination request dated May 8, 2007 for Corps verified wetlands located on the parcel where the proposed Maui Medial Plaza at Kanaha is sited at 151 Hana Highway, Kahului, Maui Island, Hawaii 96732 (TMK: (2) 3-7-11: 28). We have reviewed the information you provided under the Corps' authority to issue Department of the Army (DA) permits pursuant to Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344).

Based on the information provided in the document *"Request for Jurisdictional Determination and Wetland Permit Application"* complied by Mr. John Vuich of Malama Environmental, LLC and dated March 7, 2007, subsequent information submittals forwarded by you at the Corps request; and a site visit conducted on March 17-18, 2008 by Ms. Joy Anamizu of my staff and a representatives from both the U.S. Environmental Protection Agency (EPA) and the State of Hawaii, Department of Health, Clean Water Branch, we have determined the wetlands on the subject property are jurisdictional waters of the U.S.

On October 25, 2007, we issued a verification letter for the wetlands delineated on the property. Based on the information provided in Robert Hobdy's report *"Wetlands Determination for the Kanaha Industrial Subdivision Project, Kanaha, Kahului, Maui"* dated June 2006, we accepted the recommended 4 foot elevation contour as the delineated boundary for wetland (Enclosure 1). A topographic survey map completed by R. T. Tanaka Engineers, Inc. better depicts two separate areas that are below the 4 ft mean sea level (Enclosure 2). Any work activities that will involve the discharge and/or placement of fill and/or dredge material into waters of the U.S., which also include these wetlands and the adjacent drainage canals, will require a DA permit.

Enclosed is a copy of the final approved jurisdictional determination form for your project and a *Notification of Administrative Appeal Options and Process and Request for Appeal* form (Form F). Please review and submit a completed Form F within 60 calendar days from date of this letter. Information regarding the appeal process is available at following link at http://www.pod.usace.army.mil/Regulatory/fedreg.pdf.

Should you have any questions regarding this jurisdictional determination or any other requisite materials you need to aid in the processing of permit, please contact Ms. Joy Anamizu of my staff by phone at 808-438-7023, by fax at 808-438-4060, or by electronic mail at *joy.n.anamizu@usace.army.mil* and reference Corps **File No. POH-2006-531** in all future correspondence.

Sincerely,

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

Copy furnished (w/o enclosures):
Dr. Wendy Wiltse, U.S. Environmental Protection Agency, Region IX, Honolulu Branch, P.O. Box 50003, Honolulu, HI 96850
Mr. Roland Asakura, Department of Health, Clean Water Branch - Maui, Maui District Health Office, 54 High Street, Room 300, Wailuku, HI 96793
Mr. Edward Chen, Department of Health, Clean Water Branch, P.O. Box 3378, Honolulu, HI 96801-3378
Dr. Fern P. Duvall II, Department of Land and Natural Resources, Division of Forestry & Wildlife, 54 South High Street, Room 101, Wailuku, HI 96793
Mr. John Nakagawa, State Office of Planning, Coastal Zone Management Program, P.O. Box 2359, Honolulu, HI 96804
Mr. Michael Molina, U.S. Fish and Wildlife Service, 300 Ala Moana Blvd. Room 3-122, P.O. Box 50088, Honolulu, HI 96858-0001
Mr. John Vuich, Environmental Consultant, Malama Environmental, LCC, P.O. Box 880487, Pukalani, HI 96788-0487
Mr. Peter A. Horowitz, Attorney at Law, 305 High Street, Suite 101, Wailuku, HI 96793
Ms. Patricia Billington, CEPOH-OC
Mr. Thom Lichte, CEPOD-PDC

Enclosure 1

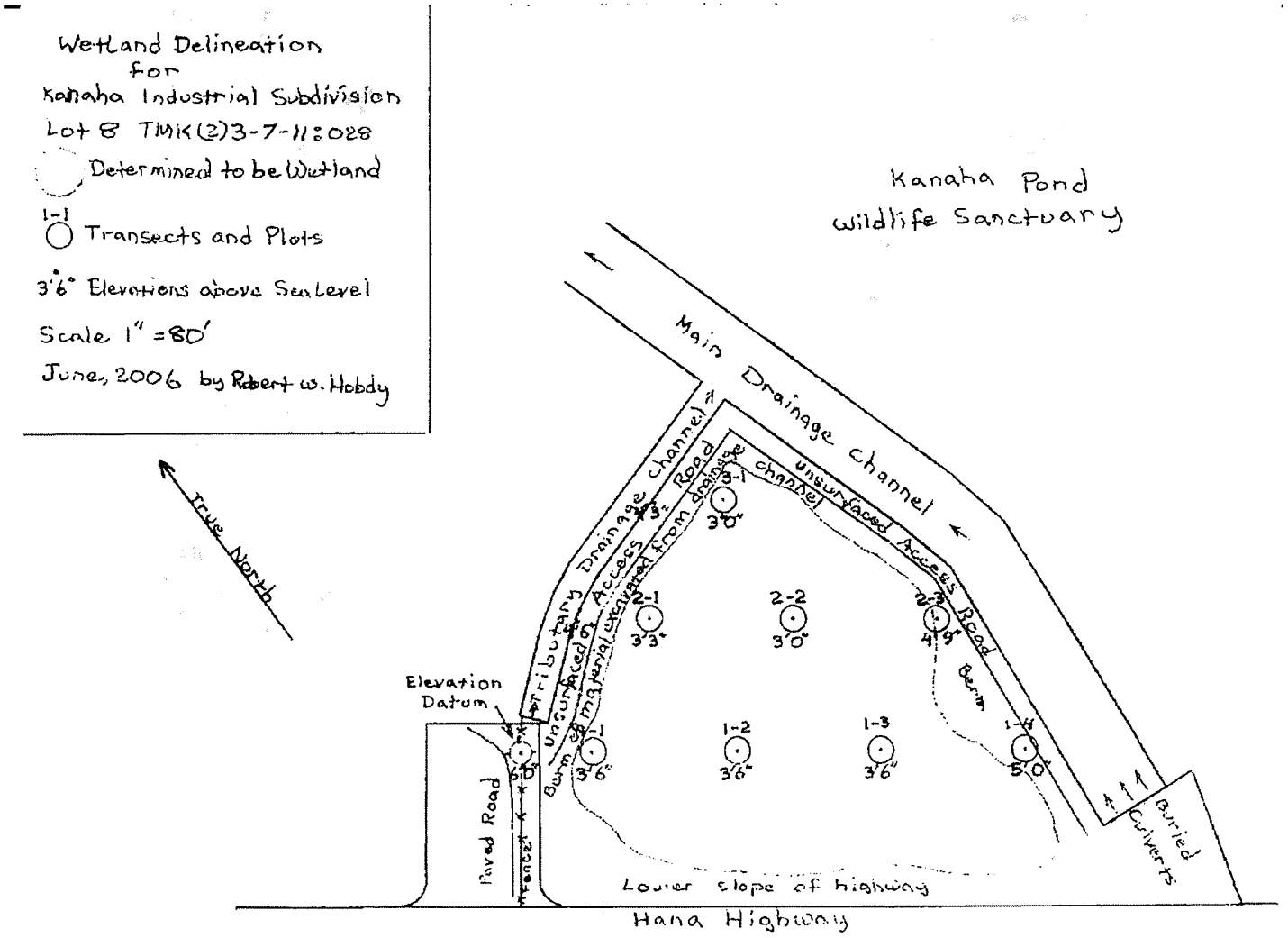
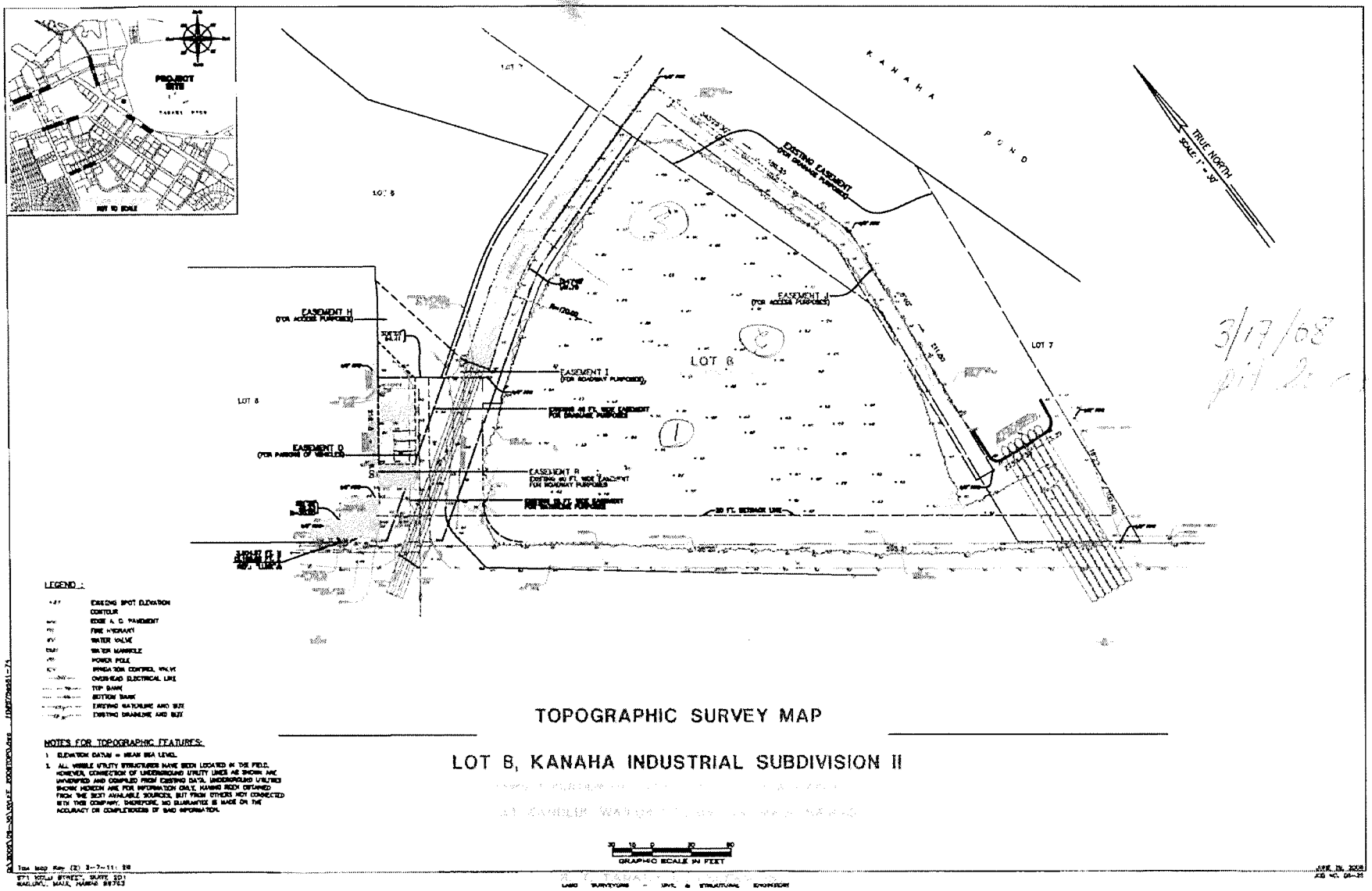



Figure 9




LEGEND :

- EXISTING SPOT ELEVATION
- CONTOUR
- EDGE A. C. PAVEMENT
- FIRE HYDRANT
- WATER VALVE
- WATER MANHOLE
- POWER POLE
- IRRIGATION CONTROL VALVE
- OVERHEAD ELECTRICAL LINE
- TOP BANK
- BOTTOM BANK
- EXISTING GATEHOUSE AND BOX
- EXISTING DRAINLINE AND BOX

NOTES FOR TOPOGRAPHIC FEATURES:

1. ELEVATION DATUM = MEAN SEA LEVEL
2. ALL VISIBLE UTILITY STRUCTURES HAVE BEEN LOCATED IN THE FIELD. HOWEVER, CONNECTION OF UNDERGROUND UTILITY LINES AS SHOWN ARE UNVERIFIED AND COMPILED FROM EXISTING DATA. UNDERGROUND UTILITIES SHOWN HEREON ARE FOR INFORMATION ONLY. HAVING BEEN OBTAINED FROM THE BEST AVAILABLE SOURCES, BUT FROM OTHERS NOT CONNECTED WITH THIS COMPANY, THEREFORE, NO GUARANTEE IS MADE ON THE ACCURACY OR COMPLETENESS OF SAID INFORMATION.

# TOPOGRAPHIC SURVEY MAP

## LOT 8, KANAHA INDUSTRIAL SUBDIVISION II

GRAPHIC SCALE IN FEET

Enclosure 2

**APPROVED JURISDICTIONAL DETERMINATION FORM**
**U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

**SECTION I: BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): April 25, 2008**

**B. DISTRICT OFFICE, FILE NAME, AND NUMBER: HONOLULU (CEPOH-EC-R); Maui Medical Plaza at Kanaha, Maui, HI; POH-2006-531**

**C. PROJECT LOCATION AND BACKGROUND INFORMATION:**

State:Hawaii County/parish/borough: Maui City: Kahului

Center coordinates of site (lat/long in degree decimal format): Lat. 20.89055° N, Long. 156.459644° W.

Universal Transverse Mercator: Zone 4

Name of nearest waterbody: unnamed drainage canal (RPW) that indirectly (physically plugged by boards) to the Pacific Ocean

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean

Name of watershed or Hydrologic Unit Code (HUC): Kahului

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

☒ Office (Desk) Determination. Date: 28 March 2008

☒ Field Determination. Date(s): 16 August, 2006; 17-18 March 2008

**SECTION II: SUMMARY OF FINDINGS**

**A. RHA SECTION 10 DETERMINATION OF JURISDICTION.**

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**

There **Are** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: approximatly less than 2.499 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
      Elevation of established OHWM (if known): 4 ft above mean sea level elevation contour.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.

[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

**The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.**

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

**This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.**

**The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.**

**A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.**

**If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.**

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) **General Area Conditions:**
   Watershed size: 14,479.48858**acres**
   Drainage area: unknown **acres**
   Average annual rainfall: 18.8 inches
   Average annual snowfall: 0.0 inches

   (ii) **Physical Characteristics:**
   (a) Relationship with TNW:
   ☒ Tributary flows directly into TNW.
   ☐ Tributary flows through **Pick List** tributaries before entering TNW.

   Project waters are **Pick List** river miles from TNW.
   Project waters are **Pick List** river miles from RPW.
   Project waters are **Pick List** aerial (straight) miles from TNW.
   Project waters are **Pick List** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: The wetland (COE verified letter issued Oct, 25 2007) identified for this JD form is on a parcel (the review area) that is adjacent to a RPW tributary (a drainage canal). Under typical every day weather

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

conditions, the RPW contains waters do not have a continuous surface connection with the receiving TNW (Pacific Ocean). Only under inclement weather conditions do the RPW and TNW connect. Surface separation of the RPW from the TNW is attributed to a beach sand berm that is located between the two waterbodies, and inhibits regular exchange/flow/mixing of RPW and TNW waters under ordinary weather conditions.

The beach sand berm that separates the RPW from the TNW is outfitted with three (3) ~4-ft diameter culverts in order to prevent flooding of upland areas adjacent to the RPW. The ocean-facing ends of culverts are fitted with plywood boards to inhibit accreting beach sand from blocking the openings. These boards are removed to allow for drainage during heavy rain events. The in-land facing ends of the culverts were observed to overhang over the surface of ponded waters at the downstream end of the RPW, directly behind the sand berm. During normal weather conditions, RPW waters are not transferred through the culverts due to the aforementioned elevation difference.

Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):

**Tributary** is: ☒ Natural

☒ Artificial (man-made). Explain: The tributary consists of a man-made drainage ditch which, according to the applicant, was originally designed to drain uplands, the areas south of the Hana Highway, for commercial development. About 75% of the upstream portion of the drainage ditch is straight and the remaining 25% near the terminal end naturally meanders. For this JD, the tributary is defined as the 0.50 miles of the drainage ditch (RPW) that "flows" towards (see "Manipulated" below) the Pacific Ocean (TNW).

☒ Manipulated (man-altered). Explain: The terminal end of the tributary consists of culverts that are fitted with removable plywood boards to prevent accreting beach sand from them. In the event of a storm event or increased-flow conditions, the plywood boards are removed to allow for the drainage of the tributary waters into the sea.

**Tributary** properties with respect to top of bank (estimate):
Average width: estimated 50 feet
Average depth: estimated 5 feet
Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):

| | | |
|---|---|---|
| ☒ Silts | ☒ Sands | ☒ Concrete |
| ☐ Cobbles | ☐ Gravel | ☒ Muck |
| ☐ Bedrock | ☒ Vegetation. Type/% cover: aquatic and hydrophytic plants/75% | |

☒ Other. Explain: Actual composition is not known; silt and muck checked above are a best guess estimate.

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: The general condition of the 0.50 mile of the tributary evaluated appeared to be fair -- measured from beach sand berm (downstream end) to the Hana Highway (upstrream portion of the drainage canal). The banks of the upstream portion of the tributary (upstream 0.25 mi) was heavily vegetated with hydrophytic plants. The following downstream portion (middle 0.1 mi) is concrete lined. The banks of the final meandering portion of the tributary (downstream 0.15 mi) is lined with erosion control fabric and sparsely vegetated with hydrophytic and uplands vegetation. From photos provided by the applicant, the banks/sides of the tributary (drainage ditch) are absent of signs of scouring, shelving, litter and debris, and sediment deposition). Overall, the tributary's condition and structural stability appeared normal and without From on-site observations, there appears to be faint traces of visible physical evidence that indicates the tributary is not regularly exposed to subject to regular high flowing waters or storm events.

Presence of run/riffle/pool complexes. Explain: None

Tributary geometry: **Relatively straight**
Tributary gradient (approximate average slope): 50 %

(c) Flow:

Tributary provides for: **Seasonal flow**
Estimate average number of flow events in review area/year: **2-5**

Describe flow regime: Under typical weather conditions, the tributary appears to function as a retention pond. No visible signs of gravitational flow, that is movement of waters in the upstream to downstream direction, were observed. It was only during periods of high wind conditions on 17-18 March did the tributary's waters appear to exhibit "flow" or movement. Otherwise no visible movement (i.e., visible surface currents, eddies, ripples, waves) were noted.

Other information on duration and volume: It is important to note, however, that the tributary is known to flow on occasion -- during seasons of increased rain (winter months). Two interviews with local persons of the area (F. Duvall and an un-named landscaper) indicated that only during high rain events did the tributary receive enough water where it required an individual, a maintenance representative from Alexander & Baldwin Properties, an adjacent landowner, to remove the plywood culvert doors so that excess stormwaters can flow out to sea.

Surface flow is: **Confined.** Characteristics: During typical weather conditions, as observed on 17-18 March 2008, surface waters appeared to be confined within the excavated depression of the drainage canal.

Subsurface flow: **Unknown.** Explain findings: Water samples were taken at various locations along the tributary. These samples were tested for salinity and although they were found brackish (State of HI standard for brackish waters are > 0.5 parts per thousand (ppt), but < 32 ppt of dissolved inorganic ions), samples were found and almost "fresh". The ocean water sampled from the beach had a salinity reading of 30 ppt (State of HI standard for saline/salt waters contain concentrations of inorganic ions > 32ppt). Based on the salinity measurements, the presence of ions in samples taken along the tributary, and a low concentration of salts in the ocean sample, it is believed there may be a dynamic hydrologic exchange between the waters of the RPW tributary and the receiving TNW (Pacific Ocean), and that under normal weather conditions, RPW-TNW mixing is very limited, but not irrefutably absent.

☒ Dye (or other) test performed: The water samples collected were tested for presence/absence of salinity with salt concentrations measured manually with a refractometer and an electronic device. .

Tributary has (check all that apply):

☒ Bed and banks

☒ OHWM[6] (check all indicators that apply):

- ☒ clear, natural line impressed on the bank
- ☐ changes in the character of soil
- ☐ shelving
- ☐ vegetation matted down, bent, or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ other (list):
- ☒ the presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ multiple observed or predicted flow events
- ☐ abrupt change in plant community

☒ Discontinuous OHWM.[7] Explain: From photos provided by the applicant, a clear OHWM is visible on the two concrete-lined portions of the tributary: I) on culverts at the upstream end of the tributary (at the beginning end of 0.50 mi length of tributary, near the review area), and 2) on the concrete-lined portion of the tributary (the middle portion of the 0.50 mi length of the tributary). Presence of an OHWM was verified at both locations during the 17-18 March 2008 field visit. .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☒ High Tide Line indicated by:

- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☐ physical markings/characteristics
- ☐ tidal gauges
- ☐ other (list):

☒ Mean High Water Mark indicated by:

- ☐ survey to available datum;
- ☐ physical markings;
- ☐ vegetation lines/changes in vegetation types.

**(iii) Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: On 17-18 March 2008, the general condition of the tributary waters along its entire length is considered poor due to its brownish-green color. The dark color of the water is attributed to several factors which include: presence of algae/bacteria growth, a nutrient waste source (waste from fishes in the canal), and turbid suspended sediment caused by natural mixing from wind-generated waves that blew over the surface the tributary's waters. A sample of water taken at the confluence of the drainage canals yielded a turbidity measurement of 23.9 NTUs and a pH measurement of 8.3; both of which are above of the State of Hawaii standards. The presence of oily films on the surface of the tributary waters could not be observed during the site visit because of the wave action/ripples at the waters' surface which were caused by the windy weather conditions. While oily films could not be observed on the canals' waters, they were present on the surface waters of test pits dug within the wetlands inside of the review area. Finally, a substantial amount of solid waste (i.e., tires, bottles, man-made objects, trash) was also observed within the tributary waters..

Identify specific pollutants, if known: See above.

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

[7]Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

☐ Riparian corridor. Characteristics (type, average width): .

☐ Wetland fringe. Characteristics: .

☒ Habitat for:

☒ Federally Listed species. Explain findings: Over 50% of the RPW tributary evaluated for this JD boarders the Kanaha Pond Wildlife Sanctuary (KPWS). This portion of the tributary has habitat that is similar to areas within the KPWS that are actively managed for the recovery of ESA-listed waterfowl such as Hawaiian Stilt (Himantopus mexicanus knudseni), Hawaiian Coot (Fulica alai), Hawaiian Duck (Anas wyvilliana) along with several species of migratory waterfowl and State-listed protected birds. The KPWS is also designated critical habitat for ESA-listed Blackburn's sphinx moth (Manduca blackburni). On 18 March 2008 at approximately 3:00 PM, several Hawaiian Stilts were observed on the KWPS side of the RPW tributary just south (approx. 30-40 ft ) of the confluence of the two drainage canals

.

☒ Fish/spawn areas. Explain findings: The RPW tributary provides habitat for non-native fish species (common and golden tilapia, guppies, mosquito fish, etc.) and invertebrates (apple snails) that are used as a food resources by wildlife and aquatic waterfouwl that frequent KPWS and the inhabit the surrounding area.

.

☒ Other environmentally-sensitive species. Explain findings: Several Black-Crowned Night Heron (Nycticorax nycticoras), a State-listed protected specie, were also observed along various locations of the tributary during the 17-18 March 2008 site visit.

.

☒ Aquatic/wildlife diversity. Explain findings: Although a variety of floral and faunal species were observed during a brief survey of the tributary, these were noted as mostly introduced/alien types. Ecologic diveristy, although limited, is present due to the presence of different types of hydrophytic vegetation and aquatic wildlife species. .

**2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

**(i) Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: less than 2.499 acres

Wetland type. Explain: Based on USFW Cowardian system, the area is classified as PEM1F. P = palustrine (system); EM = emergent (class); 1= persistent (subclass); F = semi-permanently flooded (non-tidal water regime).

Wetland quality. Explain: Based on observations made during the 17-18 March 2008 site visit, the wetland located on the review area was found to be of poor biological quality. The living vegetation within the wetland (vegetation not affected by recent land-clearing activities) consisted primarily of an invasive facultative (FAC) species (Pluchia indica) and an invasive salt-tolerant facultative wet (FACW) grass (Distichlis spicata). Both plant types did not appear to and are not known to provide any benefit or habitat for sensitive aquatic waterfowl/wildlife. The soils within the wetlands were also re-evaluated during the site visit. Several test pits were dug to an average depth of 15 inches below the surface and soils are generally characterized as consisting of low chroma jaucus sand underneath a 3 to 4 inch surface clay layer. The clay layer was found moist and both the transitional clay-sand and lower sand layers beneath were saturated within the upper 12 inches which indicates a positive presence of hydrology. Other typical hydrology indicators (i.e. water marks, drift lines, etc.) were not noticeable during the site visit because of recent disturbance (vegetation clearings) conducted at the site. The surface clay layer, in addition to the site's naturally low elevation and a high water table, allows for sufficient moisture retention in well-drained and nutrient poor sandy soils (the ground's surface contained a light layer of organic matter) to support proliferation of invasive FAC/FACW vegetation species. The presence of the three constituents: vegetation, hydrology, and hydric soils that the Corps uses to define a wetland were again re-verified during this site visit.

Although the wetlands on site are considered of low biologic/ecologic quality, we have found during our site visit that they do provide an environmental benefit to the watershed and all downstream receiving waters. These wetlands, including those in the nearby vicinity of the tributary, filter and reduce the amount of chemicals (pollutants, debris, solid waste, etc) that are in the surrounding area from entering the water resources in the nearby area. Because of this, they are assessed as having value for the protective function they perform in conserving the water quality of downstream receiving waters.

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Project wetlands cross or serve as state boundaries. Explain: No.

(b) General Flow Relationship with Non-TNW:

Flow is: **No Flow**. Explain: During the March 2008 site visit (and during typical weather conditions), we re-verified the wetland within the review area is absent of surface and ponded waters.

Although the wetlands do not abut the drainage canals and they are at an elevation much lower than the canals, no visible evidence was found to indicate whether or not any (flowing) waters that result from storm events are likely to spill over from the wetlands on site and drain into the drainage canals (RPW tributary) boarding the subject parcel. On the contrary, the manager of the KPWS, Dr. Fern Duvall, has stated that during storm events, waters from the tributary often overflow into the adjacent KPWS wetland, but not spill over from the KPWS into the tributary. He also indicated that trash and debris material that washes down from the upper parts of the tributary often accumlate on the outside of the KPWS fence that separates it from the tributary. This statement was verified during the field visit when large amounts of plastic trash and debris within the drainage canal (likely washed down from the uplands during the last storm) were found along the outside of the KPWS perimeter fence that separates the Kanaha Pond from the tributary.

We've noted and have taken into consideration that review area has likely been subject to years of illegal dumping, trash accumulation by homeless persons illegally residing on the parcel, and fly away trash from vehicles that utilize the Hana Highway; however, despite these sources of solid waste, it is reasonable to presume, based on Dr. Duvall's accounts, that during storm events, rain and storm water washes garbage and debris downstream in the tributary, which may also be washed into review area's wetlands, as is done on the opposite KPWS side of the tributary.

Surface flow is: **Overland sheetflow**

Characteristics: Based on observations made in the field on March 2008, the wetland is absent of surface waters that connect with the RPW tributary (drainage ditch). Under typical weather conditions, there are no surface flow exchanges between the wetland and the tributary. An observed change in surface elevations for areas surrounding the review area indicates that any surface flow or overland sheetflow that would result during heavy rain events would have an impact the review area's wetland is understood to be discreet (from the surrounding higher elevated areas to the wetland) and confined (to the lower depressed areas within the wetland). It is reasonable to presume a portion of the overland sheetflow from the Hana Highway would drain towards the low lying or depressed areas within the parcel, in this case, the wetlands. Under severe weather conditions when upland flow exceeds the drainage capacity of the tributary, storm waters from the tributary are likely drain from the tributary into the review area since storm waters are known to also drain from the tributary to the Kanaha Pond (see "Flow is" above).

Subsurface flow: **No**. Explain findings:

☒ Dye (or other) test performed: Tests for salinity and tidal influence were also conducted during the March 2008 on-site visit to verify previous observations and data. Past wetland delineations and verifications of the parcel have indicated that the wetland within the review area is subject to tidal influence. Recent tidal observations conducted by the applicant's consultant indicate otherwise. Salinity readings from water sampled from test pits yielded a range from 2 to 10 ppt (considered brackish by HI standards). The readings for these samples were higher than those samples taken at various points along the tributary; the higher salinity concentrations are likely attributed to leaching of salts/minerals from the soil coupled by low volume of ground water in the pits. Water levels in the test pits were also observed for changes pre- and post- high and low tides. No significant changes in water levels were observed in the test pits and at various points along the tributary with even taking into account a time lag due to elevation and distance from the shore.

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☒ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain:

☐ Ecological connection. Explain:

☒ Separated by berm/barrier. Explain: The wetland within the review area is located at the center of the parcel where the ground surface elevation (topograhpy) is lower than the berm that separates it from the RPW tributary – for this JD, the 2 canals boarding the review area are being considered as a single RPW tributary because they are connected. The berm that separates the wetland from the tributary has an access road 10-15 ft wide on it. At various points from the edge of the tributary (at the water's edge) to the depressed area on the inside of the wetlands (the opposite side of the berm/access road) the distance was was measured between 23-40 ft..

(d) Proximity (Relationship) to TNW

Project wetlands are **1 (or less)** river miles from TNW.

Project waters are **1 (or less)** aerial (straight) miles from TNW.

Flow is from: **Wetland to/from navigable waters.**

Estimate approximate location of wetland as within the **2-year or less** floodplain.

**(ii) Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: It is important to highlight that the review area (subject parcel) is located in an industrialized/commercial area. North and downstream of the review area is a petroleum fuel refinery. South, upstream, and boarding the review area is the Hana Highway. During the March 2008 site visit, a notable change in elevation was observed between the higher highway road and the lower lying parcel area. Although weather conditions that day could not demonstrate, it is reasonably foreseeable to anticipate that petroleum and oil-based pollutants from cars traveling on the highway would likely wash off from the road and into review area during heavy rain events – the road is designed and constructed so that sheetflow drains from and off the road. It is also reasonable to presume pollutants from cars (oil, gas, fluids, trash, etc.) migrate from the road with the sheetflow. Again, due to design and gravity, the polluted sheetflow then migrates from the road and on to subject parcel where it would temporarily pool and/or drain into the ground. Temporary pooling of pollutants would occur in low lying areas, such as the wetlands, where quick drainage is inhibited due to a 3-4 inch layer of clay (accumulated fine sediment). In other areas where sand is prevalent at the surface and a clay layer is not as abundant, efficient drainage is anticipated. As a result, a higher concentration of pollutants is expected to be present within the wetland area and was observed with the presence of oily films on the surface waters of pits dug there.

Identify specific pollutants, if known: Although no information on specific pollutants (the site was not tested for petroleum, oils, or other hazardous chemicals) within the wetland is available, large amounts of solid waste (trash, debris, household garbage, etc.) has accumulated on site as a result of natural storms or by human means/sources.

**(iii) Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width): .

☒ Vegetation type/percent cover. Explain: Invasive and alien vegetation species were found remaining in the non-cleared areas within the wetland: %50 FAC Pluchia indica (invasive) and 35% FACW Distichlis spicata. While these two plant species are indicative of wetlands flora, they do not support or provide habitat for federally ESA-listed or state-listed species, other environmentally-sensitive species, or provide aquatic diversity. .

☐ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: Very little wildlife diveristy was noted within the wetlands. Only introduced bird species, rats, and various invertebrates (primarily insects) were observed during the May 2008 site visit.

**3. Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: 3

Approximately ( > 34.62 ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

| Directly abuts? (Y/N) | Size (in acres) | Directly abuts? (Y/N) | Size (in acres) |
|---|---|---|---|
| 1. Kitagawa Wetland (No) | < 1 acre (~ 0.12) | No | |
| 2. Kanaha Wildlife Refuge (No) | > 1 acre (33.0) | No | |
| 3. subject wetlands (No) | > 1 acre (1.5) | No | |

Summarize overall biological, chemical and physical functions being performed: Biological: Both wetlands #1 and #2 described above provide habitat for protected waterfowl. Chemical: All wetlands identified above contribute to reducing the amount of pollutants that drain from the surrounding higher elevated areas into the adjacent tributary, which periodically discharges out to sea. Physical: All wetlands identified above function to protect the structural integrity of tributary by providing flood storage for storm waters that drain within the watershed.

## C. SIGNIFICANT NEXUS DETERMINATION

**A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.**

**Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:**

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

**Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:**

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: Not applicable.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Not applicable.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: By design, the RPW tributary (drainage canal) functions to drain and has the capacity to store storm waters from the upland areas within the watershed. In order to prevent flooding of the lower lying area areas adjacent to the tributary, excess water from heavy rain events is periodically discharged into the TNW (Pacific Ocean). All adjacent wetlands, which include the subject wetland within the reivew area, the Kanaha Pond, and the Kitagawa wetland, that are adjacent to the RPW tributary filter the pollutants that wash in from the surrounding developed industrial/commercial areas that drains into the RPW tributary, and function to reduce the amount of pollutants that reach the TNW. The RPW tributary (including the Kanaha wetland and the Kitagawa wetland) has the capacity to hold (drained storm/sheetflow) waters for a period of more than a 3 month periord (more than seasonal), which is long enough for support the growth of aquatic vegetation and provide habitat for fish and other species that are used by the surrounding protected wildlife in the RWP. The vegetated growth along the portions of the tributary (and within the adjacent wetlands) also assist in attenuating the pollutants to protect receiving ocean waters. This feature along with the beach sand berm provide allows for protection of downstream ocean waters, which found in good/fair condition -- enough to support alge growth and fish populations that were observed seaweed on beach and rocks for crabs on the jetty and fishermen on the beach..

D. **DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):**

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: **~1.5** acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or

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[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

**E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):**[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

**Identify water body and summarize rationale supporting determination:** .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

**F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

## SECTION IV: DATA SOURCES.

**A. SUPPORTING DATA. Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: see other below.
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☒ Data sheets prepared by the Corps: 17-18 March 2008.
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.

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[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

☒ U.S. Geological Survey map(s). Cite scale & quad name: Honolulu District TIG mapping resources.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Honolulu District TIG mapping resources.
☒ National wetlands inventory map(s). Cite name: Honolulu District TIG mapping resources.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Honolulu District TIG mapping resources.
or ☒ Other (Name & Date):Taken during site visit on 17-18 March 2008.
☒ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☒ Other information (please specify): Report entitled, "Request for Jurisdictional Determination and Wetland Permit Application for the Maui Medical Plaza at Kanaha" prepared by Malama Environmental, LCC., dated May 7, 2007 .

**B. ADDITIONAL COMMENTS TO SUPPORT JD:** .

## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

| Applicant: Robert McDaniel for Ben Brown | File Number: POH-2006-531 | Date: April 25, '08 |
|---|---|---|
| Attached is: | | See Section below |
| | INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission) | A |
| | PROFFERED PERMIT (Standard Permit or Letter of permission) | B |
| | PERMIT DENIAL | C |
| X | APPROVED JURISDICTIONAL DETERMINATION | D |
| | PRELIMINARY JURISDICTIONAL DETERMINATION | E |

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

## SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

## POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

| If you have questions regarding this decision and/or the appeal process you may contact: | If you only have questions regarding the appeal process you may also contact: |
|---|---|
| Joy Anamizu, (808) 438-7023 | Thom Lichte (808) 438-3063 |

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

| | Date: | Telephone number: |
|---|---|---|
| _____ Signature of appellant or agent. | | |

# APPENDIX B-1.

# Final Wetland Mitigation Plan

# MAUI MEDICAL PLAZA AT KANAHĀ
# ALTERNATE WETLAND MITIGATION PLAN

*Location:*
WAIHE'E DISTRICT, MAUI
STATE OF HAWAI`I

*Prepared for:*

Maui Medical Plaza at Kanahā
350 Hukilike Street, Suite D
Kahului, Hawai`i 96732

23 November 2009

*Prepared by:*

Penny Levin, Conservation Planner
224 Ainahou Place
Wailuku, Hawai`i 96793
(808) 285-3947 (cell)
pennysfh@hawaii.rr.com

| | |
|---|---|
| **PROJECT LOCATION:** | Wailuku District, Island of Maui, Hawai'i.<br>Lot 8: TMK: (2) 3-7-011:028; mitigation site TMK (2) 3-2-10:1 and 2 |
| **ZONING:** | Lot 8: State - Urban; Community Plan - Heavy Industrial; County - M2 Industrial. Mitigation site – Urban (state); Interim district and Agriculture (county) |
| **ESTIMATED ACREAGE:** | Lot 8: Total on-site acreage: 2.5 acres (108,900sqft)<br>Wetland loss: .94ac Total off-site wetland acreage: 5 acres |
| **MITIGATION PRIMARY GOAL:** | *Enhance and rehabilitate existing wetland ecosystem function in five degraded acres of Waihe'e Coastal Dunes and Wetland Refuge.*<br><br>Lot 8 is a severely disturbed site of minimal wetland value in its current state. Off-site wetland mitigation is proposed for the Maui Medical Plaza at Kanahā development at the Waihe'e Coastal Dunes and Wetland Refuge. Mitigation will remove invasive species and re-establish native plants on approximately five (5) acres within the wetland portions of the Refuge. An out-of-watershed mitigation approval is sought due to recent FAA restrictions on activity in the initially proposed mitigation site adjacent to Lot 8. |
| **LAND OWNER(S):** | Lot 8: Kanahā Professional Plaza LLC<br>Mitigation site: Maui Coastal Land Trust |
| **RESPONSIBLE PARTY:** | Kanahā Professional Plaza LLC |
| **CONTACT:** | Robert T. McDaniel III<br>(808) 283-8811<br>Fax: (808) 876-0861<br>Bob@MauiMedicalPlaza.com |
| **ADDRESS:** | 350 Hukilike Street, Suite D<br>Kahului, Hawai'i 96732 |
| **REVIEWING AGENCY(S):** | US Army Corps of Engineers<br>Environmental Protection Agency<br>US Fish and Wildlife Service<br>DLNR-DOFAW Maui |

**Applicable State and Federal Recovery Plans:**

Draft Revised Recovery Plan for Hawaiian Waterbirds: Second Draft of Second Revision, USFWS May 2005; *Manduca blackburni* Recovery Plan 2005; Nene Recovery Plan 2004

## TABLE OF CONTENTS

**FIGURES**



**APPENDIX A: ADDITIONAL MAPS AND IMAGES**



**APPENDIX B: SUPPORTING DOCUMENTS**

## 1. PROPOSED ACTIVITY SUMMARY

This document is supplementary to the wetland mitigation plan submitted by the Maui Medical Plaza at Kanahā (MMPK) on July 31, 2009 and proposes an alternate site and work. For descriptions of the MMPK medical facility project and other relevant background information referral to the original plan is made. On-site engineering for Lot 8 will continue to address drainage and water infiltration functionality, environmental issues and ecosystem continuity between Kanahā wetland and Lot 8 that were described in the original document.

The proposed alternate mitigation site is located at TMK (2) 3-2-10:1 and 2, and is known as the Waihe'e Coastal Dunes and Wetland Refuge. The site, zoned Urban by the state and Interim and Agriculture by the County of Maui is a permanently protected dune and wetland habitat of 277 acres approximately 10 miles from the development site (Lot 8). The alternative site was selected due to unforeseen circumstances arising from FAA concerns at Kanahā Pond Wildlife Sanctuary which rendered the originally proposed mitigation plan inoperative. Wetland mitigation will occur within the boundaries of the Refuge in coordination with the Maui Coastal Land Trust. *This alternate compensatory mitigation plan is for off-site mitigation action at the Waihe'e Coastal Dunes and Wetland Refuge only.*

The Maui Coastal Land Trust, a 501(c)(3) non-profit established in 2000, has a mission to acquire, preserve, and protect coastal lands in Maui Nui for the integrity of the natural environment and the enjoyment of current and future generations. In July 2004, MCLT, with the assistance of the County of Maui, USFWS and the general public, purchased the privately owned 277 acres along 1.25 miles of the Waihe'e coastline, Central Maui in support of this mission. MCLT holds title to the property and oversees management of the land for perpetual stewardship. Maui County and the State of Hawai'i hold Conservation Easements to assure perpetual protection of the land. While the parcel is protected, a rehabilitation and management plan, and staff and funding for the selected mitigation acreage, is not in place. In 2005, a portion of the wetlands was briefly under the NRCS Wetlands Reserve Program (less than 2 years); however, the Refuge is no longer a part of that program. None of the five acres selected for mitigation were formerly served under the WRP. A grazing program under NRCS EQIP is currently operating in some upland portions of the parcel along Halewaiu road as a means of creating a managed firebreak between the Refuge and the adjoining Waihe'e community; this mitigation proposal does not conflict or overlap with this effort.

TMK (2) 3-2-10:1 and 2 are located within the coastal zone makai (seaward) of Kahikili Highway, Waihe'e, Maui between Waihe'e Park and Waihe'e Stream. The mitigation site falls within Maui Watershed Unit 20020000 2-08 (Waiehu) and contains a palustrian wetland with only intermittent seasonal standing water at this time due to historic changes in the larger watershed and to the property, including the presence of a drainage canal (Dairy Canal) within the boundaries of the wetland/fishpond that was installed by the Waihe'e Dairy, former owner of the property from the early 1900's through the 1960s.

Dense stands of invasive species are one significant impact that can be addressed on the property. Non-native vegetation causes soil hardening, severely impairs natural saturation

and inundation and provides habitat for rats, mongoose, egrets and other predators that remain the number one threat to Hawaii's endangered waterbirds (FWS 2005:44)

A one (1) acre site mauka (behind) of the dunes along a recorded historical water flow which formerly contributed to makai (seaward) wetland health will be cleared of invasive vegetation to improve hydrology into the receiving wetland on the makai side of the dune. An additional four (4) acres within the wetland itself will be cleared of invasive species and outplanted with appropriate native species to rehabilitate wetland acreage within known wetland boundaries (see Map 1 for location of these sites).

Implementation and long term monitoring and management are supported with dedicated resources; a perpetual obligation in agreement with MCLT for the five acres will be attached to Lot 8. This partnership with MCLT provides funding and resource support for the organization at a time of severe budget and staff constraints that have affected the Trust's ability to further rehabilitation work in the wetland which is heavily dependent on volunteers.

This supplement to the MMPK mitigation plan is written in response to Clean Water Act (CWA) Section 404 requirements for permit applicants preparing compensatory mitigation and adaptive management plans based on 2008 guidelines (Authority 33 U.S.C. 401 et seq; 33 U.S.C. 1344; Pub. L. 108-136, 33 CFR 332 and 325 Final Ruling for Compensatory Mitigation for Losses of Aquatic Resources, April 10, 2008 (73 FR 19594); US-ACE Regulatory Guidance Letter No. 08-03), and Honolulu District Joint Agency Compensatory Mitigation and Monitoring Guidelines (PNN 200400448, 14 Feb 2005).

## 2. MITIGATION GOALS AND OBJECTIVES

The Mitigation Site (off-site) is a distinct parcel in an adjacent watershed to Lot 8; mitigation goals and objectives are however similar to those in the original proposed plan.

The mitigation goals and objectives are consistent with national and state guidance and policy on surface water runoff retention and wetland habitat recovery in coastal areas. They are also supportive of national, statewide and site specific goals under the USFWS Revised Recovery Plan for Hawaiian Waterbirds (2005) for improving the overall waterbird habitat availability and quality of supporting wetlands on public and private lands in Maui.

The primary mitigation goal addresses the issue of wetland functionality and quality within the Waihe'e Coastal Dunes and Wetland Refuge. **All compensatory mitigation actions occur off-site and out-of-watershed.**

A. *Enhance and rehabilitate existing wetland ecosystem function and structure in 5 degraded acres of the Waihe'e Coastal Dunes and Wetland Refuge prior to construction on Lot 8.*

**Objective 1**: Rehabilitate wetland habitat in five degraded acres in the Waihe'e Refuge by improving wetland inundation capacity through the removal of alien tree, shrub and grass species from one (1) acre above the dune to improve water percolation capacity through the dune to the primary wetland below; and in four acres within the primary wetland.

**Objective 2**: Improve the overall functionality of the four (4) acres within the primary wetland to support Hawaii's endangered waterbird needs by providing food sources, hiding and nesting materials and sites, through the outplanting of native (indigenous and/or endemic) hydrophitic sedge, upland shrub and tree species appropriate to Central Maui wetlands.

**Objective 3**: Ensure the long term health of wetland ecosystem function within the five (5) acres through carefully engineered mitigation and best management practices (BMPs), regular monitoring for regeneration of invasive species and unnecessary site disturbance during and after project implementation for a minimum of five years.

## 3. LOCATION

The mitigation site is a 5 acre portion of TMK (2) 3-2-10:1 and 2 (Waihe'e Coastal Dunes and Wetland Refuge) owned by the Maui Coastal Land Trust and located in the ahupua'a (district) of Waihe'e and the watershed of Waiehu (Unit 20020000 2-08). It is bounded on the mauka (west) side by Kahekili Highway and some residential portions of Waihe'e town. The parcel is bounded to the north by Waihe'e stream and the south by Hale Waiu Road,

Hawaiian Homes residential properties and Waihe'e Park and Municipal Golf Course. Its shoreline is east facing.

**Figure 1.** *Maui Watersheds Unit 2-08 Waiehu*

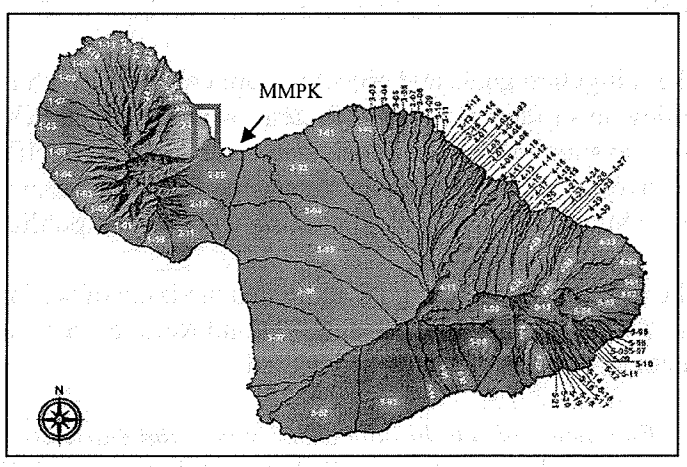
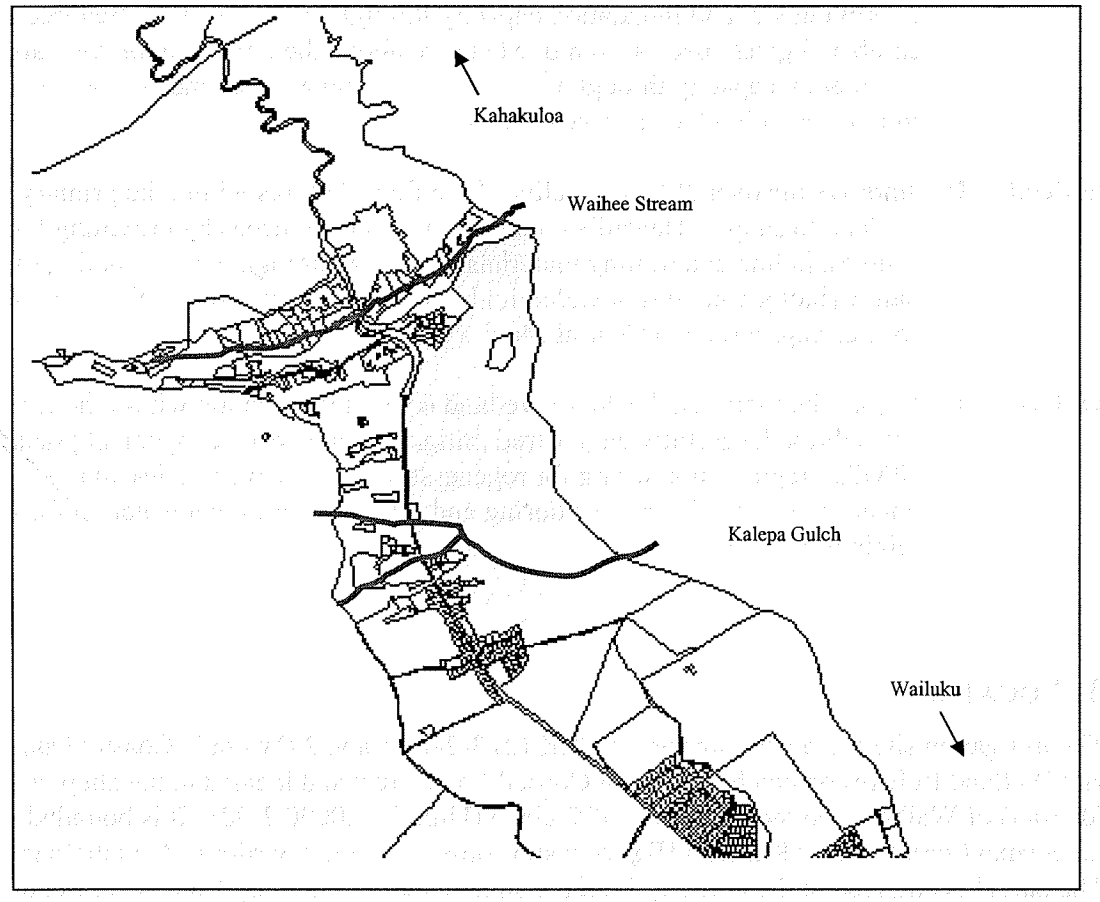



**Fig 2.** TMK Location map: Parcel (2) 3-2-10:1 and 2



# 4. AQUATIC RESOURCES AND BASELINE SITE INFORMATION

## 4.1 WETLAND TYPE AND FUNCTION

TMK (2) 3-2-10:1 and 2 is a 277 acre parcel of which an estimated 27 acres are classified as a palustrian (P) wetland with a mixed freshwater and brackish groundwater regime as identified by the NRCS in 2005. Salt-crusted soils are found in the makai portions of the pond and freshwater seeps in the more inland portions. A seven (7) acre ancient fishpond lies within the larger wetland (see Appendix A: Waihe'e Refuge Archaeological map) and the two are integrated water bodies. These wetlands lay at the makai (seaward) base of the last remaining intact high dunes in Maui. An undetermined number of acres mauka (inland; upland) of the dunes which were former taro growing lands are lotic fringe palustrine wetlands that lay between a gulch and traditional 'auwai (water channel or irrigation ditch) that still runs.[1] A recently hand cleared test area revealed sandy loam, silty clay and sandy, clay loam soils that became immediately saturated upon removal of invasive species. Three weeks later, honohono grass (*Commelina diffusa*), a FACW species dominated the site.

Four acres in the primary wetland and one acre in the upland lotic fringe wetland have been selected for mitigation action. These sites meet the criteria defining wetland ecosystems under the U.S. Army Corps of Engineers (1987 Manual) and the Environmental Protection Act, including soils, hydrophytic vegetation, and a frequency and duration of soil saturation and inundation sufficient to support wetland flora within the context of Hawai'i's unique seasonal conditions and habitats.

The Waihe'e wetlands were historically fed by rain, streams, springs and seeps through the dunes originating from upland ground and surface water flows. Evidence that water from Waihe'e Stream (Kahakuloa side of the parcel) was brought into the wetlands is found in the documention on USGS maps of an old water course through the dune and the existence of a traditional 'auwai which ran from taro patches along the perimeters of the wetland and around Waihe'e point to Waihe'e Stream. The outgoing waters of the taro patches would have fed the wetland and the fishpond and then exited to the ocean.[2] A second 'auwai near Kalepa Gulch that once fed taro patches above the dune continues to run. Old taro systems played a role in sediment and flood attenuation and reduction and groundwater recharge, as well as providing habitat for native flora and fauna. In the case of the mauka taro system, this ponding mechanism may have assisted seepage through the sandier dune soils. Existing

[1] The extent of the area is undetermined due to the current density of tall vegetation. Several acres are expected given local information regarding the placement of old taro growing lands in the area. Isolated rock wall systems that encompassed taro patches are found in several parts of the property where drainages formerly existed but have since been interrupted by development above the parcel and changes in surface and groundwater flows.

[2] This is one of the rare cases in Hawai'i where water was not returned to the stream from the taro patch. In this case, because water was drawn from the stream so close to where the mouth of the stream entered the ocean already, sending it through the wetland/fishpond would not have had significant impact on the stream or stream biota. The original exit of the fishpond at the coastline was a few hundred feet distance from where Waihe'e Stream met the ocean (this no longer functions).

USGS maps show an intermittent water course through the dune in the approximate location of this 'auwai and the gulch (see Fig. 3 and Appendix A).

Natural seepage through the dune from upland areas is currently compromised on several levels:

- Extensive water diversion of mauka (upland) streams;
- The placement of Kahekili highway between uplands and the parcel (soil hardening);
- The installation of a drainage canal (Dairy Canal) by the Waihe'e Dairy inside the wetland, which was redredged in the 1990's by a subsequent owner prior to acquisition of the property by the land trust;
- A thick growth of non-native tree, shrub and grass species which remains in the primary wetland (makai side of the dune) and takes up water coming through the base of the dune; and,
- On the mauka side of the dune, the same type of dense vegetation which prevents water from Kalepa Gulch and a second traditional 'auwai and former taro patch system from slowing and percolating through dune soils and reaching the primary wetlands.

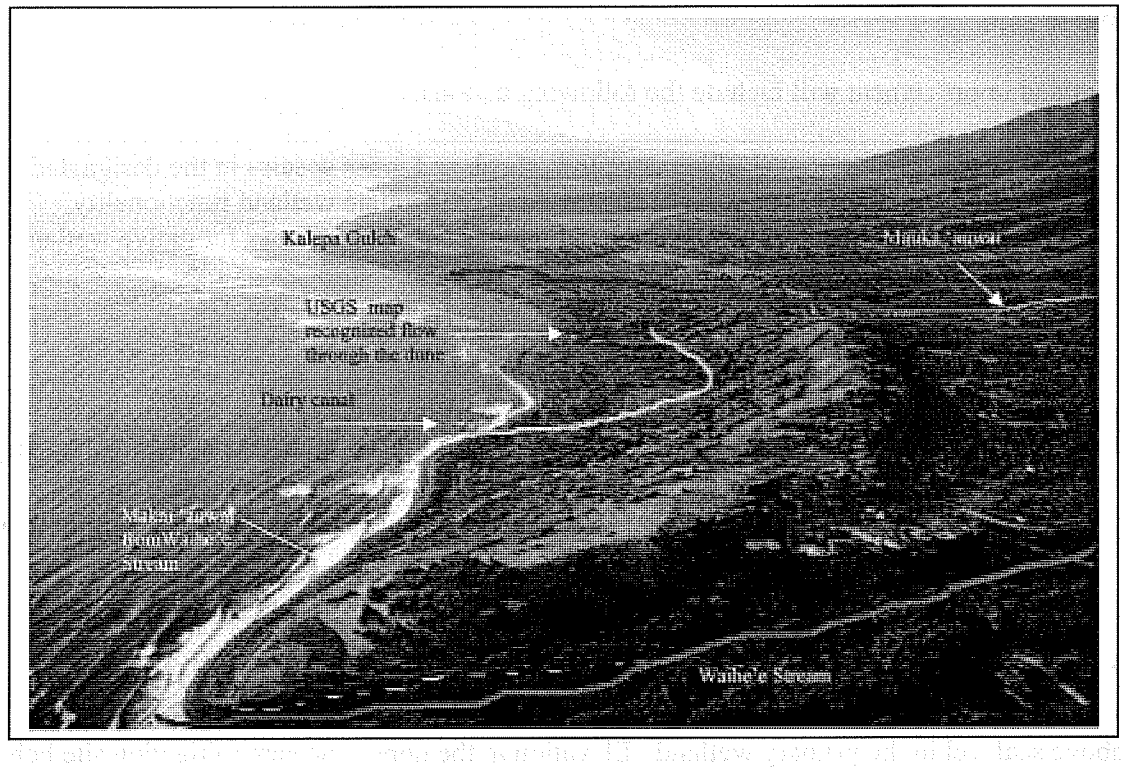
Currently, the upland 'auwai is flowing but falls directly into Kalepa Gulch. The gulch, flows during high rain periods in the uplands. A depression was known to exist near the confluence of the two which once allowed water to pool and slowly drain so that it moved through the dune. Due to the density of vegetation at this time it is unknown whether that topography still exists. Water from both sources now flows through the gulch but appears to circumvent dune hydrology and exits directly to the ocean on the Waikapu side of the parcel (see Fig 3).

Water in the primary wetlands is present year round only in the Dairy Canal. The remainder of the wetland has typically retained shallow standing water only intermittently during the winter rainy season. Volunteers have cleared invasive vegetation in the fishpond and some parts of the wetland over the last few years and this seems to be improving the duration of soil saturation; however, this has not yet been quantified and may also be reflective of a break in the drought cycle this winter (2009). During extreme rain events, water remains onsite for several weeks before disappearing again.

The mouth of the Dairy Canal where it exits the fishpond onto the stone cobble beach is tidally influenced.

The USFWS designates the Refuge as a Supporting Wetland under private ownership for endangered waterbirds (USFWS 2005:69).

**Fig 3.** Approximate location of water flows at the Waihe'e Coastal Dunes and Wetland Refuge (aerial photograph by Ron Chappel).




## 4.2. LOSSES AND GAINS

Wetland losses on Lot 8 have been addressed in the original wetland mitigation plan. No loss of wetland function or wildlife habitat will occur within the mitigation site at the Refuge.

The existing stands of invasive species severely curtail inundation in portions of the wetland, edging out native plant communities that support more natural fluxuation and soil saturation. Alien vegetation currently impairs or prevents water movement in 100 percent of the five acres selected for mitigation. Removal of non-native species will improve soil saturation within 100 percent of the mitigation area.

The endangered waterbird populations in the wetland are small (three species; less than ten birds, county-wide bird count August 2009) and no birds currently use the upland or primary wetland area due to dense vegetation and dried out soils. Cattle egrets, a threat to native bird species, roost in these trees in these areas. No roosting, nesting, feeding or loafing habitats will be lost during invasive species removal. Outplanting of native hydrophytic species in 65

percent of the four acres mitigation area (per EPA open water/cover maximum ratios) will improve native waterbird habitat in 100 percent of the five acres.[3]

Overall, a total of 217,800 sqft (5.0 acres) of freshwater palustrine wetland will be rehabilitated against 41,149sqft (.94ac) jurisdictional wetland lost on Lot 8; or, a 1:5 ratio of loss to gain.

Wetland improvement will include the following actions:

- Non-intrusive removal of invasive tree, shrub and grass species in the designated mitigation areas of the pond to enhance and rehabilitate wetland functionality, improve ponding capacity, nesting habitat and foraging sources for native wetland waterbirds and native insect populations. .

- Re-establishment of native obligate (wetland) plant species appropriate to the Waihe'e Refuge site to enhance waterbird habitat and survival.

- Monitoring and management to maintain the improved quality of the mitigation site and prevent regeneration of alien species. A viable, funded mechanism will be implemented to ensure ongoing protection of the improved wetland in coordination with the Maui Coastal Land Trust staff.

### 4.3. PHYSICAL ATTRIBUTES – SOILS, FLORA, AND FAUNA

Mean sealevel elevations in the four acre mitigation area are estimated at less than 30ft. above sealevel in the primary wetland. Elevation at the upper one acre mitigation site behind the dune is approximately 100ft based on USGS maps.

The primary wetlands at the Waihe'e Coastal Dunes and Wildlife Refuge can be described as a dune impounded wetland behind a boulder beach. As with many of Maui's larger wetlands, Hawaiians shaped the capacity and characteristics of the wetland by building a fishpond within the natural wetland.

*Soils*

According to the USGS-NRCS Soil Survey Map: Wailuku Quad, there are primarily four soil types in the Waihe'e Refuge:

- Jaucus sand (JaC 0-15%) and Jaucus saline sand (JcC 0-12% slope) found at the makai side of the dunes and dominate the wetland/fishpond complex.
- Puuone sand (PZUE 7-30% slope) representative of the main sand dunes that surround the wetland;

[3] Removing all non-native species will make 100 percent of the mitigation site accessible to waterbirds and will improve soil saturation levels overall. Outplanting 65 percent of the four acres will enhance the entire four acres by providing a variety of habitat niches for native birds and insects.

- Pulehu silt loam (PpA 0-3% slope), a relatively thick, well-drained alluvial soil with a higher organic matter content found near the old dairy footprint; and
- Iao clay (IcB) soils are located on the mauka side of the dunes facing Kahekili Highway. In representative sites, Iao clays are relatively thick (60 inches; surface and subsoil) and dark brown with moderately slow permeability indicative of good taro growing soils. In the one acre mitigation area, large rocks are also found in the surface and upper soil layers, partially due to soil and rock movement from Kalepa Gulch.

A USGS-based NRCS Soils map can be found in Appendix A.

*Flora*

The Waihe'e Refuge has representative elements of Dry, and Mesic Coastal and Lowland communities as defined by soils, rainfall, elevation, observable native plant remnants, non-native species, and historic data.[4] Historically, little is known regarding the character and species composition of coastal wetlands in Hawai'i. No pollen records have been done for the Refuge that might shed a more accurate light on rehabilitation efforts. The description below will focus primarily on plant species within the wetlands and mitigation areas, but will briefly mention the endangered species found throughout the Refuge. An informal Section 7 concurrence was given by USWFS in 2006 for restoration work during the NRCS program.

Several endangered plants are found on the dunes, including a small, but relatively healthy, endemic Nehe Herbland (*Wallastonia integrifolia*), a rare Nama herbland (*Nama sandwicensis*) and the endangered dwarf naupaka (*Scaevola coriacea*). The endangered popolo, *Solanum nelsonii*, is documented historically in the area. The Waihe'e dunes represent the type site for one endangered species of lovegrass, *Eragrostis mauiensis*, which has been listed as possibly extinct. In early 2009, the endangered sedge, pu'uka'a (*Cyperus trachysanthos*), previously unrecorded for Maui, was found growing in the wetland indicating the historic seed bank is still viable.

Other more common wetland species have also returned with little or no assistance to cleared areas of the fishpond, including 'ae'ae (*Bacopa monnieri*), 'akulikuli (*Sesuvium portulacastrum*), 'ahu'awa *(Mariscus javanicus)*, the fibers of which were used to strain the bitter 'awa root drink, kaluha (*Schoeneplectus juncoides*), and *Pycreus polystachyos*.

Along the length of the coastline in the salt spray zone, 'aki'aki (*Sporobolus virginicus*), 'ilima (*Sida fallax*), mau'u 'aki'aki (*Fimbristylis cymosa*), naupaka kahakai (*Scaevola sericea*), pa'uohi'iaka (*Jacquemontia ovalifolia*), 'uhaloa (*Waltheria indica*), pohinahina (*Vitex rotundifolia*) and pohu'ehu'e (*Ipomoea pes_caprae)* are present.

Coastal strand flora at adjacent sites are rich with additional species that were likely found within the Refuge historically, including 'ohelo kai (*Lycium sandwicense*) and ko'oko'olau (*Bidens mauiensis*).

[4] Based on "Classifications of Hawaiian Plant Communities" in Wagner et al. 1990:45-114. *Manual of Flowering Plants of Hawai'i.* University of Hawaii Press and Bishop Museum Press. Honolulu.

The vegetation at the base of the dune and encroaching into the wetland is currently composed almost exclusively of non-native species. Invasive tree and shrub species include kiawe (*Prosopis pallida*), christmasberry (*Shinus terebinthifolius*), African tulip (*Spathodea campanulata*), guava (*Psidium guajava*), Java plum (*Syzygium cumini*), octopus tree (*Schefflera actinophylla*), and koa haole (*Leuceana leucocephala*) which is prevalent in the one acre mitigation site. A small stand of hau (*Hibiscus tiliaceus*) is located adjacent to the four acre mitigation site. While hau can be invasive in uncontrolled circumstances, it has value as a resource for cordage and other cultural materials, and as a traditional mulch source for taro patches under selective management. Castor bean (*Ricinus communis*) occupies a portion of the mitigation area along the Dairy Canal, as well.

Hilahila (*Mimosa pallida*) is infrequent but present. Honohono grass (*Commelia diffusa*) is limited to a few sites on the mauka edges of the primary wetland, but, it is clear it remains in the seed bank despite heavy outcompetition by cane grass and Guinea grass (*Panicum maximum*) at the one acre mitigation site.

Several *Ipomoea* sp and passion fruit (*Passiflora edulis*) vines are present in the wetlands. Kudzu (*Pueraria montana* var. *lobata*), Chinese violet (*Asystasia gangetica*) and glycine (*Neonotonia wightii*) are found in the understory of the four acre mitigation site. California or para grass (*Brachiaria mutica*) once dominated a majority of the wetland and fishpond but has been pushed back and is currently found mostly around the Dairy Canal, within the four acre site, and towards the Waihe'e Stream side of the wetland and adjacent dry flat.

*Fauna*

A small population of endangered waterbirds are found at the Waihe'e wetland; a total of four ae'o or Hawaiian stilt (*Himantopus mexicanus knudseni*), three 'alae ke'oke'o or Hawaiian coot (*Fulica alai*) and two ducks of undetermined species (potentially hybrid Mallard- Hawaiian duck cross) were present at the August 2009 bird count (pure koloa or Hawaiian duck, *Anas wyvilliana* x *A. platyrhnchos* have not been observed on Maui). 'Alae ke'oke'o stay within the deeper parts of the Dairy Canal. Ae'o prefer the edges of the canal and slightly mounded areas within the wetland where water remains shallow during the rainy season. The pair of ducks also prefers the edge of the canal. Migratory shorebirds, make use of the mudflat-like shallow water areas formed within the wetland during the winter months. The kolea (Pacific golden plover, *Pluvialis fulva*) is a common visitor.

Nene (*Branta sandvicensis*), an endangered species which uses the Refuge advantageously, are occasionally observed. The protected 'ua'u kani (wedgetailed shearwater, *Puffinus pacificus chlororhynchus*) nests in the dunes above the wetland.

Non-native birds identified by sight or call within the Refuge include the common mynah (*Acridotheres tristis*), northern cardinal (*Cardinalis cardinalis*), spotted dove, zebra dove and rock dove (*Streptopelia chinenisis*, *Geopelia striata*, and *Columba livia*), Java sparrow (*Padda oryzivora*), house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*) and Japanese white eye or mejiro (*Zosterops japonicus*. Cattle egrets (*Bubulcus ibis*) have a fluctuating population within the wetlands.

One endangered insect, Blackburn's sphinx moth (*Manduca blackburni*) is recorded near the Waihe'e wetland; the moth or its associated native tree species, the aiea (*Nothocestrum* sp.) have not been found within the Refuge. The moth also feeds on other plants in the *Solanacea* family including non-natives such as tree tobacco, tomato and popolo (wild eggplant). A rapid assessment did not find these species within the selected mitigation acreage. Native and non-native dragonfly species have been observed in the wetlands, including pinao (Giant Hawaiian Dragonfly, *Anax strenuus* and Common Green Darner *A. junius*).

Mongoose, rats, mice, cattle egrets, feral cats, and free roaming dogs are present and a threat to stilts and shearwaters. Systematic trapping and removal, in conjunction with regular monitoring for feral animals is conducted by MCLT staff.

## 4.4 HISTORY

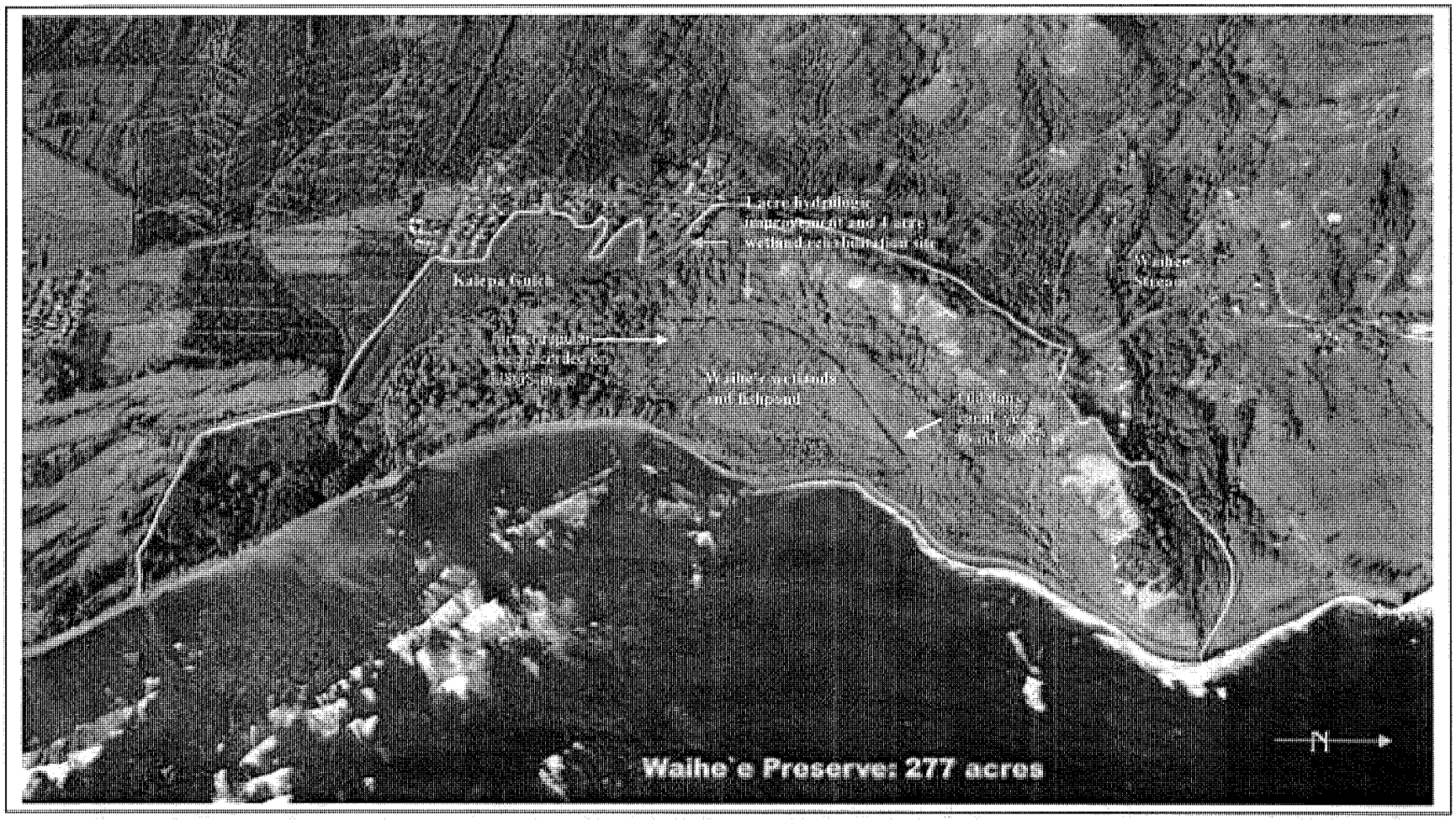
The Refuge was once a thriving Hawaiian community. Numerous archaeological sites are found on the parcel, including the remnants of two heiau (Kapoho and Kealakaihonua), a Hawaiian village complex (Kapoho), an inland fishpond, midden sites and burials within the dunes. A burial plan is on file with the Maui County Burial Council and State Historic Preservation Office. Archaeologists determined there were few sites within the wetland or fishpond. Earlier vegetation clearance within the core of the wetland/fishpond was allowed to be done using small machinery and manually where the edges of the wetland interfaced with upland or stone structures. An archaeologist was on site as needed during those efforts.

Wetland taro cultivation continued through the 1800s and some lo'i may have remained in production until the end of the century on the edge of the primary wetland and through the 1940's in the area mauka of the dunes. Between 1919 and 1967, the site operated as the Waihe'e Dairy. Three wooden buildings remain from this period; at least one was fashioned in the design of renowned Hawai'i architect C.W. Dickey. This structure is in the process of collapse. The remaining buildings are in the process of recovery to house an education center. A caretaker now lives on the property to discourage vandalism and other behavior on the site that could negatively impact the Refuge or the nearby community. Several historic period cemeteries are located on the parcel along Kahekili Highway at the top of the dunes.

In the 1990's, an attempt was made to develop the site as a golf course. The failure of the golf course became the opportunity for the initiation of preservation efforts in 2002.

The Waihe'e Coastal Dunes and Wetlands Refuge is now open to the public. A limited amount of recreational fishing, hiking and some motorcycle activity currently occurs along the periphery of the easement but not within the core of the wetland. Public access is mostly at the east end of the Refuge at a place locally called Round Table. A system of trails in conjunction with hiking tours and outreach education within the local community has reduced human impacts on the dunes and the wetland.

The Waihe'e wetland is isolated from main roads, residences and vehicular traffic and provides a safe sight for local waterbird populations.




MAP 1. WAIHE'E COASTAL DUNES AND WETLAND REFUGE

- ☐ Historic extent of the wetland (approximate)
- ☐ Historic seeps and 'auwai (ditches)
- ▩ Present day intermittent (Kalepa Gulch during storms) or perennial water (Waihe'e Stream)

## 4.5 WAIHE'E WETLAND MITIGATION SITE CONDITIONS

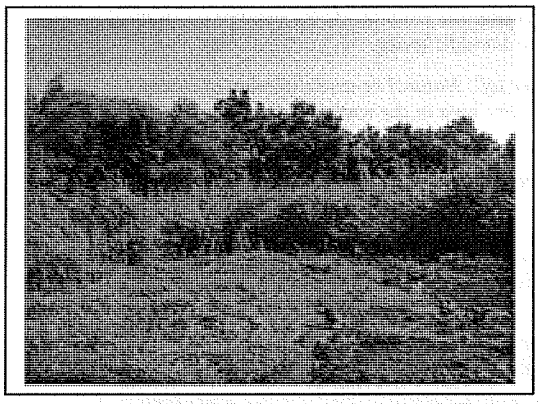
Upland one acre mitigation site along the backside of the dune.

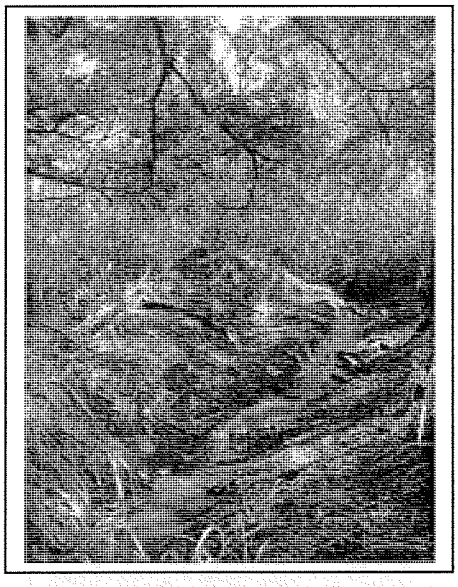
*Upper left and right: typical vegetation in the one acre mitigation site.*

*Middle: Guinea grass-koa haole thicket on the site.*

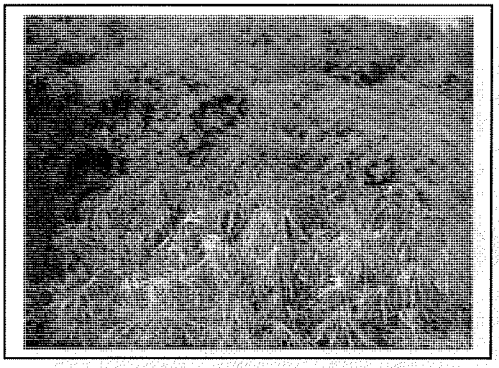
*Below left: traditional 'auwai in the foreground adjacent to the cleared test area.*

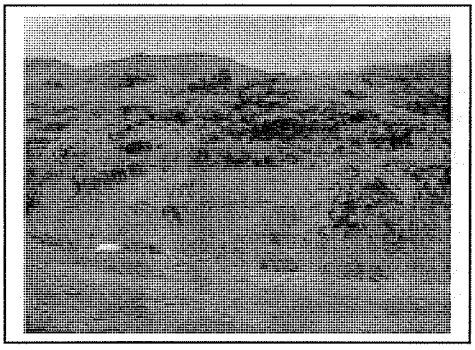
*Below right: portion of Kalepa Gulch where it runs through the mitigation site. Good winter rains in the mountains have restored intermittent shallow water to the gulch.*

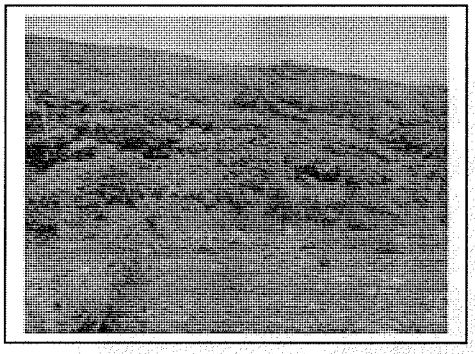




Four acre mitigation site within the primary wetland in front of the dunes.





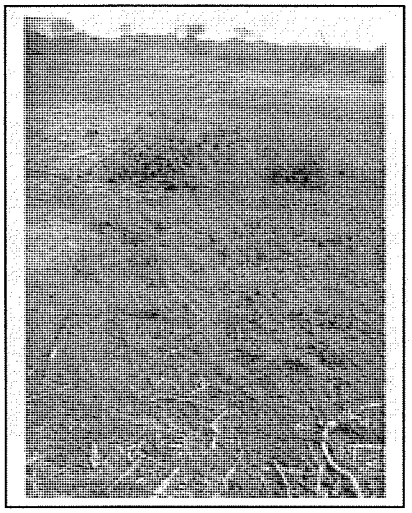


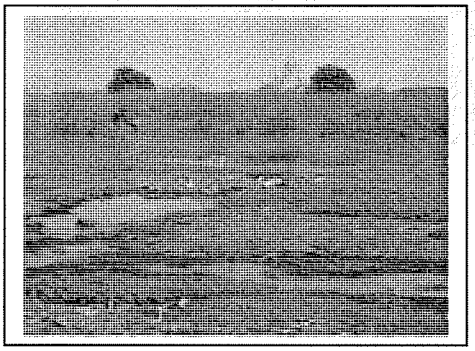
*Upper left and right: Invasive species inside the four acre mitigation site.*

*Middle left and right: view of the four acre mitigation site from inside the cleared portions of the wetland/fishpong.*

*Lower left: Natural re-establishment of Bacopa and 'ahu'awa in the wetland after clearing.*

*Lower right: Stilts in the ponded portions of the fishpond after rains (1/12/08).*





## 5. MITIGATION ACTION ANALYSIS

This mitigation plan will enhance and rehabilitate five degraded acres within the Waihe'e Coastal Dunes and Wetland Refuge. The proposed five acres of the mitigation site qualifies as rehabilitation due to the disruptive nature of the invasive vegetation established there. All of the five acres have been dewatered by the presence of aggressive tree, shrub and grass species. Hawai'i. Native waterbirds are currently unable to utilize the area.

Controlling noxious species is a major objective of the Maui Coastal Land Trust for the Refuge; the second being to encourage native species and restore some of the hydrology that once supported the wetland.

The wetland function analysis on the following page (Table 1) is based on US-ACE and USFWS examples and the discussion of function in *Hawai'i Wetland Field Guide: an ecological and identification guide to wetlands and wetland plants of the Hawaiian Islands* (Erickson and Puttock 2006), as well as local agency and individual expertise.

**Table 1. Wetland mitigation functional capacity analysis**

| Function | Lot 8 value | Mitigation site value |
|---|---|---|
| Sediment attenuation and reduction | The topography of the site traps and stores sediment. Improved water capture will also increase retention value on the property. Landscaping will trap and prevent soil movement. | Dense vegetation has dried the mitigation site. Removal of alien species will increase water retention capacity by 20 percent. Native aquatic sedges will reduce sediment movement. |
| Nutrient and chemical attenuation and reduction | The site traps and filters sediment in the ground. Pollution filters installed at the bottom of water capture basins will reduce impacts to soils/groundwater. | NA. |
| Flood attenuation and storage | Improved water capture capacity in two retention basins will increase this functional value on the property by 57 percent (from an estimated 80,000gallons to 126,000 gallons) | Removal of alien vegetation which currently blocks water movement will increase flood attenuation capacity of the entire 27 acre wetland by 15 percent by allowing water to spread into cleared acres. |
| Hydrology | NA | Rehabilitation of the mauka acre will potentially improve water seepage through the dune into the wetland, restoring a small portion of the original hydrology to the site. |
| Plant community abundance and diversity; ecological niche diversity | The construction site is dominated by non-native plant species. Natives persist for only a short period each year after extreme flooding. Landscaping on the construction site will support the use of transitional native species (from coastal strand to coastal lowland) throughout the property and as protective barriers between the parcel and the pond. | The mitigation site is dominated by invasive tree, shrub and grass species that alter the fundamental ecological character of Hawai'i wetlands. Healthy edge and buffer zones are lacking. Alien plant species diversity and abundance will decline by 80 percent or more. Native plant diversity and abundance will increase to 80 percent or more in 5 years. Appropriate wetland niche diversity will increase in kind. |
| Fish and wildlife habitat | The site is severely degraded and has no fish and poor wildlife habitat value in its current condition. It is detached and isolated from the wetland or any upstream water body. No fish are present on the site even during ponding events. Waterbirds have been noted onsite only temporarily after major storm events. | Removal of invasive species and replacement with native species will turn the structure and function of the site from an unusable portion of habitat to one of high quality for waterbirds. Mitigation will create shallow open water and mudflats (a minium of 35 percent per EPA performance standards) and provide at least 80 percent improvement to available food resources, loafing, hiding, breeding and nesting habitat for endangered and migratory waterbirds. |
| Groundwater recharge | Improved water capture in the two retention basins will increase this value on the property. Pollution filters within the basins will improve the quality of groundwater recharge. | Ground water recharge is difficult to asses as the hydrology of this wetland site has not been tested to identify water exchange patterns. Improved freshwater seep into the property will improve water quality. |
| Traditional cultural resources | None present. | Dominant invasive vegetation dramatically alters the traditional Hawaiian landscape. The plant species selected for outplanting including makaloa and 'ahu'awa have important cultural uses. Improvements in the wetland restore the context of Hawaiian landscape found at the Refuge. |

# 6. PROPOSED MITIGATION WORK PLAN

The following mitigation work plan is intended to achieve the goal and objectives outlined in Section 2.

## 6.1. BOUNDARIES OF PROPOSED MITIGATION

The proposed mitigation site is divided into two portions – a one acre mauka site and a four acre site in the primary wetland. Both sites will be GPS'd and marked with PVC pipes during the first two weeks of access to ensure they meet the acreage requirement and their boundaries can be maintained for future monitoring and management. Map 1 indicates the boundaries of the Refuge and the location of the proposed mitigation.

Removal of invasive species and replacement with native species will occur in the four acre site but not in the upper one acre site due to unknown topography and conditions under the vegetation. Removal of invasive species will increase available water for seepage through the dune that has the potential to improve hydrology to the larger wetland.

## 6.2 MITIGATION TIMING AND SCHEDULE

Project implementation will occur prior to construction on Lot 8 provided that all permits are received in time to meet this goal and that flooding at either site does not prevent mechanical access. The small size of current populations of native waterbirds and the distance separating them from the selected mitigation areas allows for work to be completed with a monitor on site to inspect areas to be cleared to avoid impact to birds or bats rather than a closed season.

Removal of non-native vegetation represents the highest level of disturbance that will occur during this effort. The estimated amount of time for this work is one week (7 days) during allowable daylight hours for the one acre site and 3 weeks (21 days) for the four acre area.

Outplanting will occur in coordination with the seasonal rains. Primary planting will begin in the first available year as plant availability occurs. Drought conditions will have impacts on plant mortality rates and replacement plantings may occur in subsequent years through year three during the same time frames. Seed collection, propagation and outplanting will be coordinated with a local nursery six months in advance of outplanting.

Invasive species removal and outplanting schedules are contingent on the timing of permit approvals. No work will occur until authorization by permitting agencies is provided.

Table 2 provides an estimated schedule for implementation.

**Table 2. Estimated schedule for implementation**

| Action | Start date | End date |
|---|---|---|
| 1. Coordination with selected plant provider(s); seed collection and nursery germination | Prior to implementation | November 2010 |
| 2. GPS outline and marking of mitigation area. | Implementation year (January 2010) | 3 days (January 2010) |
| 3. Mapping to establish a baseline against which to monitor change; flagging of native species within the work area | Implementation year (January 2010) | 5 days (January 2010) |
| 4. Invasive species removal | Implementation year (January 2010) | March 2010 |
| 7. Outplantings | Implementation year (December 2010) | March 2011 |
| 8. Maintenance (weed control, plant replacement) | Year 1 (2010 after implementation) | Plant replacement Year 3; weed control perpetual |
| 9. Monitoring | Year 1 (2010) | Year 5 (2015) |

### 6.3. INVASIVE SPECIES REMOVAL

Invasive species removal in the mitigation area will be conducted using a forestry mulcher, which works from the top of vegetation down rather than by pushing; and with manual removal near rock walls per archaeologist recommendations and gulch edges for safety. No disturbance below soil surfaces is expected. Trees will be cut at the base and mulched on site. This method has been used successfully in the fishpond and some portions of the wetland for three years. The organic matter breaks down quickly and has served to keep down weeds while native species establish during the first year, significantly reducing follow-up invasive species monitoring and management. Because the wetland ponds only in small patches and intermittently in typical years, and rarely throughout, organic matter breaks down rapidly and does not hinder native species recruitment. The microtopography created by the organic matter supports a variety of flora and fauna. Stumps will be cut or ground to surface level and the stump treated to discourage resprout. The proposed activity follows earlier protocols for this site.

Invasive species removal after initial mitigation is described in Section 7.3.

*Applicable BMPs*:

1. To avoid impacts to endangered bird species and bats a monitor will be onsite during vegetation removal. A qualified monitor will survey the area for nests prior to vegetation clearing work. Vegetation will not be cut or otherwise cleared unless the area is free of birds. If perennial, woody host plants for the Blackburn's sphinx moth are found, they will be flagged and the soil around the plants will protected from disturbance within a 3 meter buffer. An archaeologist will be on site when working near cultural features.

2. Equipment will be cleaned off-site prior to work on-site to reduce potential for new invasive species introductions.

3. Invasive species will be removed mechanically within the wetland and by hand in areas adjacent to archaeological features or gulch edges to minimize impacts and ensure safety.

4. No project related materials or vehicles will be stockpiled or stored within the wetland area.

5. No trash disposal or polluted runoff will be discarded or released to the wetland site.

6. Containment supplies such as absorbent pads and other materials will be kept on site to facilitate immediate cleanup of any accidental spills of petroleum products or other chemicals.

7. Contractors and others involved in invasive plant control will be required to demonstrate to Refuge managers, or their designee(s), their ability to identify native plants likely to be found in the wetland to ensure that no accidental removal of native species occurs.

### 6.4. GRADING PLAN AND CONSTRUCTION METHODS

No grading will occur within the mitigation site and no construction will occur within the mitigation site.

### 6.5. PLANNED HYDROLOGY

Existing open water in the Refuge are minimal and confined to the Dairy Canal except during substantial rains when perhaps 20 percent of the wetland is ponded for a brief time during the peak of the winter season. Exceptions occur during extreme rains; the last documented event occurred in 1990 and 2005 when an estimated 50 percent of the wetland was flooded. Water in the pond evaporates rapidly, likely at a similar rate as that of Kanahā, meaning what little water may be captured disappears quickly. Removal of invasive species, particularly kiawe has made more moisture available to maintain wetland soil characteristics.

Removal of invasive species from the one acre mitigation site is intended to improve seepage of freshwater through the dunes to the wetland. Vegetation removal in the wetland will improve and extend water saturation levels in the soil. Piezometers will be established along the mauka edge of the wetland to monitor changes in wetland hydrology. Existing piezometers may provide some past years data for comparison; however, it may be impossible to determine if increased saturation will be in response to increased rains overall or to improved hydrology.[5]

[5] We appear to be coming out of a seven year drought cycle but the uncertainty of rains in the last five years has left Maui with a groundwater deficit that will continue to impact watersheds and acquifers in the future.

Seasonal fluctuations mimic to some degree naturally occurring conditions for coastal wetlands in Maui, where water levels change daily, weekly, seasonally and annually particularly on hot days and in drought years. For this reason, it is not possible to accurately predict or define changes in duration, depth and acreage.

## 6.6. PLANNED VEGETATION

For a discussion of plant species choices in the context of Maui's coastal dune and fishpond associated wetlands refer to the original mitigation plan.

The following native species (endemic, indigenous or Polynesian-introduced) were selected based on documented presence within coastal fresh and brackish water wetland in Maui and at the site in consultation with the MCLT project manager. These plants serve multiple functions, including:

- Aquatic niches
- Soil retention
- Water filtering
- Food sources for birds and other aquatic fauna
- Hiding, nesting and loafing niches
- Cultural use

| Hawaiian Name | Common Name | *Scientific Name* | Species Status | Height (meters) | Wetland Status* |
|---|---|---|---|---|---|
| Sedges and rushes (to 1.5m) | | | | | |
| 'Ahu'awa | Java sedge | *Cyperus javanicus* | I | 0.4 to 1.1 | FACW |
| Makaloa | Smooth flatsedge | *Cyperus laevigatus* | I | 0.2 to 1.0 | OBL |
| Kaluhā | Saltmarsh bulrush | *Bolboschoenus maritimus* | I | 0.5 to 1.5 | OBL |

* OBL = Obligate wetland species (99% found in wetlands); FACW = Facultative wetland species (67-99% found in wetlands).

Some flexibility in species choice will be essential in the event that the needed amounts of seedlings are not available. Mitigation team members will work closely with MCLT staff to ensure the best mix of species for the site for all plantings. Changes in species composition will be submitted to the US-ACE for review prior to implementation.

### *Planting plan*

The EPA has determined that "less than 75 percent of [a] restoration site should be dominated by plant cover" and open waters and mudflats should be "actively maintained to prevent invasive plants of low habitat value (e.g. mangrove and pickleweed, *Batis maritime*)" as a performance standard in previous wetland mitigation projects in Hawai'i in support of endangered waterbirds (EPA Docket No. CWA-404-309(s)-06-007; Steinwascher).

Planting will occur in 65 percent of the four acre mitigation area in support of maintaining a balance of open mudflat and potential ponding area as preferred bird habitat. The one acre site will not be planted due to uncertain topography at this time but will be maintained to prevent soil erosion.

*Source, size, spacing and numbers for outplanting*

Seed stock for kaluhā and 'ahu'awa will come from existing populations within the wetland. Makaloa seed will be sourced from neighboring wetlands in Central Maui or approved nurseries known to have a healthy source of local plant material.

Plant stock will be grown to 4-inch pots. An estimated four to six months are needed for herbaceous species growth in the nursery prior to outplanting to ensure healthy root development.

A minimum 2ft on center (FOC) (or 4ft diameter) is recommended for sedges and rushes. Planting patterns will follow those outlined in the original mitigation plan to mimic more natural habitat cover. A minimum of 24,000 starts will be established.

| Hawaiian Name | Species | Height (meters) | Spacing FOC | Sq FOC | Estimated Numbers |
|---|---|---|---|---|---|
| 'Ahu'awa | *Cyperus javanicus* | 0.4 to 1.1 | 2ft | 4ft | 3,000 |
| Makaloa | *Cyperus laevigatus* | 0.2 to 1.0 | 2ft | 4ft | 15,000 |
| Kaluhā | *Bolboschoenus maritimus* | 0.5 to 1.5 | 2ft | 4ft | 6,000 |

Plants will be grown out at the MCLT Refuge nursery and a providing outside nursery. Advance coordination with nurseries will be required by the party(s) responsible for mitigation to allow for reasonable growing time; a minimum of four to six months prior to seed collection and outplanting where necessary.

*Applicable BMPs*:

1. Planting material will not be brought in from other islands or high risk nurseries as a caution against invasive species and soil or plant pathogen introductions, including cocqui frogs (Hawai'i, O'ahu, and Maliko gulch area on Maui), little red fire ant (Hawai'i and Kaua'i), ants, nematodes and root aphids (O'ahu and Hawai'i), powdery mildew and other fungal diseases. In addition, plant material will be inspected upon delivery and rejected if disease, insect or weed infestations, or poor vigor are observed.

2. Outplanting crews will clean their boots, clothing and equipment of weed seeds or soil prior to entering the mitigation site.

3. Planting depths for herbaceous seedlings will be no more than four inches. A thin, light covering of soil will be placed on top and tamped down by hand.

4. Replacement plantings will be done where significant mortality (greater than 20 percent) occurs during the first three years after planting.

### 6.7 PLANNED SOILS

No planned soils are required for this mitigation effort.

### 6.8 PLANNED HABITAT FEATURES

Hawai'i's endangered waterbirds prefer shallow ponds (one foot or less), marshy areas or mudflats and feed on fish, crabs, worms, aquatic insects, seeds and leaves. Existing soil surfaces will support nesting, feeding, wading and loafing sites for ae'o once re-planted with appropriate native species.

Deliberately maintained open waters and mudflats support desirable waterbird habitat for birds and their food sources. Variable densities in planted material (sedges) provide more diverse managed habitat for bird activity. No additional features are necessary to be installed.

### 6.9. PLANNED BUFFERS AND ADDITIONAL FEATURES

There are no planned buffers or additional features for this plan.

## 7. PERFORMANCE STANDARDS

Performance standards and monitoring techniques are selected appropriate to the status of the wetland as a federal and state wildlife sanctuary. The following practical performance standards will be used to quantify and qualify the status of desired outcomes and verify that objectives have been met.

### 7.1. MEASURES OF SUCCESS

The following measures (performance standards) will determine the level of project completion:

- *Hydrology* – a 20 percent (1 acre) increase in the overall area of inundation/saturation within the primary wetland mitigation area (4 acres) at the peak of the rainy season after alien vegetation removal is completed. A discussion of the imperfect nature of this measure is found in measures of success in original mitigation plan.

  *During implementation*:
  - no water turbidity will occur during implementation as no standing water or adjoining water exists inside or adjacent to the mitigation areas at this time. The mitigation site is 100 percent dry as are adjoining areas.

- *Vegetation* - a permanent increase in presence and cover of native obligate and upland species to a maximum of 65 percent of the four acre mitigated area within five years.

Allowing for natural spacing and water inundation between individual plants and recognizing initial sedge seedlings will be small in size, the following annual standards are proposed:

Year 1: A reduction in the area covered by invasive and non-native vegetation within the mitigation area by a minimum 80 percent after one year and will not exceed 20 percent cover in subsequent years.

Year 2: Vegetative cover of native species will reach 20 percent in mitigated areas. Outplanted native species will achieve an 80 percent survival rate.

Year 3: Native plant cover will reach 30 percent in mitigated areas.

Year 4: Native plant cover will reach 45 percent in mitigated areas.

Year 5: Native plant cover will reach a maximum cover of 65 percent.

## 8. SITE PROTECTION AND MAINTENANCE

There is no need for a legal instrument to convey easement or deed for this mitigation project as the property is already protected in perpetuity by the Maui Coastal Land Trust and the County of Maui. Lot 8 will carry a deed requirement for maintenance of the five acres within the pond in perpetuity.

### 8.1. LEGAL PROTECTIONS AND PARTY RESPONSIBILITY

A legally binding agreement between Maui Coastal Land Trust and Kanahā Professional Plaza LLC will be created to ensure all mitigation measures and future monitoring and maintenance work is completed and supported either through funding, contract, or provision of necessary resources. A legally binding CC&R document that carries these obligations to MCLT with the property in perpetuity will be attached to the deed of Lot 8

During implementation, Kanahā Professional Plaza LLC, or its designated representative(s), will be responsible for providing independent monitoring and compliance and for obtaining all permits as required.

Invasive plant species removal and disposal, plant propagation and/or purchase, outplanting and weed management inside the mitigation area will be handled by contract to MCLT under Kanahā Professional Plaza LLC. The will responsibility for monitoring and maintenance after initial mitigation is complete and the resources required to support that will be assigned either to MCLT or an outside contract at completion of implementation.

After implementation, Kanahā Professional Plaza LLC, or its designated representative(s), will bear the responsibility of ensuring site protection, management, independent monitoring, compliance and reporting to county, state, and federal agencies on the status of the mitigation site.

MCLT will remain the owners and primary managers of the site.

## 8.2. MAINTENANCE PLAN AND SCHEDULE

Maintenance is tied closely to monitoring. Two levels of maintenance scheduling will occur;

- Quarterly maintenance of invasive species control coordinated with bi-annual monitoring schedules for five years.
- Day-to-day observation by MCLT staff to guide maintenance scheduling for other than quarterly maintenance for five years.

Measures to control invasive species and conduct replacement plantings will be undertaken by Kanahā Professional Plaza LLC or its contracted site manager(s) and monitor(s).

## 8.3. INVASIVE SPECIES CONTROL PLAN - MAINTENANCE

The wetland will be monitored for invasive species regermination and new introductions on a quarterly basis during the first five years after native plant establishment. More frequent monitoring and maintenance will be done if incipient (new) populations of alien species occur to rapidly eradicate them or if invasive encroachment persists heavily. Alien invasives will be removed using manual techniques (hand pulling) or herbicide treatment where appropriate, particularly where stump resprout occurs. Aquamaster is approved for use in wetlands on emergent wetland plants and may be used to control persistent germination of invasive species (DOFAW 3/31/09). Monitoring will continue for five years to ensure permanence of control action.

*Applicable BMPs*:

1. All project-related equipment and tools will be free of pollutants and weed seeds to the best possible degree during mitigation activities.

2. Vigilance during the early stages of native plant establishment will significantly reduce invasive species control work loads long term.

3. In the event that chemical control of invasive species is used, such application shall follow label and MSDS instructions for cleanup and disposal of chemical containers and applicators. A licensed pesticide applicator will be on-site. Cleanup will occur outside of wetland areas.

4. Herbicide use will be done during no or low wind periods using a narrow spray range or nozzle drip (ie. basal bark) and clear weather to minimize peripheral impacts. Where non-native plants are in tight proximity to natives, removal with hand tools will be used.

5. A qualified archaeologist will be onsite as needed to monitor the area in the advent of inadvertent discovery of cultural materials and for protection of existing features.

# 9. MONITORING PLAN

## 9.1. PARTIES AND RESPONSIBILITIES

The US-ACE has federal authority over permitting and action on this project, with advisory from EPA, USFWS, DLNR and DOH. State and county SMA rules also apply.

Kanahā Professional Plaza LLC will be the responsible party for implementing and/or managing contracts for implementation, onsite management and monitoring. All implementation and monitoring will be carried out in coordination with MCLT.

## 9.2. DATA

The data collected and reported will provide sufficient information to evaluate performance standards without being overwhelming to a small project. The following types of data will be collected:

- Water presence/absence - date, area inundated and duration (if practical).
- Plant community composition (species) and cover (area).

## 9.3. ASSESSMENT METHODS

A general baseline has been established against which to measure change though the use of existing photographs and on-site surveys indicating 100 percent alien cover. A GPS outline will provide clear boundaries for measurement. Photographs and species composition lists will be developed by the project monitors. Minimizing regular disturbance within the wetland is a priority for all assessment methods selected.

Vegetation assessment methods are described in the original mitigation plan and are not changed. Water inundation will be evaluated using the percent cover method described for vegetation.

Additionally, a minimum of 5 piezometers will be installed along the length of the four acre mitigation site to monitor soil saturation and ponding levels on a quarterly basis. During the winter quarter, data collection frequency will increase to twice a month.

## 9.4. MONITORING AND REPORTING FORMAT AND SCHEDULE

Baseline monitoring will be conducted two weeks prior to vegetation removal. Site inspection will occur immediately prior to vegetation removal to ensure no presence of waterbirds in the mitigation area.

Monitoring frequency is described above as part of methodology. A monitor will be present daily during invasive species removal and weekly during outplanting throughout the implementation period, and at bi-annual and annual intervals thereafter.

Reports will be filed with the US-ACE, EPA, USFWS and DLNR bi-annually during the implementation, once a year for all subsequent years. Reports will describe the status of goals, objectives, performance standards, challenges, and status of outplantings, invasive species control and wetland function.

It is noted that the County of Maui has requested review of wetland mitigation projects every 5 years for some wetland properties. In the past, the County has occasionally requested the an outsider site review and report (rather than from the applicant) for the Maui County Council.

## 10. ADAPTIVE MANAGEMENT PLAN

Adaptive management is a key strategy in increasing the success of any habitat restoration project. Where a goal or objective is met, then mitigation activities have been effective. Where difficulties arise in achieving set standards, the methods or tools in use may need to be revised. The key tool in effective adaptive management is observation (monitoring).

Climate related events, newly observed behaviors or needs in wildlife using the habitat, natural plant community changes, and disease events are all factors beyond the control of wetland managers and the second reason for adaptive management to be included in mitigation. Flexibility within management and monitoring parameters and performance standards is a necessary part of responding to changes in the environment and recognizing the limits of the resources at hand.

### 10.1. PARTIES AND RESPONSIBILITIES

The US-ACE has federal authority over substantive changes to management strategies. MCLT is the authority for this site.

In the case of adaptive management response, Kanahā Professional Plaza LLC will be the responsible party in collaboration with MCLT for managing contracts for onsite management and monitoring after implementation. Both parties will work together to respond to any needs for adapting practices based on changing conditions at the site.

### 10.2. POTENTIAL CHALLENGES

A number of potential challenges exist to meeting performance standards in a timely manner and to the success of the project, including:

- Rapid recolonization by aggressive invasive species from the soil seedbank or from new sources.
- Heavy rain or flood event which could potentially disrupt implementation schedules, inundate outplantings and/or result in plant die-off.

- Malicious habitat damage by people or dogs. This can include fire, waterbird kills or destruction of native plants which can potentially impact waterbird populations or quality of the wetlands and is one of the challenges of conservation sites near urban areas.
- Plant species selected for this project may not be immediately available in the numbers required due to seed/stock shortages. This can be the result of drought conditions or rodent predation at seed gathering sites, selection of species that are habitat specific and not kept in large quantities by nurseries, or pest/disease infestations within nursery plantings.
- Delays or poor coordination between invasive species removal and nursery-to-outplanting schedules. A permit issued too late to coordinate with nurseries and grow out plants, will result in unavoidable delays in completion of outplanting. The species selected for the project can not be held over in a nursery without becoming root-bound which makes them unsuitable for outplanting (high failure rate); an extremely expensive loss for a nursery, the applicant and the mitigation project.
- Botulism or insect pest outbreaks within the bird or plant community.
- Changes in project management, monitoring and oversight parties.
- Failure of mitigation efforts at the site due to uncontrollable circumstances.

### 10.3. POTENTIAL REMEDIAL MEASURES

Remedial measures to address the potential challenges listed above are:

- Rapid recolonization by invasive species will be handled by rapid response. Control of large infestations will be coordinated with MCLT staff and appropriate actions taken using the above described BMPs.
- The site will be inspected after extreme rain or flood events and damage assessed. The appropriate agencies and MCLT will be consulted prior to remedial action in such cases. Flooded plantings may revive on their own. Replacement plantings of the same or similar hydrophitic native species will be done where needed.
- If some plant species selected are not available when the site is ready for outplanting, partial planting or a shift in species composition will occur.
- If permit issue is delayed, seed collection will continue in the summer of 2010. Grow-out time in the nursery will begin in August 2010 and outplanting will occur in December 2010 through March 2011. Delays in outplanting schedules may occur due to natural and uncontrollable elements. Where outplantings can not be completed within a single season; they will be finished in the following year.
- Maui has seen several large botulism outbreaks within Keālia Pond with resultant loses in waterbirds. Any bird deaths within the wetland will be immediately reported to DOFAW and USFWS. Carcasses of any animal (ie. rats) or large fish dieoffs will be reported immediately to minimize potential for fouling water quality. In the event

of an outbreak, DOFAW and USFWS specialists are the responding and responsible agencies.

- The need for changes in project management are often unforeseen. Any new responsible party will be fully briefed on the history, current status of the project and required actions on the part of the managing entity. An alternative management and monitoring agency or individual will be required to have previous local wetland habitat management experience and familiarity with wetland plants and invasive species control.
- Mitigation efforts may fail for a variety of reasons beyond the control of the project. The property owner(s) will work with the US-ACE and MCLT to seek out appropriate alternatives and/or sites in need of assistance. Fund and/or resources would be rededicated to the new site.

### 10.4. PLAN MODIFICATION PROCEDURE

The mitigation project may meet its goals but in unanticipated ways, particularly during the first year. Where substantive plan modification may be needed the following procedure will be used:

- The management party will consult with specialists (ie. species or habitat restoration or invasive species control specialists).
- The responsible managing party will document the unanticipated changes and the need for plan modification and provide a report and request for modification to US-ACE, the ruling agency and cc to the USFWS, EPA, and DLNR-DOFAW.
- The US-ACE and the responsible management party will review the information and existing standards and develop appropriate alternative standards to fit the situation.

## 11. FINANCIAL ASSURANCES

Kanahā Professional Plaza LLC will contract Maui Coastal Land Trust for implementation of the mitigation. This will include invasive species removal, native species propagation, and outplanting. A perpetual CC&R will be attached to Lot 8 in the form of a Mitigation Fund, to assure continued monitoring and maintenance.

The cost of implementing mitigation within Waihe'e Refuge is estimated at $112, 200

| BUDGET ITEM | ESTIMATED COST |
|---|---|
| A. COSTS | |
| 1. Equipment and tools | $5,700 |
| 2. Non-native vegetation removal | $20,000 |
| 3. Archaeological monitoring | $1,500 |
| 4. Native plant species propagation/outplanting | $35,000 |
| 5. Contracted field staff | $50,000 |
| | $112,200 |
| B. LONG-TERM MITIGATION FUND | |
| 1. Contracted maintenance staff | $75,000 |
| 2. Alien plant control materials | $10,000 |
| 3. Wildcard events | $10,000 |
| 4. Monitoring and reporting | $12,500 |
| | $107,500 |

The cost of all monitoring and reporting and a perpetual mitigation fund, including coverage for wild card events that may occur, is assigned to Lot 8 development costs, along with the perpetual CC&R conditions assigned to the development property, irrespective of who owns the land. Maintenance and monitoring are estimated at $107,500 over a five year period. A sum of $10,000 is built into the this fund to cover "wildcard" events such as the establishment of an aggressive invasive species currently not present on the site or plant replacement due flooding.

An account will be established initially with a Hawai'i bank (the "Account") into which the developer will deposit $107,500 (the "Mitigation Fund") for the first five years. Additional funding will be added as need in subsequent years. The "Mitigation Fund" will be restricted to use for the monitoring, maintenance and reporting described herein and as approved by the MCLT. The developer will maintain the Account and be solely responsible for all fees associated with the Account. The restrictions on access to the Mitigation Fund consistent with the terms of this plan shall be given to the designated bank or any successor holder of the Account. The Account and the Mitigation Fund shall be deemed an asset of the project and shall be transferred to any successor landowner to ensure available funds for compliance with this plan. Ongoing obligations relating to the mitigation shall also be set forth in a recorded document which shall encumber the developed property. In this way the developer shall ensure that it and any successor landowner shall be appraised of the ongoing obligations and shall be bound by the same.

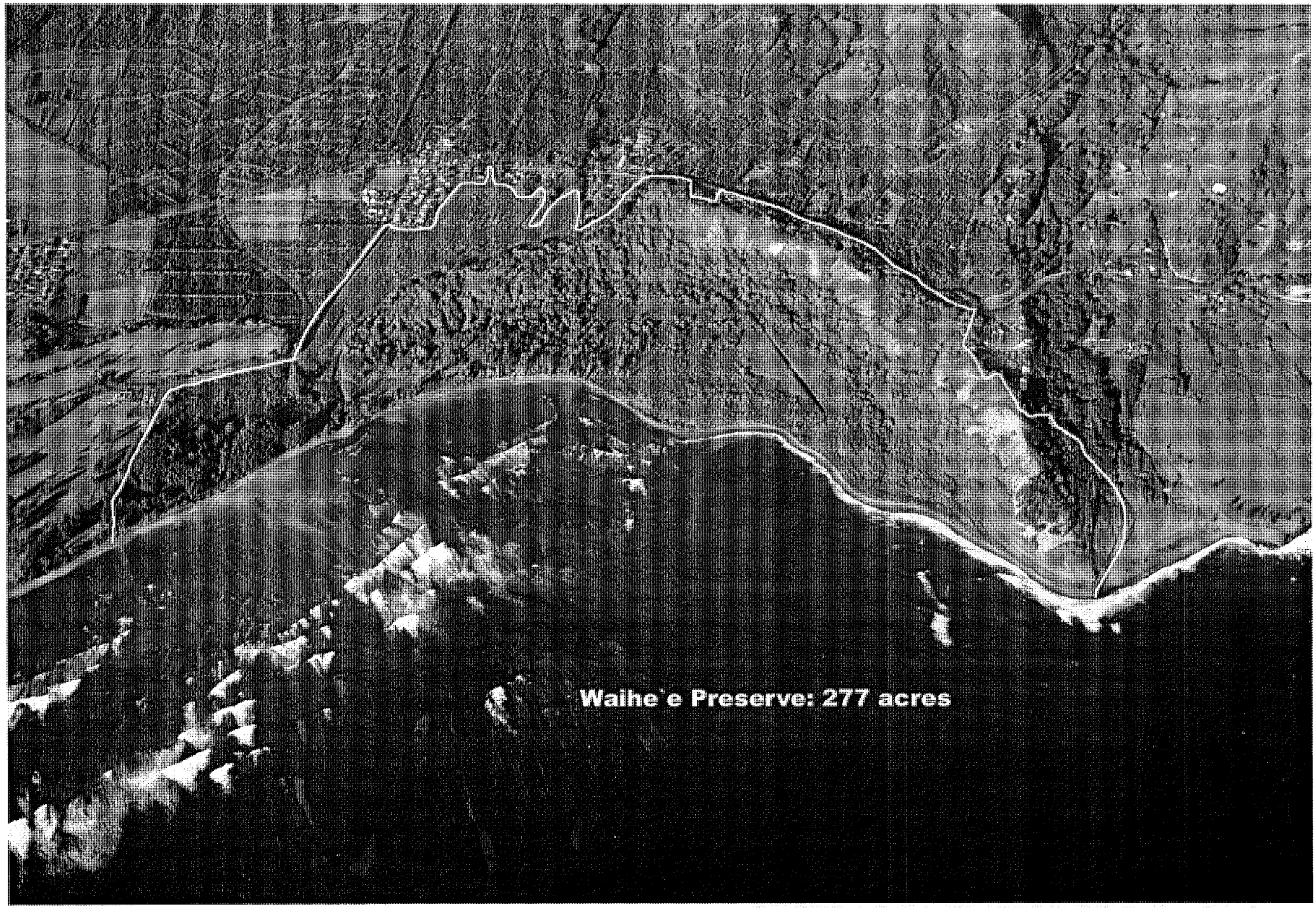
Financial assurances will be reviewed by MCLT and adjusted to reflect current economic conditions such as a rise in the cost of supplies, monitoring and maintenance.

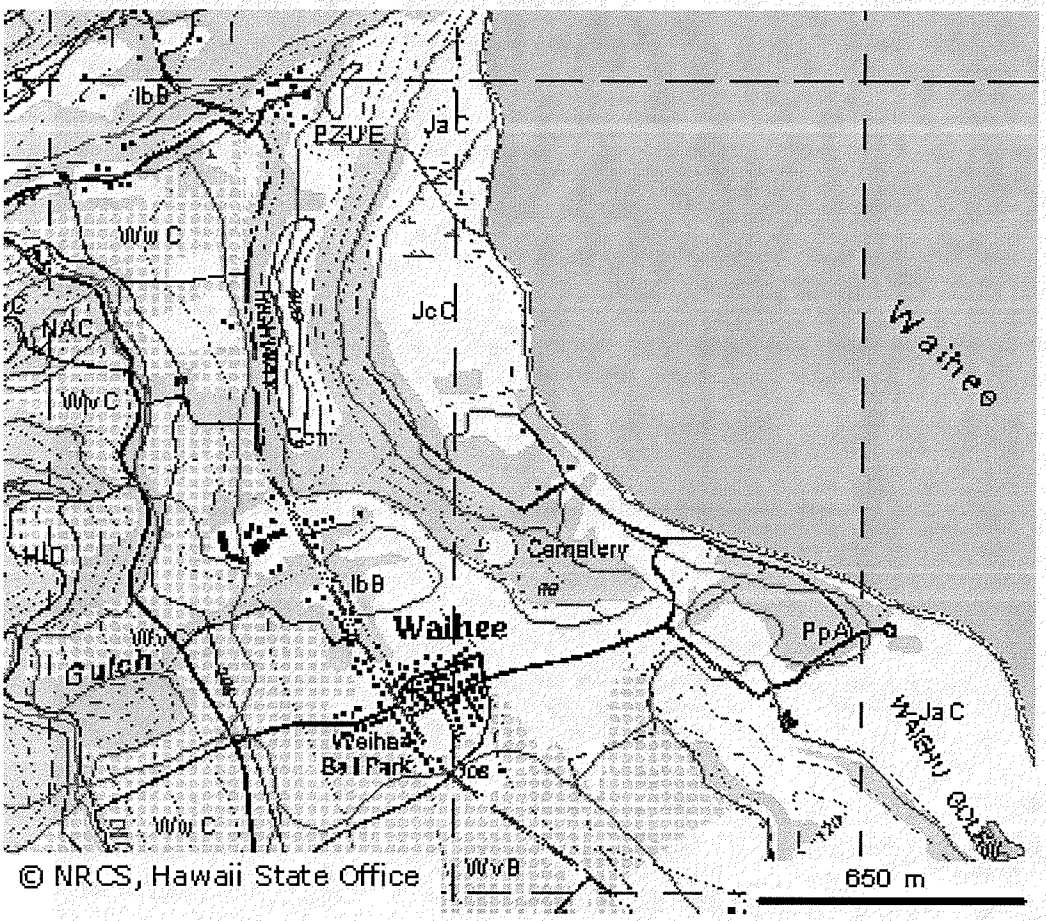
## 12. REFERENCES

References are found in the original mitigation plan. Photographs were taken by P. Levin except where noted. Aerial photographs underlying maps belong to MCLT.

## APPENDIX A: ADDITIONAL MAPS AND IMAGES

Waihe'e Coastal Dunes and Wetlands Refuge boundary map and aerial
USGS/NRCS topographical, soils and T&E species maps
Waihe'e Refuge archaeological sites map, including fishpond location


Waihe`e Preserve: 277 acres


IbB
PZU'E
JaC
WwC
JcC
NAC
WvC
HLD
Cemetery
IbB
Waihee
Gulch
PpA
JaC
Waihee Golf Course
WvB
650 m
© NRCS, Hawaii State Office

# Soils Map

**Maui Coastal Land Trust**

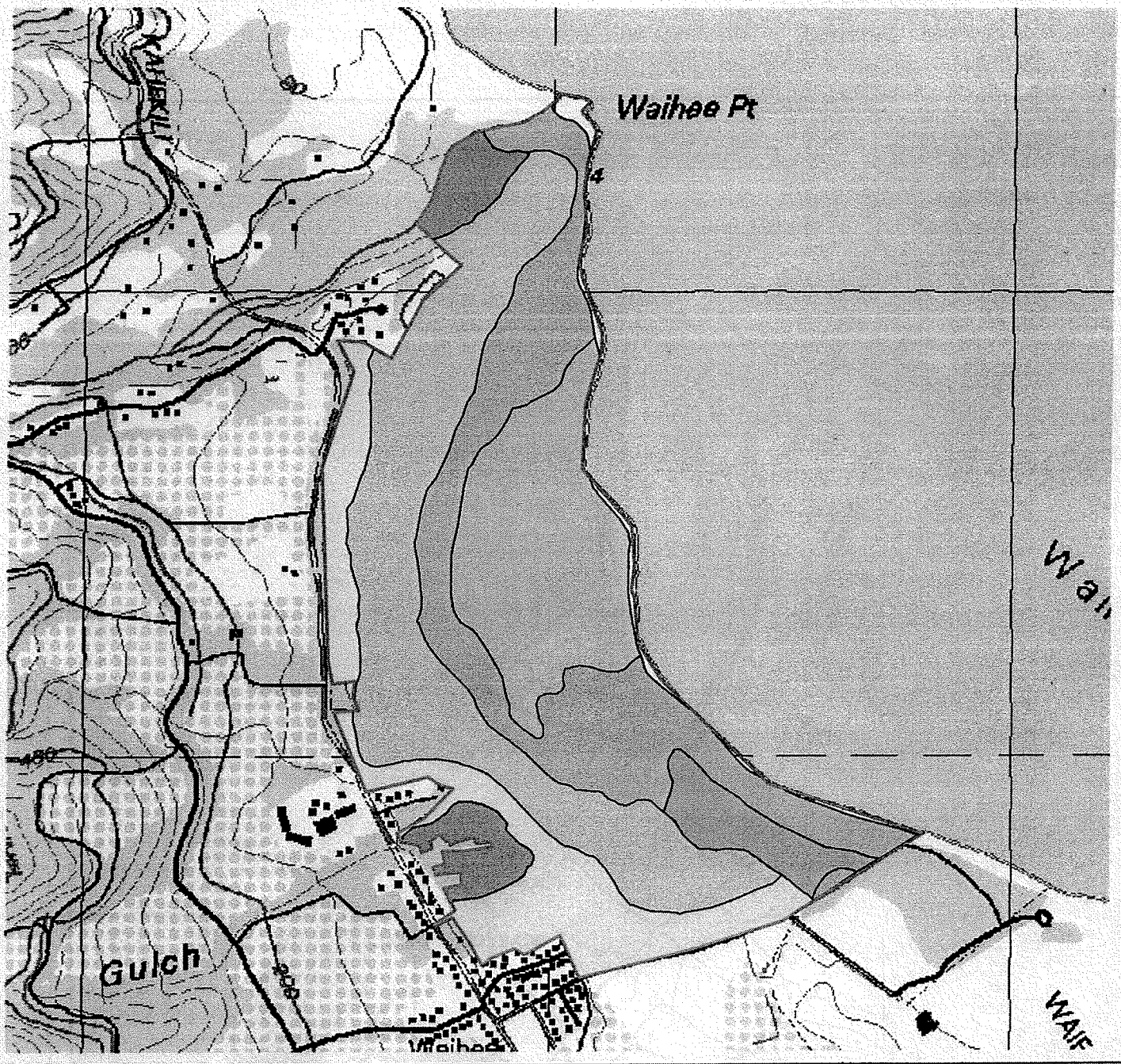
**Central Maui**

**Date: 04/21/2005**

**Wailuku**

**USDA-NRCS**

**RFGC**




## Legend

- Planned Land Units
- Soils Map
  - lbB
  - lcB
  - JaC
  - JcC
  - PZUE
  - PpA
- Planned Land Units Labels

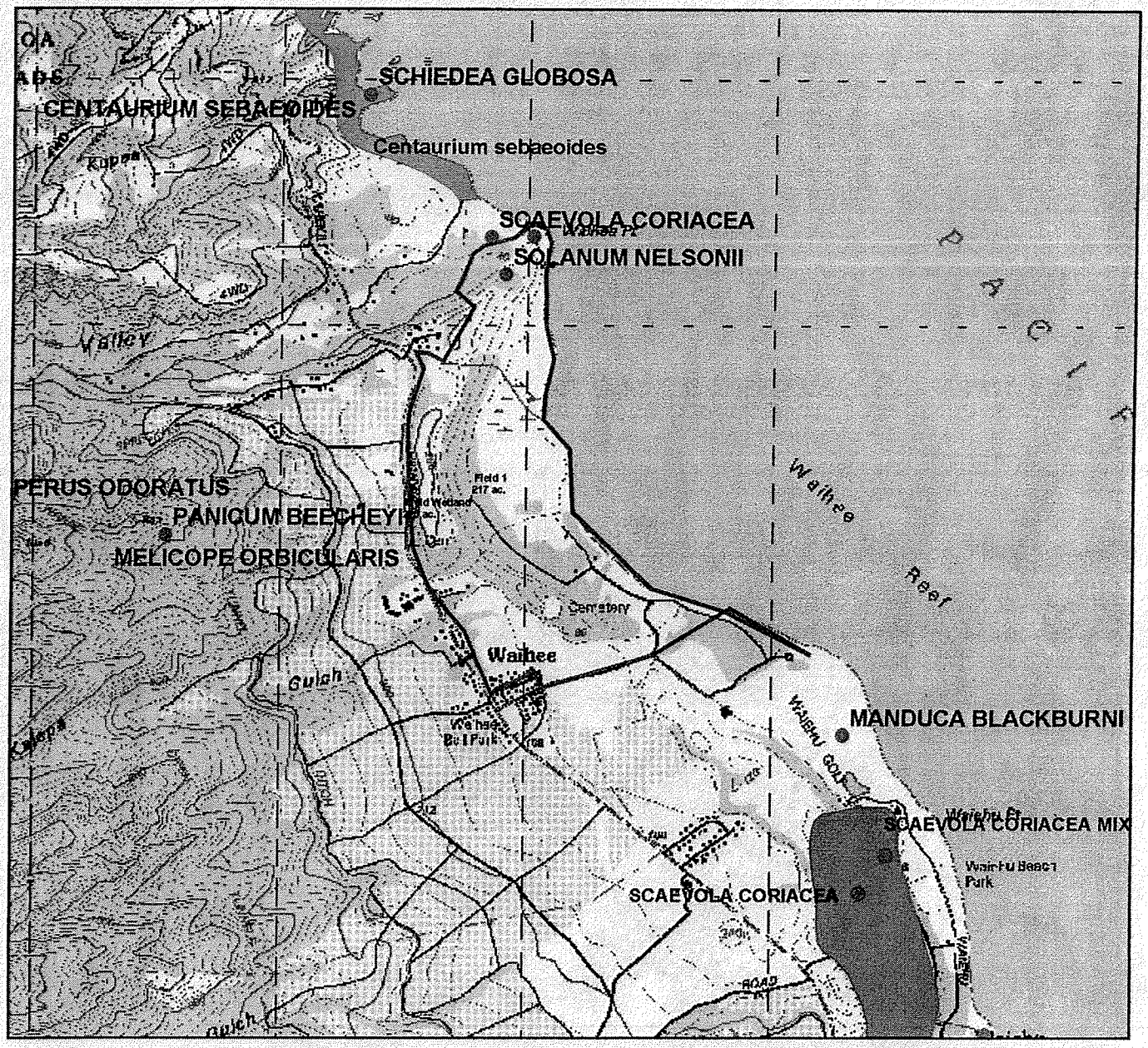
N

1000 0 1000 2000 Feet

USDA

# T&E Map

Customer(s): MAUI COASTAL LAND TRUST



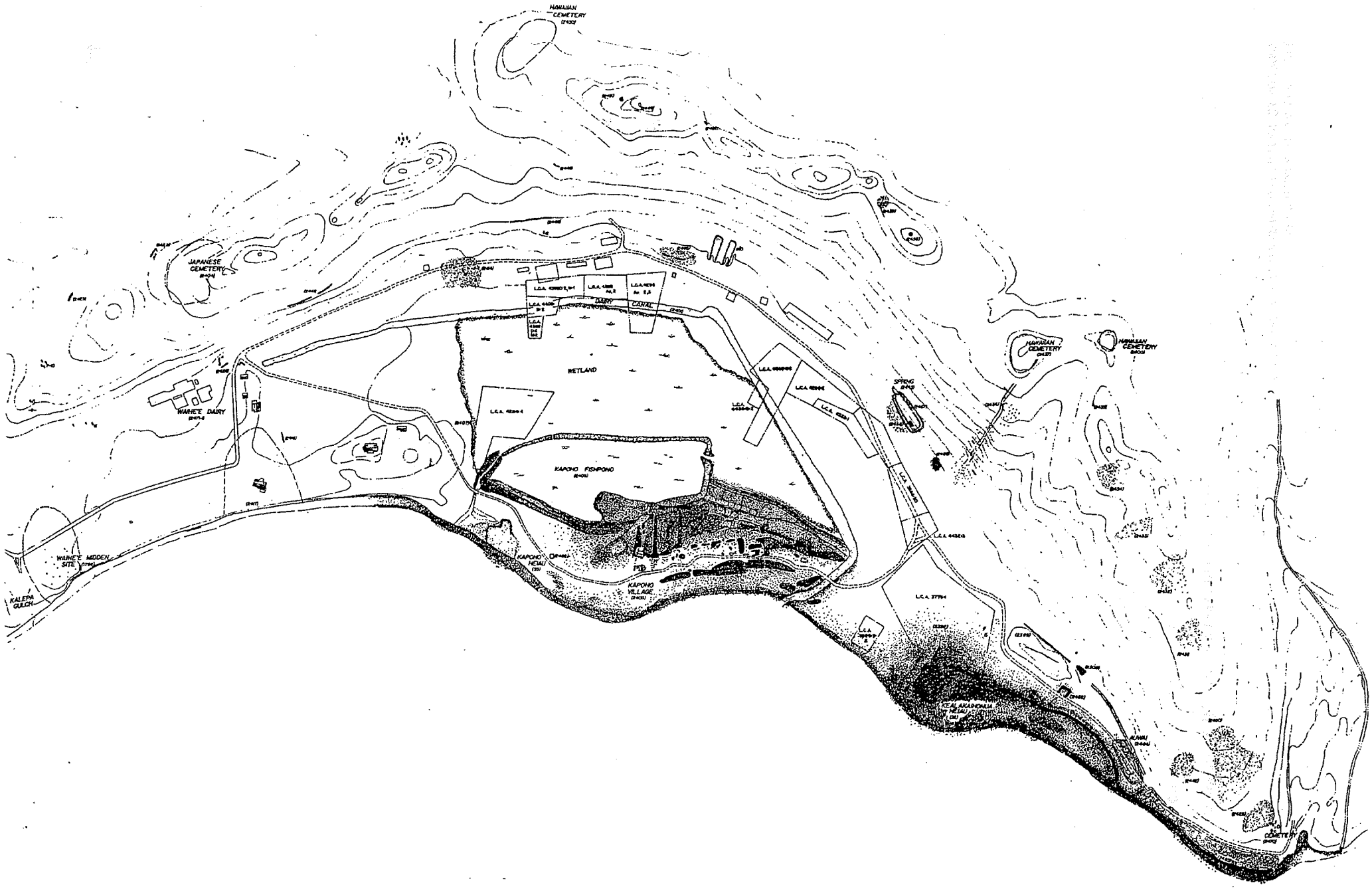

**Legend**

- Tract Boundaries
- tepointsmau_p_hi009
- mau-indv-final-nad83-06jun2003
- tespeciesmau_a_hi009

Image: o20156h4.tif

1,000 0 1,000 2,000 3,000 4,000 Feet

N


HAWAIIAN CEMETERY
JAPANESE CEMETERY
WAIHE'E DAIRY
WAIHE'E MIDDEN SITE
KALEPA GULCH
WETLAND
DAIRY
CANAL
KAPOHO FISHPOND
KAPOHO
KAPOHO VILLAGE
KEAL KAPOHOKALO
HAWAIIAN CEMETERY
SPRING
HAWAIIAN CEMETERY
ALAMU

## APPENDIX B: SUPPORTING DOCUMENTS

Letter from MCLT dated 11/23/09

# MAUI COASTAL LAND TRUST



November 23, 2009

Mr. Bob McDaniel
Maui Medical Plaza
350 Hukilike St. Suite D
Kahului, HI 96732

Dear Mr. McDaniel

On behalf of the Maui Coastal Land Trust, I want to express my appreciation for the offer to provide wetlands restoration funding for the Waihe`e Coastal Dunes and Wetlands Refuge as part of the planning for the new Maui Medical Plaza at Kanaha.

As you know, the Waihe`e Refuge is, like Kanaha Pond, home to a wide variety of shorebirds, including the endangered ae'o (stilt), alae ke`okeo (coot), koloa (duck) and nene (goose).

Although we have been working with a volunteer crew to begin restoring the wetlands and buffers back to native habitat, we do not currently have any specific funding or restoration plan in place to perform the more extensive work we would like to do, and the mitigation funding provided by Maui Medical Plaza will be a tremendous boost to our restoration efforts.

Partnerships such as this, between nonprofits and local business entities, are critical to the protection and enhancement of the Maui that we all treasure. We are pleased to be working with you on this project and look forward to showing you the accelerated progress we will be able to make as a result of this partnership.

Sincerely,

Dale B. Bonar, Ph.D.
Executive Director

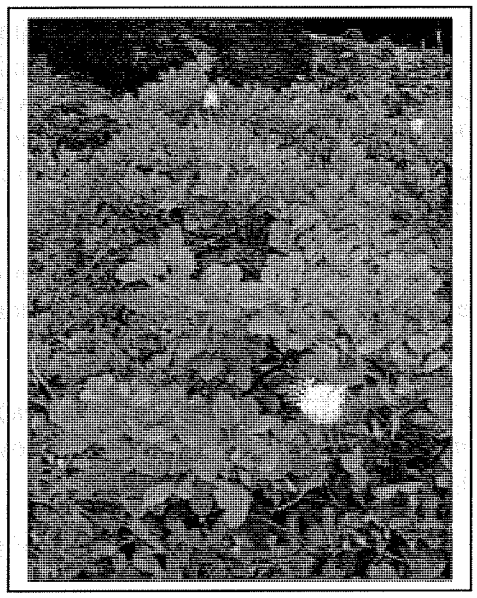
cc. Penny Levin

2371 Vineyard St. • PO Box 965, Wailuku, Hawai'i 96793 • ph: 808.244.5263 fx: 808.242.4741 • www.mauicoastallandtrust.org

Recommendations on Landscape Plants Selection:

1. All Kou Haole – replace with the native Kou (*Cordia subcordata*). This is readily available. There is no justifiable reason to plant the non-native version of this species.

2. Olulu/Alulu (*Brighamia insignus*) is endemic and Endangered (listed). It is found in the wild only on the island of Kaua'i. While it is a showy and beautiful native species, it does not belong on the island of Maui. Recommend *Schiedea globosa* (no Hawaiian name) or miapilo (*Capparis sandwichiana*), both of which are known to the coastal and cliff zone from Waihee to Kahakuloa.



Maiapilo (left) Schiedea globosa (right)

3. Maia – definitely use and show off the Hawaiian varieties.

4. Loulu species - *Pritchardia munroi* may be more suited to this habitat. *P. hillbrandii* prefers wet windward areas at slightly higher elevations.

5. Ti should be featured heavily along the highway frontage and near the doorways. It is an important healing plant, one of its uses being to clear the spiritual path to allow for physical healing. The placement of these plants along the path leading in to the building and along its entrances and exits will be supportive of the patients and people who work there.

6. Hau (*Hibiscus tillaceus*) can become invasive. The movement of seeds by birds or rats into the wetland would become a problem for wetland managers. Replace with Hala or native Hawaiian sugarcane (ko) varieties. Kept clean, these are strikingly beautiful elements to any landscape. Ko varieties can reach heights of 15ft.

7. Naupaka kahakai – strongly recommend stock from the hardier, glossier wild populations found along north/northeast facing shores grown by a few local nurseries and not the standard nursery plants that have evolved into large leaved, tall succulent shrubs. This will result in a much more resistant and resilient landscape.

8. Seashore paspalum should be replaced with 'aki'aki (*Sporabolus virginicus*), a hardy native coastal grass that propagates by stolon rather than seed. The location of MMPK adjacent to the wetland presents a problem for movement of nonnative species into the wetland. The use of 'aki'aki will provide a buffer for the wetland and remove the opportunity for the paspalum to move into the wetland.

9. Tahitian gardenia should not be planted if the native and Endangered Hawaiian gardenia (nanu) is also planted (this would be preferred). The native is a smaller flower with milder scent (better for asthma patients). The presence of the two species will result in hybrid seed. The chance that someone would gather the seed to grow out elsewhere (ie. yards or nurseries) has the potential to be outplanted in areas that might jeopardize this Endangered species in the wild.

10. Taro rather than water lilies. The native Hawaiian taros are beautiful. The project wishes to capitalize on the health and wellness image of Hawaiian healing; taro is the heart of this image.

11. African lily (*Agapanthus orientalis*) and white turf lily (*Ophlopogon jaburon*) recommend replacing with 'uki'uki (*Danella sandwicensis*), a native lily known for its striking blue fruits or kokio'ula'ula, the native red hibiscus.

12. Hearts and flowers is not necessary and recommend replacement with any of the other native groundcovers on the list.

For the planters on the building I strongly recommend no bougainvillea. The native *'Awikiwiki* (*Canavalus* sp.) and nehe (*Lipochaeta integrifolia*) are stunning vine species that will drape over the building floors and soften the edges of the structure with silvery green foliage and deep purple and yellow flowers.

MAUI COASTAL LAND TRUST



November 23, 2009

Mr. Bob McDaniel
Maui Medical Plaza
350 Hukilike St. Suite D
Kahului, HI 96732

Dear Mr. McDaniel

On behalf of the Maui Coastal Land Trust, I want to express my appreciation for the offer to provide wetlands restoration funding for the Waihe`e Coastal Dunes and Wetlands Refuge as part of the planning for the new Maui Medical Plaza at Kanaha.

As you know, the Waihe`e Refuge is, like Kanaha Pond, home to a wide variety of shorebirds, including the endangered ae'o (stilt), alae ke`okeo (coot), koloa (duck) and nene (goose).

Although we have been working with a volunteer crew to begin restoring the wetlands and buffers back to native habitat, we do not currently have any specific funding or restoration plan in place to perform the more extensive work we would like to do, and the mitigation funding provided by Maui Medical Plaza will be a tremendous boost to our restoration efforts.

Partnerships such as this, between nonprofits and local business entities, are critical to the protection and enhancement of the Maui that we all treasure. We are pleased to be working with you on this project and look forward to showing you the accelerated progress we will be able to make as a result of this partnership.

Sincerely,

Dale B. Bonar, Ph.D.
Executive Director

cc. Penny Levin

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# APPENDIX B-2.

# Letter from Department of the Army, USACE Accepting Final Wetland Mitigation Plan

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

January 15, 2010

Regulatory Branch

File No. POH-2006-00531

Mr. Benjamin Brown
8056 Molt Road
Billings, MT 59106

Mr. Robert McDaniel III
Maui Medical Plaza at Kanahā, LLC
350 Hukiliki Street, Suite D
Kahului, HI 96732

Dear Mr. Brown and Mr. McDaniel:

We have reviewed the revised mitigation plan entitled, *Maui Medical Plaza at Kanahā Alternate Wetland Mitigation Plan*, dated November 23, 2009, proposed to compensate for the proposed loss of 0.95 acres of wetland associated with the development of a medical center. We have determined that the proposed mitigation plan will adequately compensate for wetland impacts as required under the Mitigation Rule 33 CFR Parts 325 and 332.

Please note that the Corps will not be able to issue a final permit decision until we receive an amended letter from the Hawaii State Historic Preservation Department for the revised mitigation site. We also must receive Section 401 Water Quality Certification and a Coastal Zone Management Determination from the State of Hawaii. Other federal, state, and local laws may apply.

If you have any questions, please contact Ms. Amy Klein at (808) 438-7023 or via email at Amy.S.Kleir@usace.army.mil.

Sincerely,

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

e-Copy Furnished:
Ms. Penny Levin

# APPENDIX B-3.

# Special Management Area Minor Permit and Environmental Assessment Exemption Determination Letter from Department of Planning for Offsite Wetland Mitigation Project

CHARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

KATHLEEN ROSS AOKI
Deputy Director

COUNTY OF MAUI
# DEPARTMENT OF PLANNING

March 15, 2010

Ms. Michelle Cockett
P.O. Box 1633
Wailuku, Hawaii 96793

Dear Ms. Cockett:

**SUBJECT: APPROVAL OF WETLAND MITIGATION PLAN AT MAUI COASTAL LAND TRUST'S WAIHEE COASTAL DUNES AND WETLANDS REFUGE AT KAHEKILI HIGHWAY AND HALEWAIU ROAD, LOCATED AT WAIHEE, ISLAND OF MAUI, HAWAII; TMK(S): (2) 3-2-040:001 AND (2) 3-2-040:002, AS COMPENSATORY MITIGATION FOR THE PROPOSED MAUI MEDICAL PLAZA AT KANAHA, LOCATED AT KAHULUI, ISLAND OF MAUI, HAWAII; TMK: (2) 3-7-011:028 (SMX 2009/0220) (SM2 2010/0017) (EAE 2010/0011)**

In response to your modified plans received on December 2, 2009, the Department of Planning (Department) understands that:

1. The project scope of work is to complete compensatory mitigation at the two (2) subject Tax Map Keys [TMK(S)], as required by the U.S. Army Corps of Engineers (USACE), for the proposed Maui Medical Plaza at Kanaha for filling 0.95 acres of wetlands adjacent to Kanaha Pond, at TMK: (2) 3-7-011:028. This project is to offset loss of wetlands on parcel 28 where the proposed Maui Medical Plaza building is to be constructed in the future;

2. The original proposed project site location for the mitigation has been changed to the Maui Coastal Land Trust's Waihee Coastal Dunes and Wetlands Refuge at TMK: (2) 3-2-040:001 and (2) 3-2-040:002. The USACE has approved this site for the compensatory mitigation;

3. The reason for the change in location is due to the State Department of Transportation's September 10, 2009 letter to the Department that finds the original proposed mitigation location at Kanaha Pond, TMK: (2) 3-7-011:028, may generate adverse impacts to the State highway, Hana Highway, and to the State Airport, Kahului Airport. In addition, on January 15, 2009, U.S Airways flight 1549 made a crash landing in the Hudson River after ingestion of Canadian geese in its two (2) engines. Since that event, there has been a heightened awareness of the seriousness of bird strike hazards to aviation. Thus, habitat improvements near airports have become a National concern; and

4. Mitigation will involve removal of invasive species along a one (1) acre portion of wetland behind an existing sand dune and within a four (4) acre portion of the wetland itself in front of the sand dune. Upon removal of the invasive species, that area will be replanted with *ahuawa (Cyperus javanicus), makaloa (Cyperus laevigatus),* and *kalua (Bolboschoenus maritime).* Work will be done using a forestry mulcher in order to limit impacts to the surface and avoid ground-altering disturbance.

***SPECIAL MANAGEMENT AREA MINOR PERMIT APPROVAL***

In accordance with the *Special Management Area (SMA) Rules for the Maui Planning Commission*, Sections 12-202-12 and 12-202-14, a determination has been made relative to the above project that:

1. The project is a development;

2. The project has a valuation not in excess of $125,000.00; (Valuation: $112,200.00)

3. In a letter dated January 15, 2010, the USACE, Honolulu District, Regulatory Branch approved the revised mitigation plan entitled, "*Maui Medical Plaza at Kanaha Alternate Wetland Mitigation Plan,*" dated November 23, 2009. The determination is that the proposed mitigation plan will adequately compensate for wetland impacts as required under the Mitigation Rule 33 CFR Parts 325 and 332;

4. The project parcel where the Compensatory Mitigation actions will be completed has a standing accepted Archaeological Monitoring Plan for the project site (SHPD LOG NO: 2007.3717; DOC NO. 0803JP01);

5. The Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) issued a Letter of No Effect to the USACE, (LOG No: 2009.3578 DOC NO: 1001PC22 Archaeological), dated January 22, 2010;

6. The project has no significant adverse environmental or ecological effect, taking into account potential cumulative effects; and

7. The project is consistent with the objectives, policies, and SMA guidelines set forth in the Hawaii Revised Statutes (HRS), Chapter 205-A, and is consistent with the County General Plan and Zoning.

**In consideration of the above determination, you are hereby granted a SMA Minor Permit approval, subject to the following conditions:**

1. That mitigation actions shall be in accordance with the revised plans submitted on December 2, 2009.

2. That a professional archaeologist must be on-site to monitor for the presence of archaeological resources during all mitigation activities. The archaeologist must have the authority to halt excavation in the event that cultural materials are identified. Consultation with the SHPD will occur in this event, to determine an acceptable course of action. USACE, Honolulu District, Regulatory Branch must also be immediately notified.

3. If human burials or remains, historic or archaeological resources are encountered during mitigation work, all activities in the immediate area shall cease and the permittee must notify the USACE, Honolulu District, Regulatory Branch within one (1) business day of the discovery. The permittee shall perform any work required by the USACE, Honolulu District, Regulatory Branch in accordance with Section 106 of the National Historic Preservation Act and USACE, Honolulu District, Regulatory Branch regulations.

4. That all necessary County and State permits shall be obtained prior to the initiation of compensatory mitigation. Please inquire with the Clean Water Branch, Department of Health at (808) 586-4309, as to any requirements for National Pollutant Discharge Elimination System permit and Community Noise Permits.

5. That compensatory mitigation shall be initiated within one (1) year of the date of this approval letter.

6. That compensatory mitigation activities are permitted on the property periodically over the next five (5) years, or until March 31, 2015.

7. That, at no time, shall construction of the project interfere with public access along the shoreline.

8. That, at all times, the health and safety of the public shall be protected and take precedence over any mitigation activity.

9. That compliance with all applicable government requirements shall be fulfilled.

Furthermore, since no structures will be constructed as part of this project, a County of Maui Special Flood Hazard Permit is NOT required.

***ENVIRONMENTAL ASSESSMENT EXEMPTION***

This project utilizes state or county lands or funds and therefore, is subject to review under Chapter 343, HRS. This project is *exempt* from an Environmental Assessment as it involves the "Minor alteration in the conditions of land, water, and vegetation," as defined in the *Exemption List for the County of Maui*, Exemption 4.

Thank you for your cooperation. If additional clarification is required, please contact Staff Planner James Buika at james.buika@mauicounty.gov or at (808) 270-6271.

Sincerely,

JEFFREY S. HUNT, AICP
Planning Director

xc: Clayton I. Yoshida, AICP, Planning Program Administrator
Aaron H. Shinmoto, PE, Planning Program Administrator (2)
James A. Buika, Staff Planner
Development Services Administration
Police Department
Department of Environmental Management
Department of Public Works
DLNR-SHPD
USDA-NRCS, Maui
USACE, Honolulu District, Regulatory Branch
DOT-Office of Statewide Planning
EPA, Pacific Islands
U.S. Fish and Wildlife
Department of Health, Clean Water Branch
Maui Medical Plaza at Kanaha
Dale Bonar, Executive Director
CZM (SMX/SM2)
Project File
General File

JSH:JAB:vb
K:\WP_DOCS\PLANNING\SM2\2010\0017_MauiMedicalPlazaRemoveInvasiveSpecies\SM2ApprovalCompMitigationPlan.doc

# APPENDIX C.

# Biological Resources Survey

# BIOLOGICAL RESOURCES SURVEY

**for the**

# KANAHA LOT 8 PROJECT

## KANAHA, KAHULUI, MAUI

**by**

**ROBERT W. HOBDY**
**ENVIRONMENTAL CONSULTANT**
**Kokomo, Maui**
**September 2006**

**Prepared for:**
**Kanaha Professional Plaza, LLC**
**8056 Molt Road, Billings, MT 59106**

# KANAHA, KAHULUI, MAUI

## INTRODUCTION

The Kanahā Industrial Subdivision Lot 8 property lies on 2.5 acres TMK (2 3-7-11:028) of undeveloped land in central Maui (Figure 1). The property is bounded on the east by a 50 foot wide drainage canal and levee (Lot 7) that separates it from the Kanahā Pond Wildlife Sanctuary, is bounded on the north by a 20 foot wide drainage canal and levee, and is bounded on the southwest by Hāna Highway (Figure 2).

## SITE DESCRIPTION

The terrain within the project area is nearly level. It is situated on a low-lying coastal plain near to (but separate from) a large wetland area. Elevations range from 3 feet above sea level in the central part of the property up to 5 and 6 feet above sea level on the peripheral levees and Hāna Highway. The soils on the property are entirely Jaucus Sand, Saline, 0-12% (JcC) (Foote et al, 1972). This soil occurs near the ocean where the water table is near the surface and where salts have accumulated. These soils can become temporarily inundated following heavy rainfall events. Rainfall in this area averages 20-25 inches per year with the bulk falling between November and March (Armstrong, 1983).

## PHYSICAL AND BIOLOGICAL HISTORY OF THE AREA

Kanahā Pond and its twin pond, Mau'oni, were built in the middle 1500's by Kiha a Pi'ilani, the King of Maui, taking advantage of a natural wetland at this location. A chant celebrates this feat and mentions a stone wall that separated the lower pond, Mau'oni, from the upper pond, Kanahā. The earliest map, dated September 1881, that accurately depicts the ponds and the Kahului coastline prior to any major land alterations (Figure 3) shows their location and shape and the placement of the stone wall. The pond extended to a narrow arm on its northwestern corner where an outlet (not shown on the map) was said to have connected to the ocean near an old landing just west of the present Pier 1. A small estuary still exists here alongside of the canoe hale. The same general pond configuration continued up through 1910 when Kahului Harbor was dredged (Figure 4).

When Kahului Harbor was dredged, great amounts of coral and sand were removed and spread out along the shoreline from the intersection of Ka'ahumanu Avenue and Kahului Beach Road to eastward of Hobron Point. The extent of the

depositions of fill material is documented in the previously cited Soil Survey of Islands of Kaua'i, O'ahu, Maui, Moloka'i and Lāna'i, State of Hawai'I (Foote et al, 1972) (Figure 5). This deposition of fill raised the ground surface several feet, turning what must have been low-lying saline flats into dry land. Apparently buried during the process was the western arm of the lower pond which extended over to the present Hobron Lane. All maps since this time show the pond in this reduced configuration. At no time since 1881, according to maps, photos and soils data, does it appear that the subject property was either covered with fill from Kahului Harbor or included within the permanently inundated expanse of Kanahā Pond. It lies within an intermediate area between the filled land and the pond, albeit rather close to both (Figure 6).

During the late 1970's a Corps of Engineers approved project saw the development of a network of drainage canals that channeled ground water out of the Kahului Industrial Area, along the western edge of Kanahā Pond and out to the ocean (Figure 7). This network of canals was constructed along the east and north sides of the subject property further isolating it from the permanent wetlands in the Wildlife Sanctuary. During the construction of these canals dredged material was deposited on both sides of the canal to create levees and to discard excess material. This material was leveled to create a narrow access road along each side of the canal, but additional material outside of the road was not leveled and has created a raised berm. The raised roadway and berm deposits have resulted in a 25-30 foot wide ring bordering the north and east sides of the subject property. There is also a raised manmade bank along the southwest side of the property where a slope rises to the grade of the Hāna Highway.

During the past 25 years this property has lain idle and is now densely overgrown with non-native shrubs, sourbush (*Pluchea indica*), grasses, seashore saltgrass (*Distichlis spicata*) and a few scattered trees, Kiawe (*Prosopis pallida*) and date palm (*Phoenix x dactylifera*) (Figure 8).

## SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the Kanahā Lot 8 property which was conducted in June, 2006. The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.
5. Note which aspects of the proposed development pose significant concerns for plants or for wildlife and recommend measures that would mitigate or avoid these problems.

## BOTANICAL SURVEY REPORT

### SURVEY METHODS

A walk-through botanical survey was conducted on all parts of this small property. Areas most likely to harbor native plants such as drainage canal margins were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

### DESCRIPTION OF THE VEGETATION

The majority of the area is nearly monotypic dense shrubland of Indian fleabane (*Pluchea indica*). Interspersed within it and along the disturbed margins are patches of seashore saltgrass (*Distichlis spicata*) and Bermuda grass (*Cynodon dactylon*). A few trees: Kiawe (*Prosopis pallida*) and hybrid datepalm (*Phoenix x dactylefera*) are scattered across the property, and a few wetland plants: kaluhā (*Bolboschoenus maritimus subsp. paludosus*) and 'ae'ae (*Bacopa monnieri*) can be found along the canal margins. Thirty two plant species were recorded during the survey. Five species were indigenous to Hawaii as well as to other areas; kaluhā, 'ae'ae, 'akulikuli (*Sesuvium potulacastrum*), kipukai (*Heliotropium curassavicum*) and popolo (*Solanum americanum*). These are all of common occurrence. The remaining 27 plant species were all weeds or landscape species.

### DISCUSSION AND RECOMMENDATIONS

The project area consists of a highly altered environment dominated by introduced plants and weeds. No Federally listed Endangered or Threatened plant species (USFWS, 1999) occur on the property nor were any plants that are candidates for such status observed. No special plant habitats were found on the

property either, although important wetland vegetation does occur in the nearby Kanahā Pond Wildlife Sanctuary.

From a vegetation standpoint there is little of interest or concern regarding this property in its current state, and any proposed land use changes are not expected to have a significant negative impact on the botanical resources in this part of Maui.

No recommendations are deemed appropriate regarding the vegetation on this property.

## PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups: Monocots and Dicots. Monocots and Dicots are in accordance with Wagner et al. (1999) and Staples and Herbst (2005).

For each species, the following information is provided:
1. Scientific name with author citation

2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:
   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   non-native = all those plants brought to the islands intentionally or accidentally after western contact.
4. Abundance of each species within the project area:
   abundant = forming a major part of the vegetation within the project area.
   common = widely scattered throughout the area or locally abundant within a portion of it.
   uncommon = scattered sparsely throughout the area or occurring in a few small patches.
   rare = only a few isolated individuals within the project area.

| SCIENTIFIC NAME | COMMON NAME | STATUS | ABUNDANCE |
|---|---|---|---|
| **MONOCOTS** | | | |
| ARECACEAE (Palm Family) | | | |
| *Phoenix x dactylifera* | hybrid date palm | non-native | uncommon |
| *Washingtonia filifera* (Andre) S. Watson | California washingtonia | non-native | rare |
| CYPERACEAE (Sedge Family) | | | |
| *Bolboschoenus maritimus* (L.) Palla subsp. paludosus (A.Nels) T.Koyama | kaluhā | indigneous | rare |

| | | | |
|---|---|---|---|
| POACEAE (Grass Family) | | | |
| *Brachiaria mutica* (Forssk.) Stapf | California grass | non-native | rare |
| *Cenchrus ciliaris* L. | buffelgrass | non-native | uncommon |
| *Cenchrus echinatus* L. | common sandbur | non-native | rare |
| *Chloris barbata* (L.) Sw. | swollen fingergrass | non-native | uncommon |
| *Cynodon dactylon* (L.) Pers. | Bermuda grass | non-native | uncommon |
| *Distichlis spicata* (L.) Greene | seashore saltgrass | non-native | uncommon |
| **DICOTS** | | | |
| ACANTHACEAE (Acanthus Family) | | | |
| *Asystasia gangetica* (L.) T. Anderson | Chinese violet | non-native | rare |
| AIZOACEAE (Fig-marigold Family) | | | |
| *Sesuvium portulacastrum* (L.) L. | 'akulikuli | indigenous | uncommon |
| ASTERACEAE (Sunflower Family) | | | |
| *Bidens pilosa* L. | Spanish needle | non-native | rare |
| *Conyza bonariensis* (L.) Cronq. | hairy horseweed | non-native | rare |
| *Eclipta prostrata* (L.) L. | false daisy | non-native | rare |
| *Lactuca sativa* L. | prickly lettuce | non-native | rare |
| *Pluchea carolinensis* (Jacq.) G. Don | sourbush | non-native | rare |
| *Pluchea x fosbergii* Cooperr. & Galang | ---------- | non-native | rare |
| *Pluchea indica* (L.) Less. | Indian fleabane | non-native | abundant |
| *Sonchus oleraceus* L. | pualele | non-native | rare |
| *Verbesina encelioides* (Cav.) Benth. & Hook. | golden crown-beard | non-native | rare |
| BORAGINACEAE (Borage Family) | | | |
| *Heliotropium curassavicum* L. | kipukai | indigenous | rare |

| SCIENTIFIC NAME | COMMON NAME | STATUS | ABUNDANCE |
|---|---|---|---|
| *Heliotropium procumbens* Mill. | ---------- | non-native | rare |
| BRASSICACEAE (Mustard Family) | | | |
| *Lepidium virginicum* L. | pepperwort | non-native | rare |
| CARYOPHYLLACEAE (Pink Family) | | | |
| *Spergularia marina* (L.) Griseb. | saltmarsh sand spurry | non-native | uncommon |
| CHENOPODIACEAE (Goosefoot Family) | | | |
| *Atriplex suberecta* Verd. | ---------- | non-native | rare |
| *Bassia hyssopifolia* (Pall.) Kuntze | ---------- | non-native | uncommon |
| EUPHORBIACEAE (Spurge Family) | | | |

| | | | |
|---|---|---|---|
| *Chamaesyce hirta* (L.) Millsp. | hairy spurge | non-native | rare |
| FABACEAE (Pea Family) | | | |
| *Indigofera hendecaphylla* Jacq. | creeping indigo | non-native | rare |
| *Leuceaena leucocephala* (Lam.) de Wit | koa haole | non-native | rare |
| *Prosopis pallida* (Humb. & Bonpl. ex Willd.) Kunth | kiawe | non-native | uncommon |
| SCROPHULARIACEAE (Snapdragon Family) | | | |
| *Bacopa monnieri* (L.) Pennell | 'ae'ae | indigenous | rare |
| SOLANACEAE (Nightshade Family) | | | |
| *Solanum americanum* Mill. | popolo | indigenous | rare |

## FAUNA SURVEY REPORT

### SURVEY METHODS

A walk-through survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species abundance, activities and location as well as observations of trails, tracks scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

### RESULTS

**MAMMALS**

No mammals were observed during four site visits to the property. Not seen but of expected occasional occurrence are such rodents as mice (*Mus domesticus*) and rats (*Rattus rattus*) as well as such predators as cats (*Felis catus*) and Mongoose (*Herpestes auropunctatus*) that hunt for and feed on the rodents. Also expected would be the occasional domestic dog (*Canis familiaris*) which might wander on to the property.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent and plenty of flying insects were seen. This area does not represent ideal bat habitat and there have been no reports of bat sightings in the vicinity.

**BIRDS**

Birdlife was moderate but diversity was low on this small property. Just four species of non-native birds and one endemic waterbird were observed during four visits to the property. Taxonomy and nomenclature follow American Ornithologists' Union (2005).

Common mynah (*Acridotheres tristis*) – Mynas were common, usually in pairs or small groups in the kiawe trees or flying over the property.

House sparrow (*Passer domesticus*) - Sparrows were also common in small groups in the kiawe trees, chattering and feeding on small caterpillars.

Spotted dove (*Streptopelia chinensis*) – Several individuals of these large doves were seen flying over the property or landing in the trees.

Zebra doves (*Geopelia striatus*) – A few groups of these small doves were seen flying about and feeding in grassy clearings.

Ae'o, Hawaiian Stilt (*Himantopus mexicanus knudseni*) - A few ae'o were seen flying over the property at all times of the day. None of these Endangered birds were seen to land on the property as the dense brushy vegetation is unattractive as habitat for them. Ae'o are fairly common in the nearby Kanahā Pond Wildlife Sanctuary where there is ample habitat which is managed for these and other native waterbirds. Ae'o are opportunistic feeders that range widely searching for suitable habitat, even if temporary in nature. They also occasionally land in clearings near wetlands to rest and preen. They do use the nearby drainage channels as well as

Kanahā Pond so their presence in the neighborhood is on a regular basis even if it is only flying overhead.

Other birds that might occasionally occur on the property, but which were not seen, include House finch (*Carpodacus mexicanus*), Japanese white-eye (*Zosterops japonicus*), cattle egret (*Bubulcus ibis*) and the migratory Pacific golden plover (*Pluvialis fulva*). Other more strictly aquatic Endangered waterbirds that frequent Kanahā Pond, the 'alae ke'oke'o or Hawaiian coot (*Fulica alai*) and the koloa or Hawaiian duck (*Anas wyvilliana*), were not seen on the property and would not use it as habitat.

**INSECTS**

While insects in general were not tallied, one native Sphingid moth species, Blackburn's sphinx moth (*Manduca blackburni*), has been put on the Endangered Species list and this designation requires special focus (USFWS, 2000). Blackburn's sphinx moth occurs on Maui and is known from nearby areas. Its native host plants are native species of 'aiea (*Nothocestrum spp.*) and a non-native alternative host species is tree tobacco (*Nicotiana glauca*). None of these host species occur on or near this property and no Blackburn's sphinx moth or their larvae were observed.

## DISCUSSION

Fauna surveys are seldom comprehensive due to the short window of observation, the seasonal nature of animal activities and the usually unpredictable nature of their daily movements. This survey might have yielded a greater diversity of non-native mammals and lowland birds had it been expanded and included observations at other times of the year, but it would be unlikely to have turned up any species that would have been of environmental concern.

No Endangered species were seen on or using the property. One Endangered species, the ae'o or Hawaiian stilt, was observed flying overhead and other Endangered waterbirds are known to breed and nest in the nearby Kanahā Pond Wildlife Sanctuary. These occurrences and this proximity requires consideration and discussion to evaluate potential threats to these native birds and their habitat.

Kanahā Pond Wildlife Sanctuary has been in place for nearly 50 years, and during that time Kahului has grown around it to include an airport, industrial area

businesses, parks and highways. During the early years the waterbirds struggled to survive, but not because of human activities but because of predation by cats, mongoose, dogs and rodents. When fencing and predator control programs were instituted, the waterbirds in Kanahā Pond started to recover and are now doing fairly well. These birds have adapted to human activities and can be seen daily feeding in ponds alongside highways and industrial activities with minimal apparent adverse effect.

It would appear that as long as there are adequate buffers between the birds habitat and human activities, and possible pollutants, that the birds will be fine. These buffers need to be both spatial as well as visual to be successful.

The main drainage channel to the east of this property provides a buffer between it and Kanahā Pond that is about 100 feet wide. The levee on the Kanahā Pond side of the channel is high enough that it also makes a visual barrier so that one cannot see the water or the birds in it from the property and vice versa. Buffering thus appears to be reasonable.

The drainage channel constructed was designed to remove excess surface and ground water from the Kahului Industrial Area. In so doing it undoubtedly transports some minor levels of road generated pollutants through the canal to the ocean. The levee on the east side of the channel prevents the direct intermixing of these waters with the pond and thus provides another level of buffering. None-the-less it would be important to prevent the addition of any significant pollutants into this drainage system.

The property was recently evaluated for wetland status and was found to largely qualify as a wetland by Corps of Engineers standards, based on its vegetation, shallow water table and waterlogged soils. This wetland status is somewhat marginal, however, because the property only maintains temporary surface water for less than 1% of the time following large rainfall events and the ground is covered by dense brush. The property has been in this condition for over 100 years, not quite an open water habitat, but qualifying as a wetland by proximity and marginal conditions. With the development of the drainage canal system nearly 40 years ago, this property was functionally separated from the larger wetland ecosystem and its natural ground water drainage pattern has been altered.

The property is not suitable as waterbird habitat in its present condition and none of the Endangered waterbirds were observed using it. It is serving no use in this capacity and is likely to do so indefinitely. Its only value to waterbirds is as additional buffering of Kanahā Pond from Kahului.

In light of the above discussion it is felt that, should this property be developed, it would not result in significant negative impacts to the adjacent wetland habitat and species if carefully designed and constructed.

## RECOMMENDATIONS

If this property is to be approved for development the following recommendations are offered.

1. Buildings be placed with their backs to the drainage canal so that human use is concentrated on the Kahului side.

2. A tall hedge be planted along the drainage canal boundary to provide a visual barrier between the Kanahā Pond Wildlife Sanctuary and the project structures.

3. That material and chemical pollutants be carefully managed in the construction and use of the facilities.

## ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within one group: Birds. For each species the following information is provided:

1. Commnon name

2. Scientific name

3. Bio-geographical status. The following symbols are used:

   endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
   indigenous = native to the Hawaiian Islands and also to one or more

other geographic area(s).

non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.

4. Abundance of each species within the project area:

abundant = many flocks or individuals seen throughout the area at all times of day.

common = a few flocks or well scattered individuals throughout the area.

uncommon = only one flock or several individuals seen within the project area.

rare = only one or two seen within the project area.

| COMMON NAME | SCIENTIFIC NAME | STATUS | ABUNDANCE |
|---|---|---|---|
| **BIRDS** | | | |
| Common myna | *Acridotheres tristis* | non-native | common |
| House sparrow | *Passer domesticus* | non-native | common |
| Spotted dove | *Streptopelia chinensis* | non-native | common |
| Zebra dove | *Geopelia striata* | non-native | uncommon |
| Ae'o, Hawaiian stilt | *Himantopus mexicanus knudseni* | endemic | uncommon |

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Armstrong, R. W. (ed.) 1983. Atlas of Hawaii. (2nd. ed.) University of Hawaii Press.

Foote, D.E. , E.L. Hill, S. Nakamura, and F. Stephens. 1972. Soil survey of the islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. U.S. Dept. of Agriculture, Soil Conservation Service. Washington, D.C.

Staples, G.W. and Dr. R. Herbst. 2005. A Tropical Garden Flora, Plants Cultivated in the Hawaiian Islands and other Tropical Places. Bishop Museum Press.

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Plants. 50 CFR 17.11 & 17.12

U.S. Fish and Wildlife Service. 2000. Endangered and threatened wildlife and plants: determination of endangered status for Blackburn's sphinx moth from Hawaii. Federal Register 65(21): 4770-4779.

Wagner, W. L., D.R. Herbst, and S. H. Sohmer. 1999. Manual of the flowering plants of Hawai'i. Univ. of Hawai'I Press and Bishop Museum Press. Honolulu.

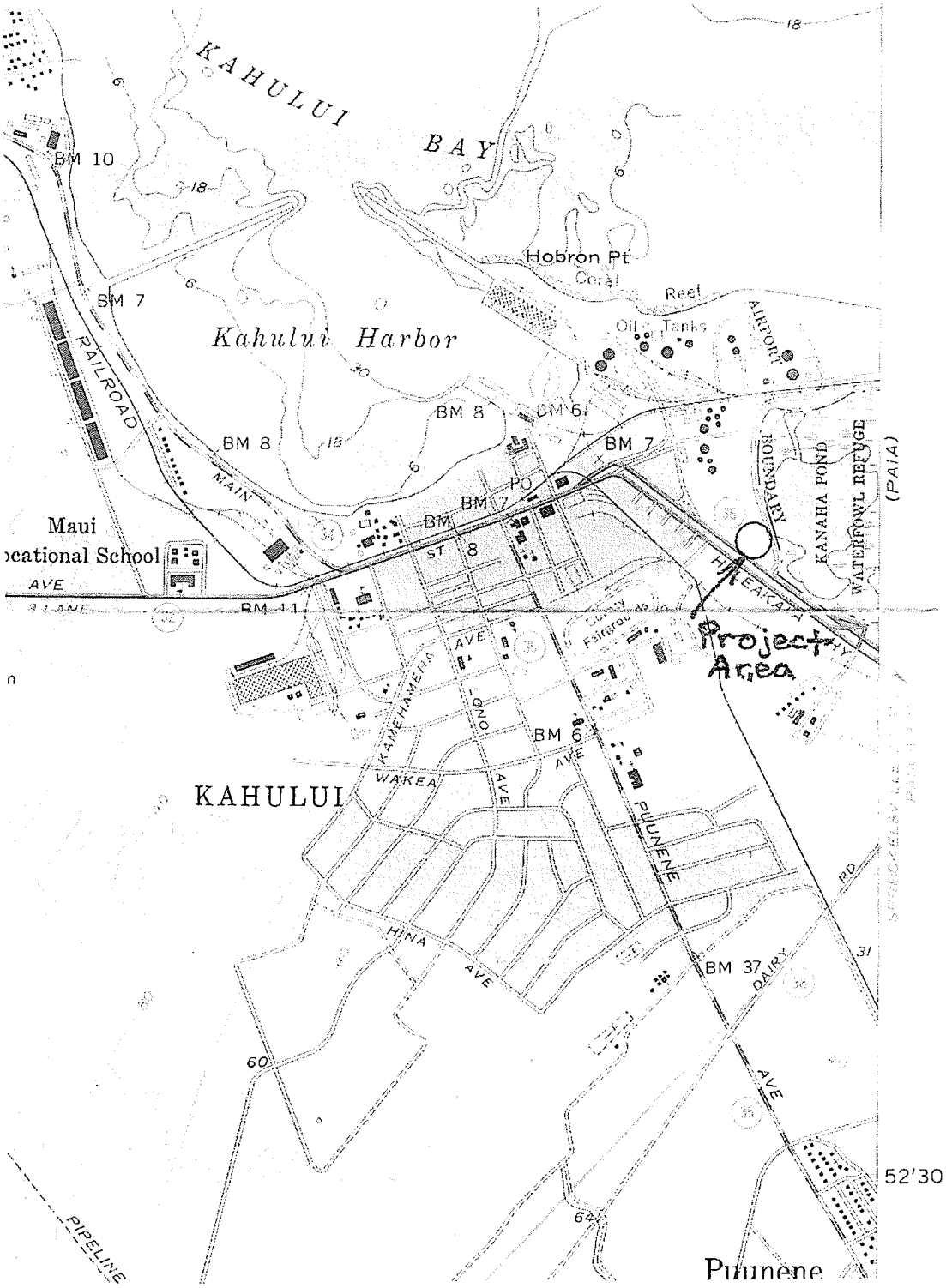


Figure 1 – USGS 1954 Wailuku Quadrant Map
Project Location – Kanahā, Kahului, Maui.

Figure 2 – Site Location – TMK (2) 3-7-011:028

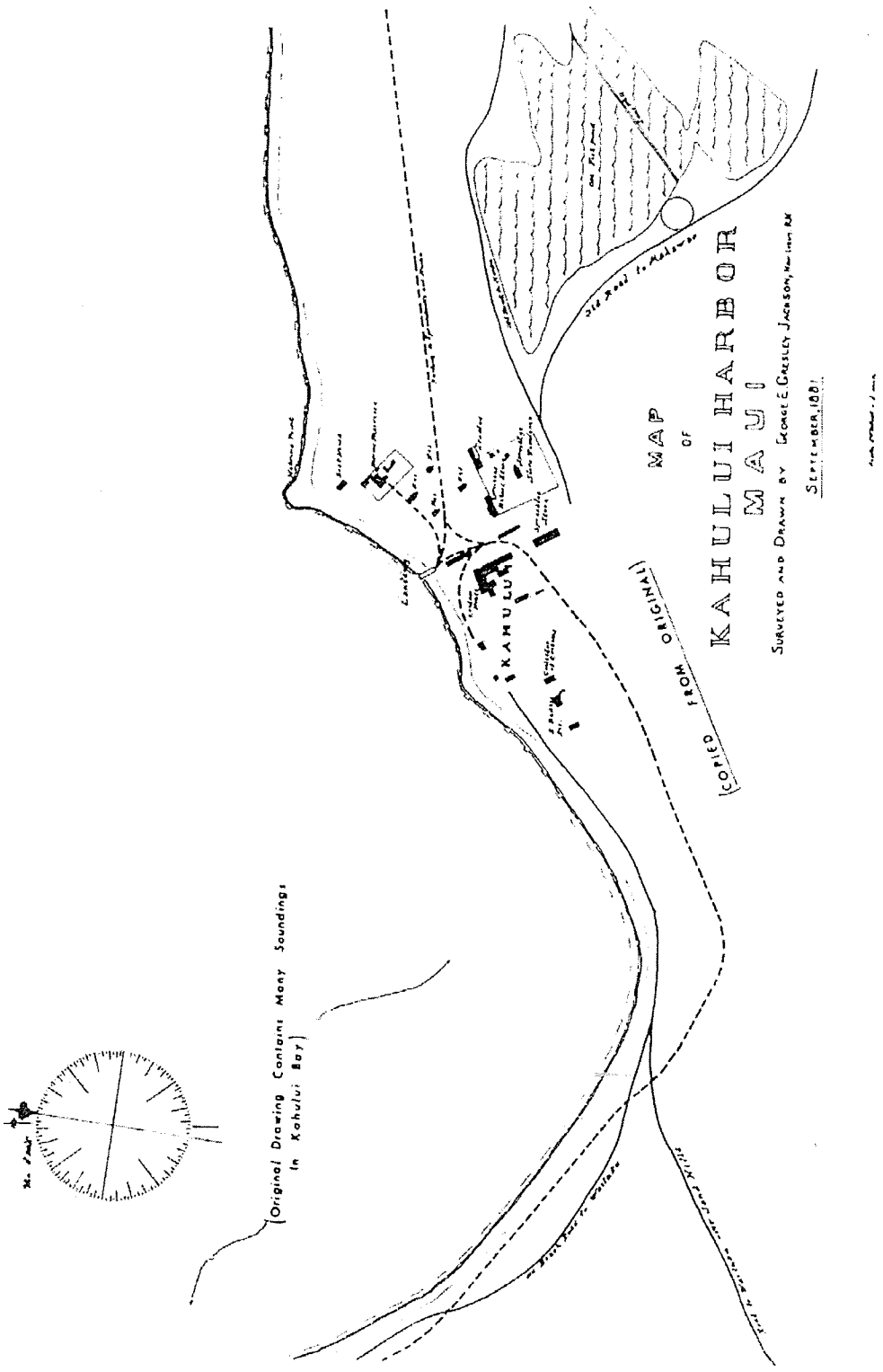


Figure 3 – Location of Kanahā – Mau'oni Pond relative to Kahului, in 1881.
Red circle = Project Location

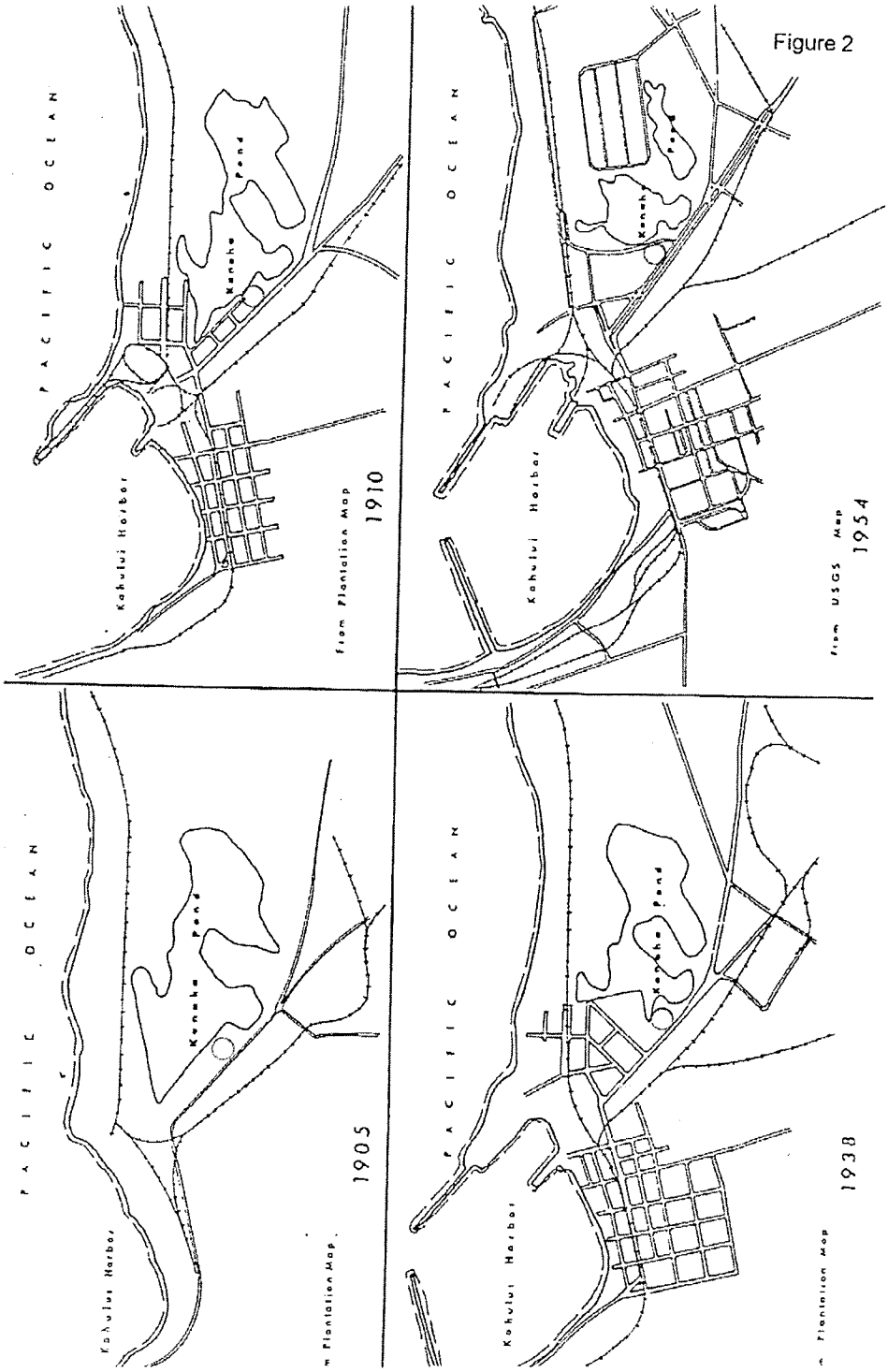


Figure 4 – Kahului and Kanahā Pond in 1905, 1910, 1938 & 1954.
Red circles = Project location

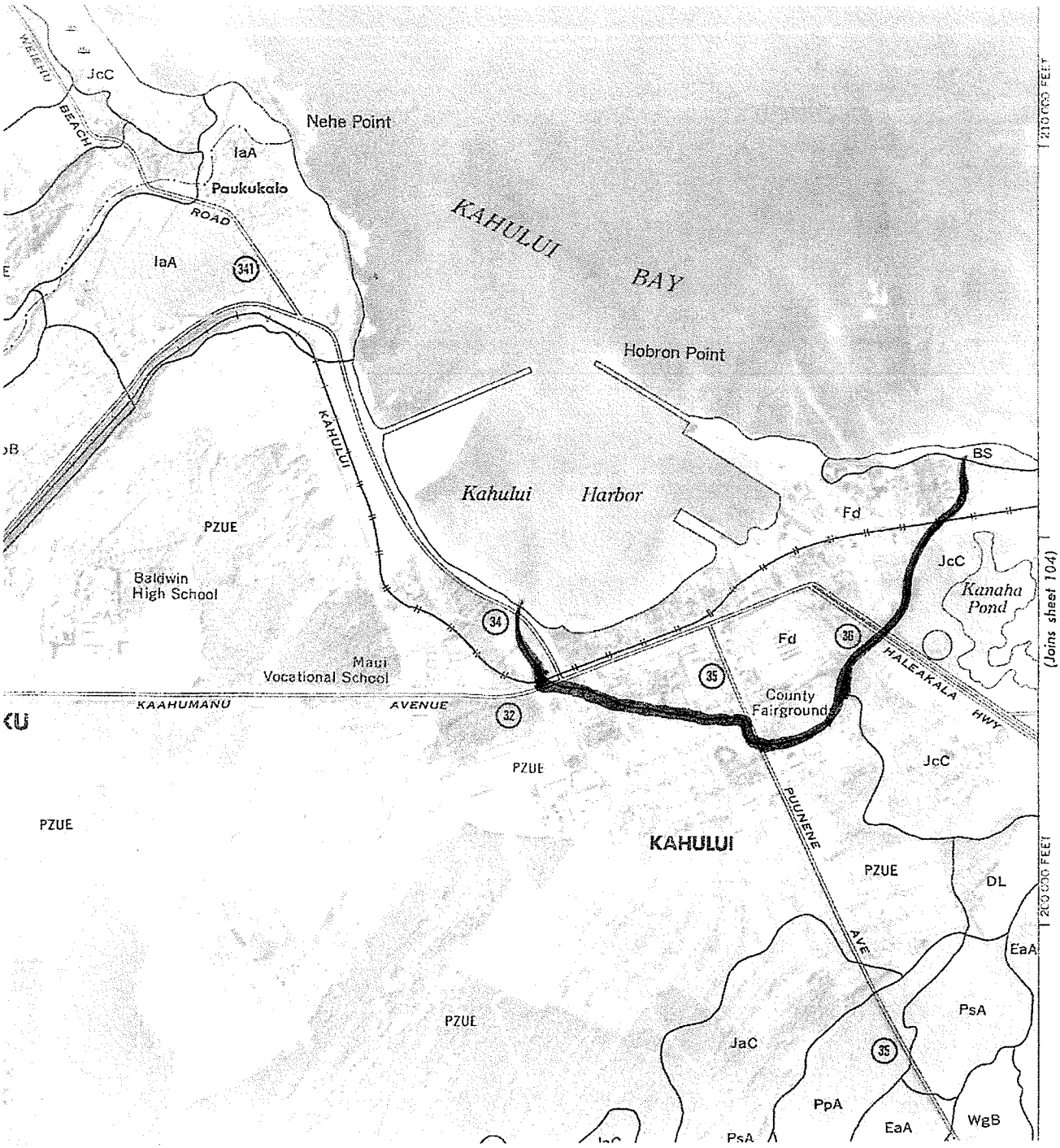


Figure 5 –
Soil survey of Islands of Kaua'i, O'ahu, Maui, Moloka'i and Lana'i,
State of Hawai'i (1952).
Extent of Fill Deposition from the Dredging of Kahului Harbor, 1910.
Red circle = Project location

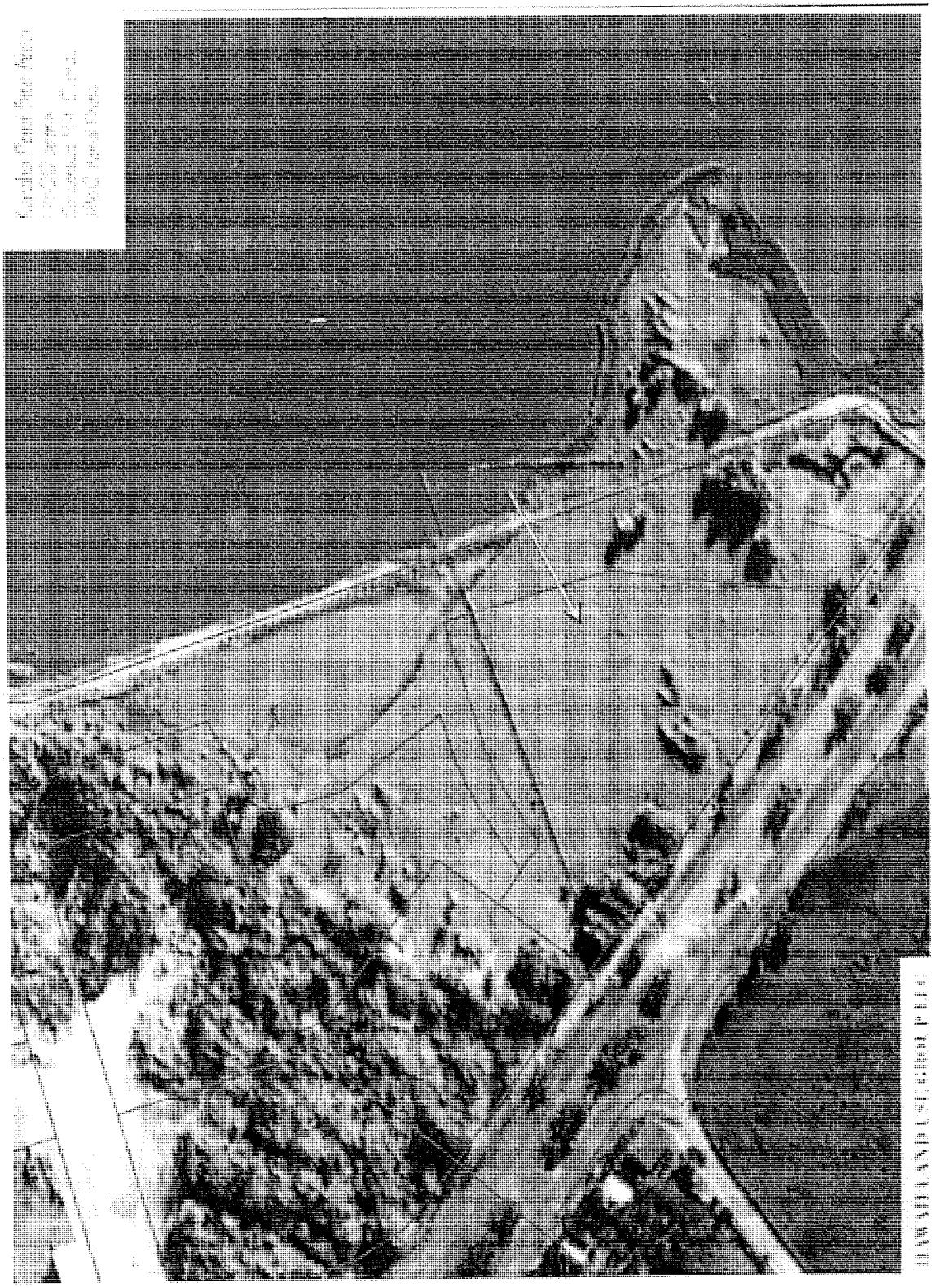

Figure 6 – Property prior to drainage canal construction. Vegetation consists of grasses and a few trees. No standing water.

Figure 7 – Property after construction of drainage canal. Grass being taken over by Pluchea indica shrubs.

Figure 8 – Current situation. Area completely taken over by Pluchea indica.

# APPENDIX D.

# Archaeological Assessment Survey

# AN ARCHAEOLOGICAL ASSESSMENT SURVEY FOR LOT 8, KANAHA INDUSTRIAL SUBDIVISION II, LOCATED ON A C. 2.5 ACRE PORTION OF LAND IN WAILUKU *AHUPUA`A*, WAILUKU DISTRICT, MAUI ISLAND

**(TMK: ([2] 3-7-11: 028)**

**Prepared on behalf of:**

**Mr. Benjamin Brown, Principal**
**Kanaha Professional Plaza, LLC**
**Wailuku, Maui**

**Prepared by:**

**Xamanek Researches, LLC**
**Pukalani, Maui**
**Erik M. Fredericksen**

*8 May 2007*
*(Revised 14 June 2008)*

## ABSTRACT

Xamanek Researches, LLC conducted an archaeological assessment survey of Lot 8, Kanaha Industrial Subdivision II, a c. 2.5 acre portion of land in Kahului, Wailuku Commons, Maui during December of 2006 (TMK [2] 3-7-11: 028). The study area is located on a portion of land that is adjacent to Kanaha Pond in Wailuku *Ahupua`a*, Wailuku District, Maui. The subject parcel is a portion of a large central Maui land grant—Grant 3343 to Claus Spreckels. This survey was conducted on behalf of Mr. Benjamin Brown, Principal, Kanaha Professional Plaza, LLC. Project plans call for the construction of a c. six story medical facility that will be leased to medical professionals, along with other on-site improvements, including a parking structure.

This archaeological study utilized a 100% pedestrian surface survey, 10 backhoe trenches, 2 shovel test units, and monitored results of soil testing that occurred on the parcel to assess subsurface conditions. Mechanically excavated soil was spot-checked with 1/8$^{th}$ inch wire mesh. All manually excavated soil was screened with 1/8$^{th}$ inch hardware cloth. All backhoe trenches were terminated in the water table and none of them exceeded 1 m in depth. There were no significant material culture remains located during the walk-over or subsurface testing. No further archaeological work is recommended for this parcel of land in Kahului, Maui at this time. However, precautionary monitoring is recommended, depending upon final construction plans.

# TABLE OF CONTENTS





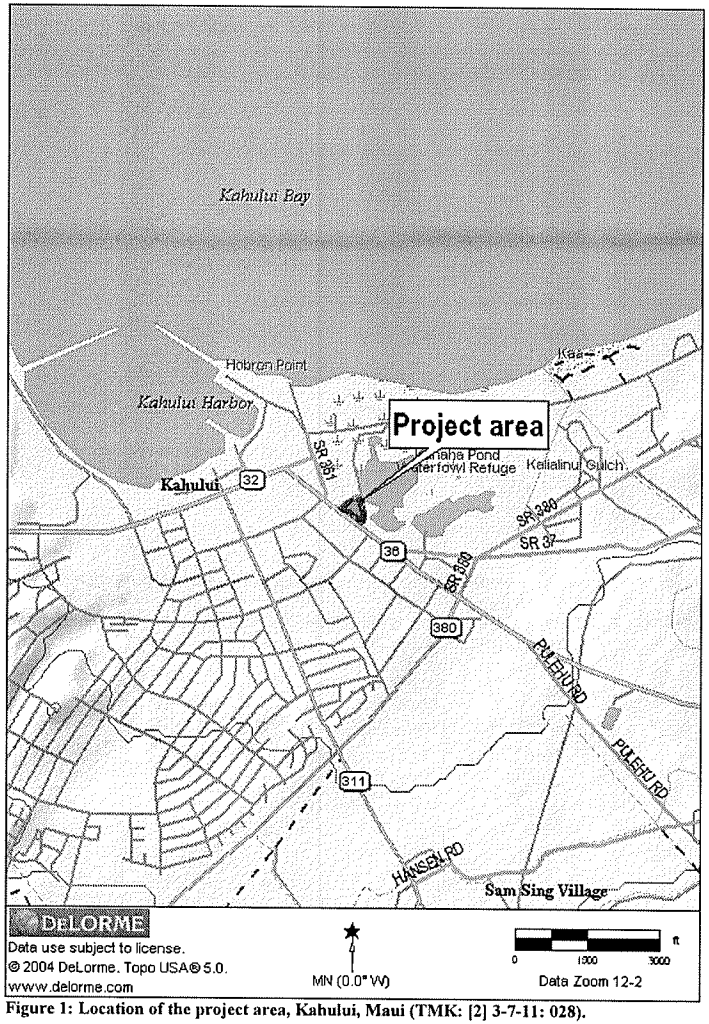


**Figure 1: Location of the project area, Kahului, Maui (TMK: [2] 3-7-11: 028).**

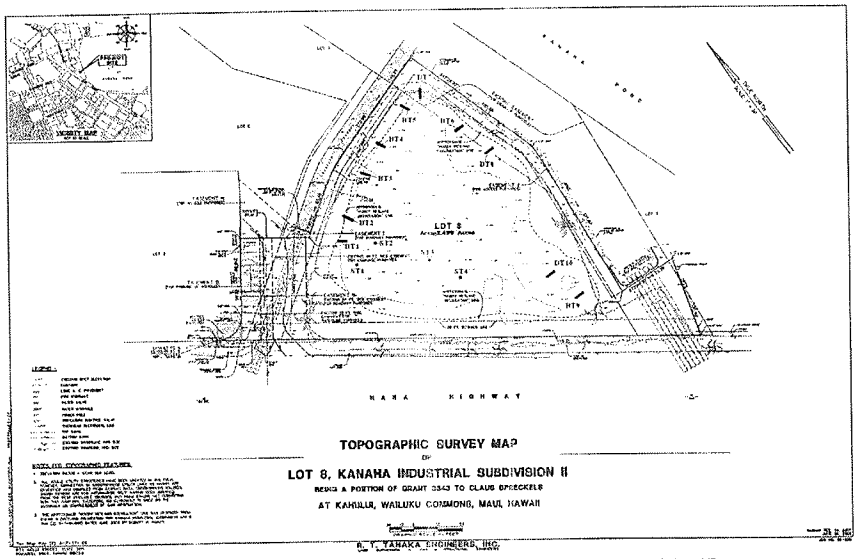


Figure 2: Topographic map of Lot 8, Kanaha Industrial Subdivision II, including locations of BT 1 – BT 10, and ST 1 – ST 4.



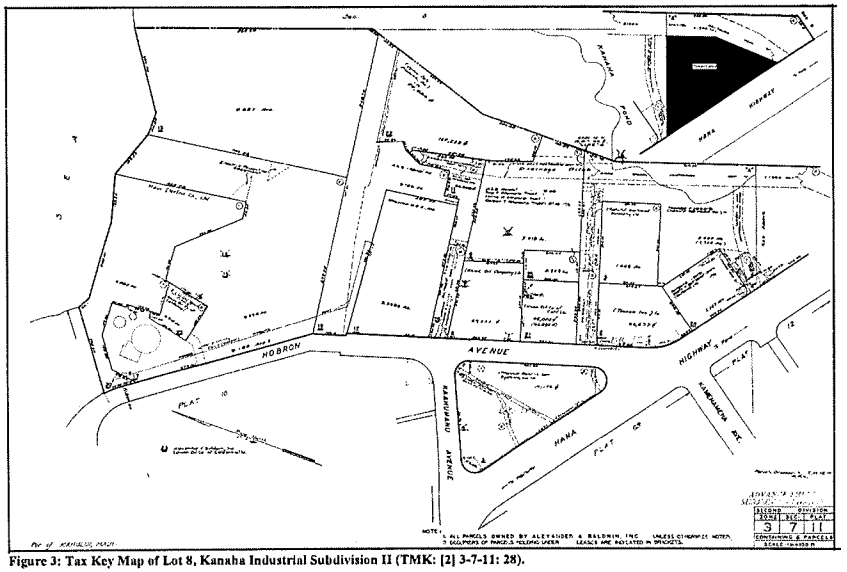


Figure 3: Tax Key Map of Lot 8, Kanaha Industrial Subdivision II (TMK: [2] 3-7-11: 28).

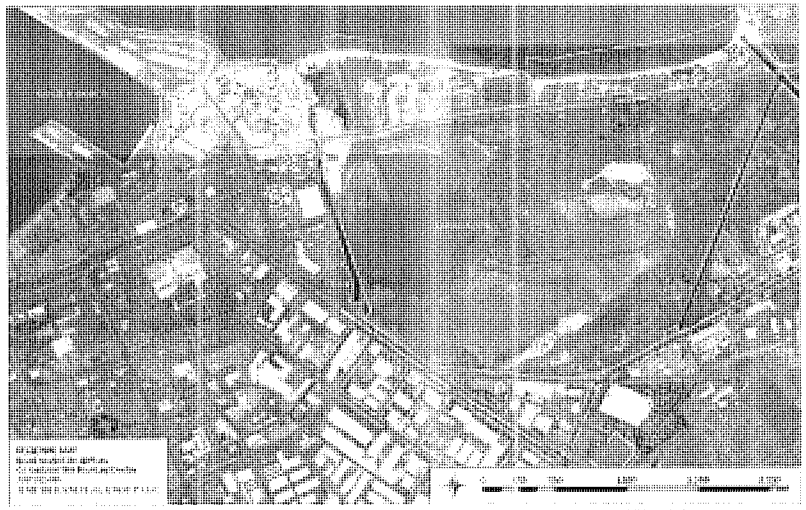

**Figure 4: Overall plan view of project area (Lot 8) in relationship to Kanaha Pond and the general Kahului area. Note WWII era modifications to Kanaha Pond in upper center right of aerial photograph, along with 1970s flood control drainage canal to the right of Lot 8, and additional canal at right in photograph.**



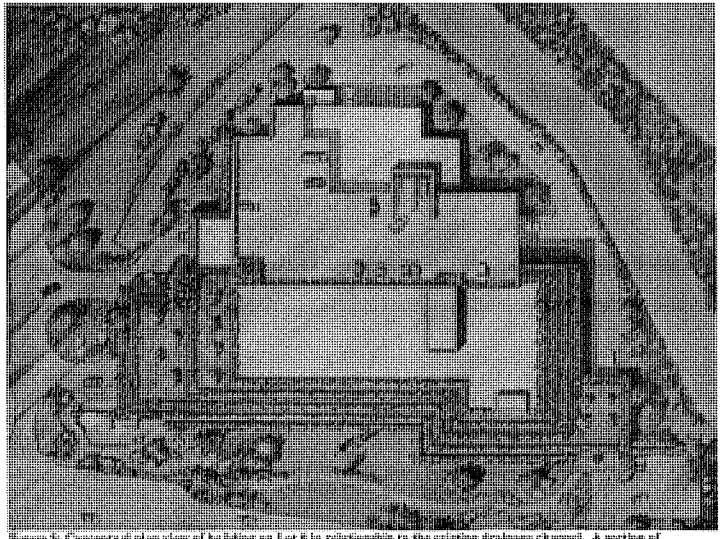

**Figure 5: Conceptual plan view of building on Lot 8 in relationship to the existing drainage channel. A section of Kanaha Pond is visible in the upper right of this figure, and Hana Highway is at the bottom of the figure.**

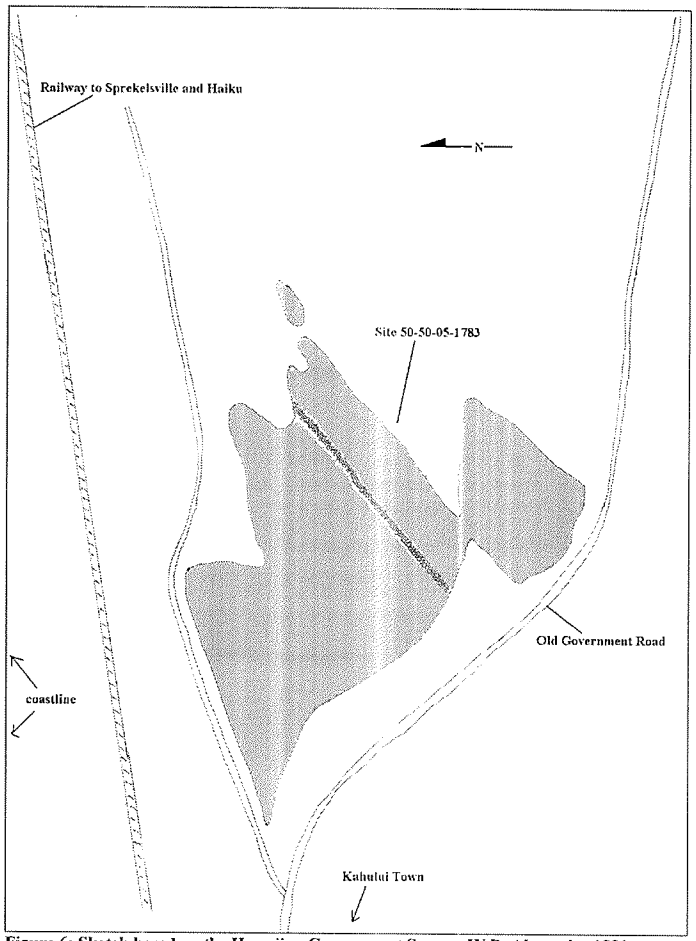


**Figure 6: Sketch based on the Hawaiian Government Survey, W.D. Alexander 1881 map (map provided by Mr. Les Kuloloio), emphasizing the rock wall that separates Kanaha Pond from Mau`oni Pond at center right in the sketch.**



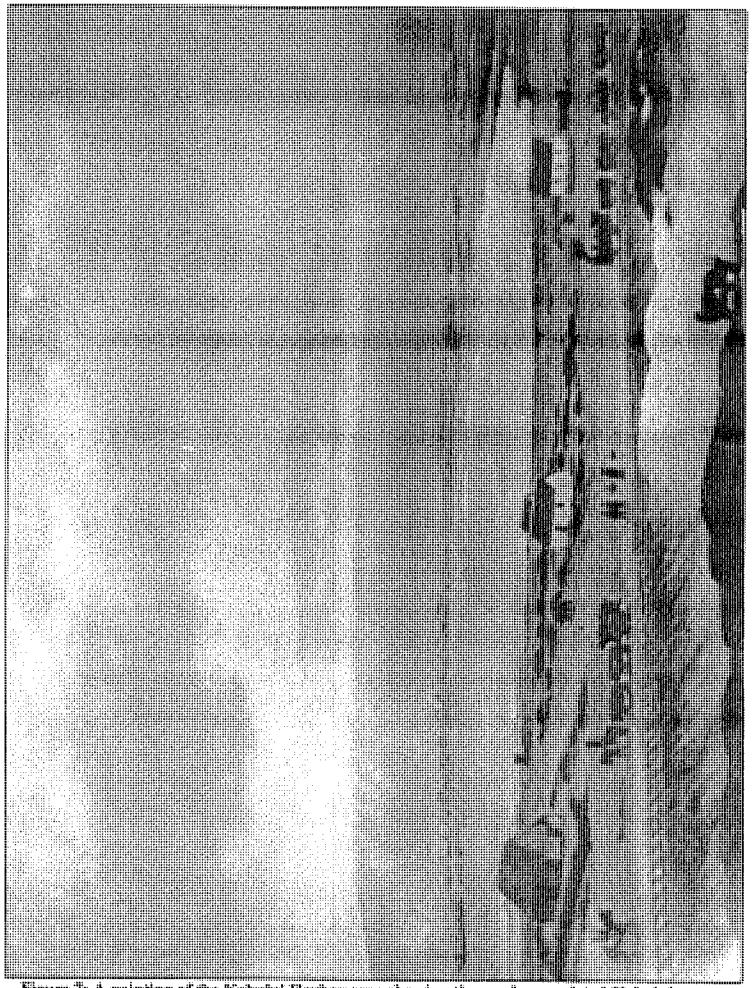

**Figure 7: A painting of the Kahului Harbor area showing the newly completed Kahului Railroad as well as old houses possibly associated with Land Commission Awards in the general area (i.e. near Keopuolani Park).**

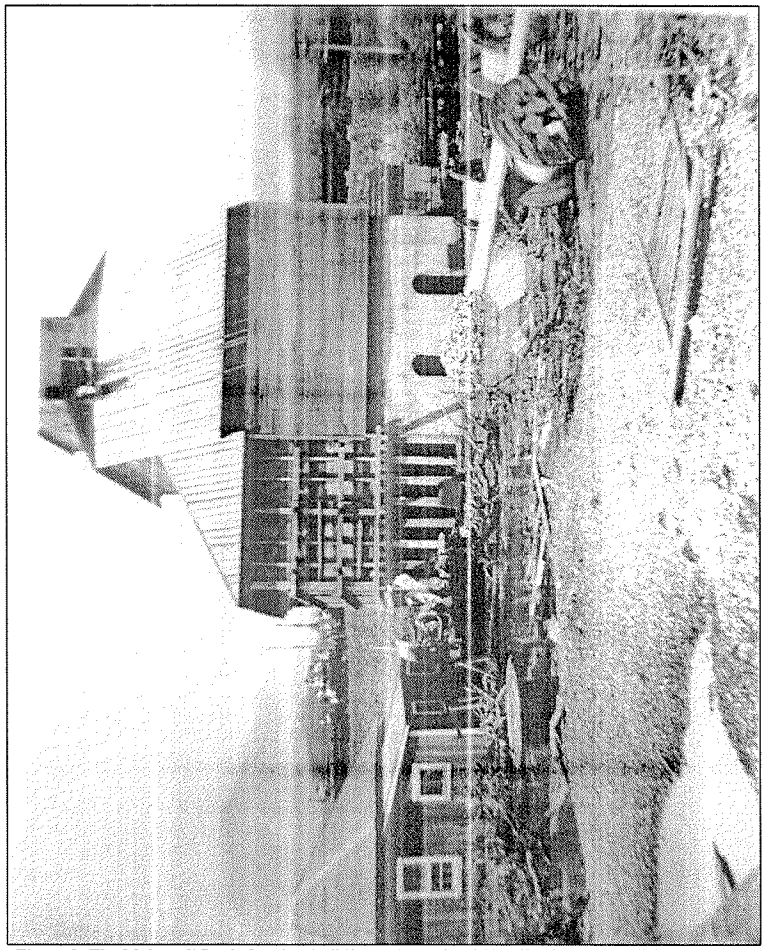

**Figure 8: The Makaweli Rock Crusher building—shown in 1941, following the April 1 tsunami of that year.**



# INTRODUCTION

Xamanek Researches, LLC was contacted by a representative of Kanaha Professional Plaza, LLC in the summer of 2006 about conducting an inventory survey on a parcel of land in Kahului, Maui. Project plans called for the development of a multi-story medical building that would be leased to medical professionals (see Figure 5). The proposed project area consisted of Lot 8, Kanaha Industrial Subdivision II, a c. 2.5 acre portion of land in Kahului, Wailuku Commons, Maui (TMK [2] 3-7-11: 028). The study area is located in Wailuku *Ahupua'a*, Wailuku District, Maui. The c. 2.5 acre parcel is a portion of a large central Maui land grant—Grant 3343 to Claus Spreckels. The State Historic Preservation Division (SHPD) was contacted and subsequently indicated that an archaeological inventory/assessment survey was needed for this project, because of its location. We submitted a proposal and we were subsequently contracted to carry out the inventory/assessment survey on behalf of Mr. Benjamin Brown, Principal, Kanaha Professional Plaza, LLC.

We were given the notice to proceed in the fall of 2006 and fieldwork was carried out in late December of the same year. The following report presents the results of this survey, which under the revised SHPD rules is an archaeological assessment.

# STUDY AREA

As previously noted, the project area consists of Lot 8, Kanaha Industrial Subdivision II, which is located in Kahului, Maui. The c. 2.5 acre parcel is bordered along its eastern side by a c. 50 ft (15 m) wide drainage canal/levee (Lot 7), which separates the study area from the Kanaha Pond Wildlife Sanctuary. A portion of the Lot 8 northern boundary is defined by a 20 ft (6 m) wide drainage canal/levee, while a portion of a previously developed parcel bounds the lot on its northwestern side. Finally, Hana Highway borders the property along its southern side.

The c. 2.5 acre parcel is essentially level. As noted above, it is located near, but separate from, a large wetland area. Project elevations range from c. 3 ft AMSL in the central portion of the parcel to c. 5 ft AMSL along the levees and to a bit over 6 ft AMSL along portions of Hana

Highway. The project area is located within a larger parcel of land in Kahului, Wailuku Commons, Maui (TMK [2] 3-7-11: 028). The project area lies an estimated 1 km inland from the Kahului coastline.

This windward portion of Maui is typical of much of the low lying near coastal inland Kahului region, with soil components consisting of Jaucus Sand, Saline, 0-12% (JcC) (Foote et al., 1972). This soil type is encountered near the ocean where ground water is near the surface and where salts have accumulated over time. These soils are subject to inundation after periods of heavy precipitation. Annual precipitation in this windward area ranges from c. 20-30 inches, with the majority of rainfall occurring between November and March (Juvic and Juvic, 1998).

A recent biological resources survey of Lot 8 was carried out by Robert Hobdy in 2006. In his report, Hobdy notes that the parcel is heavily overgrown. Noted species include the non-native shrub sourbush (Plucea indica), seashore saltgrass (Distichlis spicata), and a few scattered trees such as *kiawe* (Prosopis pallida), and date palm (Phoenix x dactylifera).

# BACKGROUND RESEARCH

## Precontact Period

The *ahupua'a* of Wailuku is a large land unit stretching around Kahului Bay from Paukukalo to Kapukaulua. It includes Iao Valley and the northern half of the Kahului Isthmus. This single land division comprises nearly half of the District of Wailuku, and is noted as a place where chiefs were buried and wars were fought. The word itself can be translated as "water of destruction" (Pukui, et. al., 1974, p. 225), and this name is in reference to the battles that took place in the area.

Iao Valley and the two associated dune formations on the north and south sides of the river, constituted the core area of Wailuku. This was the religious and political center of Maui, which culminated during the time of Pi`ilani (c. 1600 AD). In the late precontact period, warfare increased as the chiefs from Maui, Oahu and Hawaii struggled for political and military dominance. High Chief Pi`ilani succeeded in unifying the districts of Maui by warfare, but after his death, his sons fought with one another--each hoping to succeed their father as high chief. Eventually Kiha-a-Pi`ilani became victorious, but each following generation of chiefs had to struggle through warfare to secure their positions of political domination (Speakman, 1978, pp. 9-13).

During the reign of the last powerful paramount chief or king, Kahekili (who ruled from 1765 to 1790), Wailuku again became the site of intense warfare. Wailuku was considered to be



the capital of Maui, as Kahekili's royal residence, Kalanihale, was located in there, surrounded by his retinue.[1] In the mid-1770s, Kalanihale was marched upon by a Big Island chief named Kalani`opu`u and his *alapa* (the name given to his warriors). News of his coming preceded him, and Kahekili hid his warriors in the sand dunes above Haleki`i *heiau* to surprise the invading troops. A fierce battle ensued, and Kalani`opu`u's army was pushed to the sea and slaughtered (Speakman, pp. 16-17).

By 1786, Kahekili controlled Maui, Molokai, Lanai, and Oahu. This undisputed political control lasted for only 4 years, however. In 1790, Kamehameha the First invaded Kahekili's territory—an action that ended in the battle of Kepaniwai[2] and the defeat of the Maui ruler. The word Kahului can be translated as "the winning", and the Bay takes this name because Kamehameha gathered his warriors there prior to fighting the battle in Iao Valley (Pukui, et. al., 1974).

### Kanaha Pond and Mau`oni Pond

These two ponds have been designated SIHP No. 50-50-05-1783. While Mau`oni Pond is shown on the 1881 Alexander map in this report, a later 1922 USGS map does not show this pond, indicating that it was apparently filled at some point during the c. 40 year period between these two maps. Modern maps only depict the c. 37 acre Kanaha Pond, which is just to the east of the Lot 8 project area. To date, there have not been any archaeological investigations conducted on either of these ponds. These ponds were built in a natural wetland that was located in this area.

Kanaha Pond and Mau`oni Pond have been mentioned by Samuel Kamakau (1961). He related that Maui high chief Kiha-a-Pi`ilani was involved in the initial construction of a rock wall that divided these two ponds. Fornander (in Walker, 1931) has suggested that Kiha-a-Pi`ilani lived in the mid-1500s, which potentially dates modification to this area to the mid-16th century. The two ponds are also associated with an early 18th century Oahu high chief, Ka-pi`i-oho-o-ka-lani who ordered construction at the ponds, naming them for his son, Kanaha-o-ka-lani, and his daughter, Kahama-lui-hi`i-ke-ao-ihi-lani[3] (from notes by Catherine Summers, quoted in Kikuchi, 1973).

The 1881 Alexander map contained in this report depicts the wall that divided these two ponds (see Figure 6). A narrow extension of the pond on its northwestern corner was said to have connected to the ocean near an old landing to the west of the present Pier 1 in Kahului Harbor. The pond area was again impacted by human activity in c. 1910 when Kahului Harbor was first dredged.

The dredging of the harbor generated substantial quantities of coral and sand. Much of this material was spread out along the shoreline from near the intersection of Ka`ahumanu Avenue and

[1] The location is said to be located just north of the intersection of High Street and Main Street leading into Iao Valley in Wailuku town.
[2] Kepaniwai means literally "water dam" in reference to Iao Stream, because the stream was choked with human bodies after the slaughter there (Pukui, et. al., 1974, p. 109).
[3] Kahama-lui-hi`i-ke-ao-ihi-lani was also known by the name Mau`oni.

Kahului Beach Road and eastward toward Hobron Point. In addition, we have located fill associated with this time period near Maui Community College, the hospital, under sections of various roads, including Mahalani Street, Lower Main Street, and even in some unpaved access roads in the Central Maui area. The deposition of this fill in some near shore areas added several feet to the former ground surface (Foote et al., 1972).

Robert Hobdy (2006) carried out a Biological Resources survey of the subject parcel in 2006. In his study he notes that Lot 8 does not appear to have been filled or included within the permanently inundated portion of Kanaha Pond since 1881. The subject parcel does however contain some wetland (Ibid.).

The next era of impact to the study area occurred in the late 1970s when the U.S. Army Corps of Engineers approved a flood control project.[4] This project created a network of drainage canals that served to channel groundwater out of the developing Kahului Industrial Area and to the ocean. Some of this drainage network was constructed alongside Lot 8, further separating the subject parcel from Kahana Pond. The construction of the drainage canals adjacent to the study area created levees/berms that are still present today (see Figure 4). In addition, an access road to service the drainage canal on the northern side of the parcel is built on a berm that is composed of dredged material associated with the above flood control project.

**Early Post-Contact Period**

The reign of Kamehameha was intertwined with the increasing presence of foreigners (*haoles*) in the Hawaiian Islands. The arrival of Captain Cook offshore at Kahului Bay in 1778 began the steady flow of outside influences that would forever alter the indigenous population and environment. One of the first of these influences came with missionaries, whose charge it was to save heathen souls. The first missionaries arrived in Wailuku in 1832, and the traditional religion began to wane under their influence. Rev. Jonathan Green established a girls' seminary (Central Female Boarding School) in 1836, where young Hawaiian women were taught the language, customs and religion of the foreigners.

Another influence to bring change to the Hawaiians was foreign commercialism, and it came initially in the form of sugar production. The first sugarcane crops grown in the *ahupua`a* were harvested and processed in 1828. Kamehameha III, with the help of two Chinese technicians, established a water-powered mill in Wailuku. This was known as Hungtai Sugar Works, and its location was fairly close to the later location of the Wailuku Sugar Mill, which was established in 1862. Hungtai Sugar Works continued to operate until the opening of the new mill.

The population of the *ahupua'a* of Wailuku was listed in the 1831-32 census as 2,256, with most of it being in the northern portion, presumably in Iao Valley (Cordy, 1978, p. 59).

In Central Maui, on the southern and eastern side of the Iao Valley dunes (Pu`uone Dunes), an early commercial activity took the form of cattle ranching. This sizable area was used for pasturage. By as early as 1845, large herds of cattle were roaming the Kahului Isthmus (cattle had

[4] Another Army Corps of Engineers flood control project also impacted Iao Stream and its flood plain in the late 1970s.



been introduced on the Big Island by Vancouver in 1793). The Maui cattle were under royal *kapu*, so were not to be molested. They were so destructive to the environment that Native Hawaiian landowners protested, but to no avail (Barrere, 1975, p. 52). In addition to the commercial raising of cattle, there were also other commercial efforts, one being a brief attempt at the production of cotton in the 1830s. This endeavor met with little commercial success however[5], and further adversely impacted the landscape.

**Post-1850s Period**

After the Mahele in 1848, much of the *ahupua`a* of Wailuku was designated as Crown Land, to be used in support of the royal "state and dignity". In 1872, Kamehameha V died, and his sister Princess Ruth Ke`elikolani inherited the land. She was designated as the owner of the *Ka`a* lands of Wailuku, the southern portion of the *ahupua`a*. The *ili* of *Owa* comprised of 743.40 acres, (LCA 420) was granted to Kuihelani, a steward to Kamehameha I. The much smaller northern section (the *ili* of *Kalua*-LCA 7713, Apana 23--391 acres) was awarded to Princess Ruth's half-sister, Victoria Kamamalu. In 1882, Princess Ruth sold one-half of the Crown Lands of Hawaii to sugar producer, Claus Spreckels, in order to settle her debts with him. Spreckels already held a lease for 16,000 acres of Wailuku *ahupua`a*, dating from 1878. Worried about what Spreckels might do with half of the Crown Lands, King Kalakaua gave him Land Grant 3343, a 24,000 acre portion of the southeastern section of Wailuku ahupua`*a*, in return for the surrender of his claim (Adler, 1966, pp. 262-263).

The Reciprocity Treaty of 1876 with the United States gave a boost to the sugar industry by increasing the prices of sugar. The dry eastern part of the *ahupua`a* became attractive as potential sugar land—if only water could be brought to it. In 1880, Spreckels began construction of what was called "Spreckels' Ditch", located *makai* of the Hamakua Ditch, which had been built earlier by Alexander and Baldwin to water their Maui Agricultural Company's fields in and around Pa`ia. The "Spreckels' Ditch" brought Haleakala water farther west onto the arid Kahului isthmus. The ditch was 30 miles long, delivered about 60 million gallons of water a day, and cost $500,000 to construct.

Spreckels also built another ditch, the Waihe`e ditch in 1882, which tapped the water resources from the West Maui Mountains, thus bringing water to both sides of the Wailuku Commons isthmus area (Adler, 1966, pp. 48-49). These endeavors enabled him, in 1882, to found Hawaiian Commercial and Sugar Company. He continued involvement in that company until 1898, when control was wrested from his hands. The parent company still bears the name of Alexander and Baldwin, the principal participants in the transfer of corporate control. The

[5] The Anglican Church felt that "the Hawaiian people, freed from their service to and dependence on the chiefs should be self-supporting and thought that the encouragement of the manufacture of cloth from the superior cotton which grew luxuriantly in the islands would be a means to that end. They therefore suggested that a manufacturer be sent with sufficient machinery to get the project started. They felt that the people would continue to work with the encouragement and cooperation of the chiefs." (Lemmon et. al., 1973, p. 2.B.3). To this end they sent Miss Lydia Brown in 1835 with " 'a quantity of domestic spinning apparatus' (presumably spinning wheels and a loom)" (Ibid.), and "charged with the responsibility of teaching the Hawaiian girls the arts of carding, spinning, weaving and knitting locally grown cotton and wool." (Ibid.) As each class grew proficient enough to teach others, a new class was formed (Ibid., 2.B.4).

production of sugar cane continues to be an activity in the isthmus area to this day, although some portions operated by C. Brewer and Company have shifted to pineapple production.

The environmental conditions during precontact times in lower Iao Valley, which lies well to the WNW of the project area, were ideal for agricultural production necessary to support a large population. The wide valley floor, rich alluvial soils, and a constant water supply from Iao Stream in combination provided Native Hawaiians with an abundance of food. These combined with the access to the Kahului Harbor area, rich in marine resources, made this general area the prime precontact location on West Maui for a political and religious center. The lower portion of Iao Valley contained some of the most productive taro land on the island, and the abundance of Land Commission Awards in the lower valley attest to this. There are 66 LCA's, primarily taro patch *kuleana*, and 39 *po`alima* located between the old Wailuku Mill site and Paukukalo, on the southern side of Iao stream. In addition, Kamehameha IV granted 13 awards directly to individual chiefs.

The above land use pattern is in contrast to the area south and east of Lower Iao Valley, in which the study parcel is located. Here there were only two LCAs awarded—one to Victoria Kamamalu (7713), and one to Kuihelani (420). The largest land partition of Central Maui area is Grant 3343 to Claus Spreckels. The subject parcel is a portion of the large Grant 3343 to Spreckels.

Lower Main Street was built along the route of an old government road, which very likely followed the course of traditional transportation routes from the ocean to the inland portions of Iao Valley. Many of the LCAs in this area have borders aligned with the road, indicating it was an important transportation corridor at the time the *kuleana* were granted. This corridor follows the natural boundary between the sand dune and the alluvial deposits of the valley. The Kahului Railroad paralleled Lower Main Street, and was one of the earliest known commercial projects that impacted the dune itself.

The route of the railroad ran from Kahului Harbor to Wailuku Sugar Mill (see Figure 7). The remnants of this old railroad bed can still be noted in a few places along Lower Main, and along Kahului Beach Road. The most striking architectural remnants of the railway system located along Kahului Beach Road are the 5 concrete pillars and arches, the most visible *makai* one impressed with the date "1921". In the past, a large wooden frame building rested on these pillars, serving as the housing for the Makaweli Rock Crusher apparatus (see Figure 8). It was constructed so the train carrying rock from the quarry could off-load from the track-bed into the crusher. The concrete pilings elevated the crusher adequately above ground so trucks could be driven in and filled with crushed rock. This series of pillars (that was the footings for the Makaweli Rock Crusher Mill) still stands near the intersection of Kanaloa Avenue and Kahului Beach Road.

Railroad construction was begun in the late 1870s (Figure 7)[6] and continued for nearly 2 decades, as routes were added and service expanded. The Maui News contains articles dealing with activities in the general vicinity of the project area. One dated February 8, 1902, describes a problem and potential solution resulting from the railroad:

[6] This painting by Rev. Bailey shows several structures, which may be houses associated with two LCAs near the intersection of Kanaloa Avenue and Kahului Beach Road to the northwest of the project area.



*"Superintendent R.W. Fuller of the Kahului Railroad Company is preparing to make some important changes in the line of railroad track between Kahului and Wailuku.*
*At present the sharp turn and the railroad crossing at the beach is extremely dangerous on account of the sand dunes that shut out the approaching trains from the view of those approaching the crossing with teams, especially the wind is blowing a gale.*

*The track will be moved some hundreds of feet south of its present location, so that the point where it crosses the road as well as the approaching trains themselves can be seen for quite a distance. On crossing the road, the track will skirt the pasture at greater distance from the public road."*

On June 8, 1907, another reference describes plans improving the land for further residential use in the future:

*"The Kahului Railroad Company is filling in the lowlands, in and about Kahului and will in time raise the level of the entire town site, when the work is completed and proper drains provided, the town should be free of mosquitos and the place a most desirable locality in which to live."*

The Kahului Railroad continued operations until after World War II. Then demands slowly began to change, and segments of the system were phased out over the next two decades. An article contained in an article of **The Maui News** on 15 October 1957 bore the headline "Iron Horses Bow Out As Wailuku Sugar Company Discontinues Use of Railroad". The railroad continued to serve other areas until 1966, when it ceased operation.

## PREVIOUS ARCHAEOLOGICAL WORK

### Iao Valley/Pu`uone Dunes Area

The earliest archaeological work in the Wailuku area was part of the island-wide survey done by Winslow Walker in 1931. He reported that there were a number of *heiau* in the general area of Wailuku. Two of these religious structures lie on the northern side of Iao Stream atop the large dune formation there—Pihana and Haleki'i *heiau*. Both *heiau* have been restored and are designated as the Halekii-Pihana Heiau State Monument, which is under the supervision of the Division of State Parks (DLNR). Walker also reported that there were a number of other *heiau* in this area of Wailuku, which were said to have been consecrated by Liholiho during his visit to

Maui for that purpose in 1801 (Walker, 1931, pp. 146-147). At the time of his survey, none of these reported *heiau* (named Keahuku, Olokua, Olopio, Malena, Pohakuokahi, Lelemako, Kawelowelo, Kaulupala, Palamaihiki, and Oloolokalani) could be found (Ibid., p. 148).

A personal communication (1992) from Mr. Charles Keau, a well-respected authority on history and prehistory of Maui, provided more information about some of these *heiau*, which Walker could not find. By Mr. Keau's account, there were three *heiau* located in the Lower Main Street corridor from Kahului Harbor to the intersection of Lower Main and Mill Streets. One was situated across the street from the Maui Soda Company. Another was located on parcel 83 (TMK: 3-4-39) between the Maui Electric Power Station and the County of Maui Wailuku Government cemetery. A third may have been located near the Home Maid Bakery. During the construction of the parking lot next to the bakery, Mr. Keau reported that Wesley Wong, a well-known local antiquity collector, found five adzes of "Tahitian" style. He did not specify when this was, but thought there might still be portions of the *heiau* there as well as some burials. Recent archaeological work has corroborated at least the latter part of this prediction.

## Nisei Veterans Memorial Center and Kanaloa Avenue Projects

The closest archaeological findings of note to the northwest of the present project area, occur near the intersection of Kanaloa Avenue and Kahului Beach Road. Both projects areas contain extensive precontact habitation areas with associated human burials. Each of these is briefly discussed below.

### Nisei Veterans Memorial Center Project

The Nisei Memorial project has been underway since c. 1992, as this site has proven to be one of the more significant sites studied on the northern Maui coastline.

In February of 1992, Xamanek Researches initiated an inventory survey on this c. 2-acre parcel of land near the intersection of Lower Main and Wai'ehu Beach Road (Fredcricksen and Fredericksen, December 1992). The most notable feature surface feature located at this time consisted of a portion of the former Kahului Railroad bed that ran the length of the property (Site 3112). Another historic site (Site 3119A) was a refuse disposal area about 20 cm. below the existing surface. The predominant historic items were composed of bottles and ceramics dating from the late 1800s, about the time the railroad was built and in use. An exploratory excavation that cut through the historic site, located a subsurface precontact site that was initially designated as Site 3119B. Later data recovery work at this site caused a revision in the site numbering system. All precontact components of the site were subsequently designated as Site 3120, while the historic components bear the Site 3119 designation.

Site 3120 became extremely interesting when a very early radiocarbon date of AD 233-410 was obtained. However, later data recovery work did not produce material of a comparable date. The deposits from which it came, turned out to have been previously disturbed by excavations done during the construction of the railroad bed, and the original source was not located.



In another area of Site 3120, test excavations produced a number of artifacts, including coral files, bone picks, an unfinished fishhook, and worked bone, along with large quantities of food midden. Data recovery research has shown Site 3120 to be a large coastal habitation site, which contains a cluster of burials. The latter remain *in situ* and will be preserved as a permanent burial/grave site. Several fire pit features were recovered and a series of 12 radiocarbon dates were obtained. They range from the very early date mentioned above (AD 233-410) to AD 1200-1740, with the majority of the precontact dates falling in a range of AD 1400 to 1700 (Fredericksen, et al., 1998).

Archaeological monitoring followed the completion of data recovery work, and a total of 38 additional burials (designated Site 4668) were located in the southwestern corner of the 2-acre parcel near the crest of the dune.[7] A radiocarbon date from charcoal recovered from a large double posthole beneath one of the burials returned a conventional radiocarbon age of 620 +/- 50, and a calibrated date range of AD 1285-1420. This extended monitoring program is nearing completion at the writing of this report. To date four *in situ* burials as well as finds of unarticulated human remains have been located at the Nisei Veterans Memorial project during the last phase of the monitoring program.

Xamanek Researches surveyed the adjacent property to the south (TMK: 3-8-07: 38) in November of 1992. Fourteen backhoe test trenches were excavated, along with 3 manual test units, in the dune areas, and relatively undisturbed portions of the parcel. The *makai* portion of the property had been impacted by the installation of a sewer line, the mid-portion by the construction of the former Kahului Railroad bed (Site 3112) and a rock crusher mill (Site 3145) [see Photographs 1 and 2]. The only cultural materials recovered were historic items, most likely associated with the railroad construction (Fredericksen and Fredericksen, November 1992).[8]

### Kanaloa Avenue AIS

Four sites were identified during a March 2005 archaeological inventory survey for the Kanaloa Avenue Improvements project (Fredericksen, March 2005).[9] Xamanek Researches[10] conducted fieldwork for this earlier survey over an extended period of time beginning in 2002 and ending in early 2005. The first of the identified sites is Site 5660, which is interpreted as a possible precontact habitation area remnant. This site was deemed significant for its information content under Criterion "d" of Federal and State historic preservation guidelines. This site is located in the COM right-of-way along Kanaloa Avenue. Site 5496, a precontact habitation area with an associated waterworn basalt pavement (Feature 1), is also deemed significant under Criterion "d" for its information content. This latter site is also considered to be culturally significant under Criterion "e" because of its association with the Site 5495 human remains. This site and Site 5495 are located in Keopuolani Park within c. 250 m southeast of the current project area. This County of Maui Park was initially known as Maui Central Park (see discussion on

[7] This portion of the property had previously been covered with bulldozed trees and construction related debris from the adjacent Sand Hills residential development.
[8] A recent find of an articulated human burial was made at an abandoned campsite on a portion of this parcel in November 2006.
[9] Kanaloa Avenue lies c. 1 lot to the south of the Nisei Veterans Memorial parcel.
[10] All of the fieldwork for this inventory survey was carried out before Xamanek Researches was converted to a Hawai'i-based Limited Liability Company in February 2005.

Central Maui Area below). The four finds of Site 5495 human remains, designated Finds 3-6 (Features A-D), are interpreted as Native Hawaiian remains that are over 50 years old. These human remains qualify for significance under Criterion "d" as well as Criterion "e" because of their cultural importance to Native Hawaiians. Sites 5471 and 5472 were tentatively interpreted as a Native Hawaiian burial and previously disturbed human remains, respectively. Both of these finds are significant under Criterion "e" as well, and were found in the COM right-of-way of Kanaloa Avenue.

**Central Maui Area**

The central area of Maui, south of Ka'ahumanu Avenue, is noted for many burials in the Pu'uone Sand Dune formation, which stretches across the isthmus. There have been a number of studies documenting these finds (Fredericksen et al., 1997; 1998; Panteleo and Sinoto, 1996; Rotonno-Hazuka, 1994).

However, in the central area to the north of Ka'ahumanu Avenue, very few sites other than scattered burials have been found. Xamanek Researches conducted studies at Maui Community College, Maui Central Parkway (Fredericksen and Fredericksen, December 1992; Fredericksen, et. al., 1994), and at the Keiki Zoo Maui (Fredericksen and Fredericksen, September 1995)--all with negative results. It is interesting to note that we did locate quantities of dredged material that originated from Kahului Harbor during our subsurface testing on the college parcel.

Archaeological Consultants of Hawaii conducted a survey for the Maui Arts and Cultural Center, again without significant findings (Kennedy, 1990). Cultural Surveys Hawaii, Inc conducted an inventory survey for the 110-acre Maui Central Park area (now Keopuolani Park). A large intact dune was contained in the bulk of the park. There were no indigenous cultural sites located during the Cultural Surveys Hawaii inventory survey. However, scattered human remains (Site 50-50-04-4211) were previously identified on the surface near the Maui Arts and Cultural Center, during an earlier botanical survey conducted by Xamanek Researches in 1996. Subsequent archaeological work at the inventory level indicated that no additional human remains were present, and Site 4211 was evaluated as no longer significant (Heidel, Pyle and Hammatt, January 1997). Other historic sites noted in the Maui Central Park inventory survey included Site 4232, a former WW II military facility, and Site 3112, the Kahului Railroad Berm.[11] Both sites were partially preserved through incorporation into the landscaping of the Park (Ibid.).

It was previously thought that the paucity of archaeological findings in this area indicated that the extensive military activity associated with World War II had altered the Central Maui landscape, thereby potentially obliterating most archaeological sites.

**Airport Area Archaeological Work**

While a comprehensive inventory survey of the Kahului Airport to the southeast of the project area has not been undertaken to date, previous archaeological work in this area has

[11] The Kanaloa Avenue construction-monitoring project located a previously unidentified precontact habitation area (Site 5496) along with three *in situ* human burials and the remains of two previously disturbed individuals (Site 5495). Both of these sites lie in the northeastern portion of Keopuolani Park (Fredericksen, 2005).



uncovered significant sites. The earliest work was associated with the construction monitoring carried out in conjunction with the installation of the sewer line for the Paia Sewerage System from Spreckelsville to Ku'au. Clark and Toenjes (1987) of the B.P. Bishop Museum recorded a total of six sites that were encountered between 30 and 160 cmbs. Subsurface features included various pits and charcoal concentrations. In addition, indigenous food midden and artifacts were recovered. Charcoal recovered from Site 50-50-04-1777, part of which was identified *makai* of Kahului Airport, yielded a radiocarbon date range of A.D. 1380-1700.

Two sites have been identified on the airport property that will require additional work. These cultural resources include Site 50-50-05-1798, which is composed of an unknown number of human burials, a reburial area[12], and a subsurface terrace wall with associated pond field deposits. There is a Programmatic Agreement, signed in 1997, that covers this area, which lies to the north of the runway. To date, it remains unclear what work has been carried out in this area. The second site, Site 1799 is located to the north of Site 1798 and consists of a c. 4 m long rock alignment and a possible coral pavement of unknown function. The SHPD has previously indicated that this site has not been adequately assessed.

Site 50-50-05-2849 is made up of an extensive subsurface cultural deposit that was identified during archaeological testing carried out by IARII in c. 1990-1991 (Welch, 1991). This site qualifies for significance under Criterion "d" because of its information content. The SHPD has recommended that data recovery work be undertaken on this cultural deposit.

Site 50-50-05-4197 consists of related features of the former WWII Naval Air Station (NASKA). The SHPD has indicated that additional work at the inventory level is needed for this complex before additional evaluations/recommendations can be made.

## Settlement Patterns and Expected Findings

The lower Iao Valley portion of Wailuku *ahupua'a* was a central political and religious area of West Maui, because of its fertile taro lands and close proximity to the sea. Given these conditions, a large population could be supported, and wherever large population clusters are found, the social framework of chiefly importance and religious expression is also present. This is attested to by the existence of the two *heiau* (Haleki'i and Pihana) atop the northern dune system, and others reported by Walker (1931) and Keau (1992, oral communication) within the Iao Stream corridor. The middle and upper reaches of Iao Valley were also rich in *lo'i* and *'auwai* which produced additional food stuffs to support political and religious activities. The Upper Iao Valley had been traditionally known as a very significant sacred place in the history of Maui (Donham, MCCRC minutes, June 1, 1995). Coastal sites, such as Site 3120 at the Nisei Veterans Memorial Center, have been occupied since the 1200s (and possibly much earlier), and no doubt provided the area's population with marine resources. There seems to be a pattern in Iao Valley, whereby sites closer to the ocean have earlier dates than the ones farther inland, suggesting that settlement occurred first along the sea shore and gradually moved inland as the population numbers increased.

[12] Mr. Charles Kauluwehi Maxwell Sr., current Chair, Maui/Lana'i Islands Burial Council (MLIBC), assisted in the reburial of human remains that were disturbed by airport construction activities c. 20+ years ago (personal communication with Mr. Maxwell, 2005).

An intensification of usage appears to have occurred during the 16th century, and seems to have peaked around the time of Pi`ilani, ca. 1600 AD (Donham, MCCRC minutes, June 1, 1995). All radiocarbon dates, which have been recovered from the sites along this corridor fall into this temporal framework.

The study area lies next to Kanaha Pond. and is a part of the island that has been adversely affected by the presence of the military during World War II. A large Marine base existed in the area that is now Keopuolani Park, which lies to the northwest of Lot 8. In addition, there are several military related buildings as well as remnants of the NASKA facility that are located to the ENE of the project area. Finally, it is important to note that portions of Kanaha Pond have been altered by WWII activities (see Figure 4). The general area was formerly used for pasturage prior to WWII. As a consequence of the considerable amount of land alteration associated with these events, most surface traces of precontact activity, if it existed, has been most likely destroyed. Remnants of habitation sites—some with associated burials—have been found in the near shore area, and there is a possibility that similar subsurface features are present on some of the lands that are near Kanaha Pond.

## TABLE 1

### Selected Archaeological Studies Carried out in Lower Iao Valley, and Central Maui Area.

| AUTHORS | LOCATION | FINDINGS |
|---|---|---|
| Burgett and Spear, 1995 | TMK: 3-8-37: 48, Lower Main St., Home Maid Bakery. Sites 3924 and 3925 | Habitation sites; human burials. Dated c. AD 1430 to 1671. |
| Connolly, 1973 | TMK: 3-8-36: 94, Lower Main St., Site 1171 | Habitation site; burials discovered 1994 eroding from dune face. |
| Donham, 1994 | TMK: 3-8-37: 49, Lower Main St., . Home Maid Bakery, Site 3556 | Inadvertent burial discovery, both historic and precontact burials |
| Fredericksen, W. and Fredericksen, D, December 1992a | TMK:3-8-07: 40 and 43; Maui Community College Parking Lot Extension. | Historic sites from WWII. No indigenous materials. Kahului Harbor dredged material. |
| Ibid., September 1995 | TMK: 3-8-07: por. 1; Keiki Zoo Maui | No findings of significance. |
| Ibid., February 1996 | TMK: 3-8-07: 104; Maui Scrap Metal Company, Waikapu. Borrow Site, Site 3525. | Remains of at least 22 individuals recovered from mined sand. |



**Table 1 cont.**

| | | |
|---|---|---|
| Fredericksen D. and Fredericksen, W., December 1992b<br><br>Fredericksen, et. al., November 1998 | Inventory Survey - TMK: 3-8-07: 123, at Lower Main and Wai`ehu Road, Nisei Veterans Memorial Center.<br>Data Recovery Report | Historic site, Kahului Railroad (Site 3112); large precontact habitation site, with continuous occupation from c. 1200 AD to c. 1740 (Site 3120); numerous burials to be preserved *in situ*. |
| Fredericksen, et. al., July 1995; Fredericksen, E. and Fredericksen, D. September 1996 | Inventory Survey and Data Recovery: TMK: 3-4-39: por. 81, 82, 83 at Lower Main and Mill Streets, Site 4127 | Habitation site; dated c. AD 1450 to 1675. |
| Fredericksen, E., W., and D., September 1994 | TMK: 3-8-07: por. 125; Maui Central Park, 10 acres along Kahului Beach Road | No significant findings. |
| Ibid., January 1997 | TMK: 3-4-07: por. 121, Maui Lani Parkway corridor | No precontact finds in corridor—human remains (Site 4368) on Golf Course Hole #10—monitoring recommended. |
| Ibid., May 1997 | TMK: 3-8-47: por. 1, 2, 3, 4, 17, 18, 30, and 32; 3-9-07: por 121 Mahalani Street Extension | No significant findings—limited monitoring recommended. |
| Fredericksen, E., February 1997 (post-field summary) | TMK: 3-4-07: por. 121, Lot 11-A, Maui Lani Project—20.7 acres | One indigenous *in situ* burial (Site50-50-04-4401)-Monitoring recommended. |
| Heidel, Pyle and Hammatt, 1997 | TMK: 3-8-07: 1 and 3-7-01: 2; Maui Central Park | Historic sites: 4232-WW II military camp; 3112-Kahului Rail-road Berm; 4211-scattered human remains. |
| Kennedy, 1992 | TMK: 3-8-07; Maui Arts and Cultural Center. | No findings. |
| Pantaleo, J. and A. Sinoto, January 1996 | TMK: 3-8-07: 2, 110; Phase 1 and Phase 1A, Maui Lani Partners Development, Wailuku. | No habitation sites. Human burials in several locations. Monitoring recommended. Additional burials during monitoring. |
| Rotunno and Cleghorn, 1990<br>Rotunno-Hazuka, et. al. May 1994a | TMK: 3-8-07: 2, 110: Maui Lani Development Property. | No precontact sites other than burials (Site 2797). |
| Spear, 1995 | TMK: 3-8-37: 48; Lower Main St., Site 4066. | Human burials and habitation layers. |

# ARCHAEOLOGICAL FIELD METHODS

Fieldwork was conducted in two phases. An initial inspection of the parcel was carried out in early December of 2006. This preliminary work was undertaken in order to obtain a general understanding of the project area. This inspection revealed that portions of the project area had been previously impacted by activities associated with the placement of a flood control canal that lies between Lot 8 and Kanaha Pond (Figure 4, Photograph 2), and the installation of an access road for this drainage feature. In addition, some previous grubbing appeared to have taken place on the parcel. Finally, the project area appeared to have been utilized as an informal dumping area for some time.

Inventory/assessment level fieldwork was subsequently undertaken during December 2006. Archaeological survey members consisted of supervisory archaeologist Jonas Madeus, and Marco Molina. Erik Fredericksen was the project director for this archaeological assessment survey.

The pedestrian inspection utilized surface sweeps that were spaced c. 5 meters apart and were roughly oriented N-S. Surface visibility ranged from poor to good, depending upon ground cover and refuse.

The evaluation phase of this survey utilized 10 backhoe trenches that were up to 5 meters in length by c. 0.5 to 0.9 m in depth. Mechanically excavated back dirt was visually inspected and spot checked with 1/8$^{th}$ inch screen. In addition, four manual shovel test units were excavated by stratigraphic layer in the interior of the parcel, in order to obtain additional information. All soil excavated from these units was sifted through 1/8 inch mesh hardware cloth. Standard recordation methods were followed in the field and all mapping was done with metric survey tapes and hand held compasses. Photographs were taken in a digital format.



# ARCHAEOLOGICAL FINDINGS

As previously noted, 10 backhoe trenches were used to sample the study area. Subsurface results are discussed below. Refer to Table 2 below for backhoe test results.

## Backhoe Trenches

A total of 10 backhoe trenches were utilized to assess subsurface conditions on the project area. None of these backhoe trenches exceeded 1 meter in depth, due to very rocky subsurface conditions. There was no evidence of a subsurface cultural deposit located during testing in the study area. Portions of the project area appear to have been impacted by previous grading activities associated with the development of the existing access road. There were up to 3 common soil layers encountered during subsurface testing on the parcel (see Appendix B).

These strata consisted of Layer I—white (10 YR 8/1) silty sandy clay; Layer II—brown (10 YR 5/3) medium grained sand; and Layer III—dark grey (10 YR 4/1) sand. There were no significant material culture remains noted during backhoe testing. The groundwater table was encountered between 40 and 70 cmbs. Layers I and II are interpreted as fill, as are some portions of Layers III and IV.

## TABLE 2
### SUMMARY OF BACKHOE TEST RESULTS
### LOT 8, KANAHA INDUSTRIAL SUBDIVISION II PROJECT

| BT# | Length X depth[13] | Stratigraphy | cmbs[14] | Remarks[15] |
|---|---|---|---|---|
| 1 | 3 x 0.7 | Layer I: 10 YR 8/1<br>Layer II: 10 YR 4/1 | 0-22<br>22-70 | Layer I: white, fine silty sandy clay, semi-compact, no cultural material present.<br>Layer II: dark grey, medium, granular sand, wet, semi-compact to loose consistency |
| 2 | 3 x 0.45 | Layer I: 10 YR 8/1<br>Layer II: 10 YR 5/3<br>Layer III: 10 YR 4/1 | 0-17<br>17-25<br>25-45 | Layer I: white, fine silty sandy clay, semi-compact, no cultural material present<br>Layer II: brown, fine to medium grained sandy clay<br>Layer III: dark grey, medium, granular sand, wet, semi-compact to loose consistency |
| 3 | 3 x 0.60 | Layer I: 10 YR 8/1<br>Layer II: 10 YR 5/3<br>Layer III: 10 YR 4/1 | 0-10<br>10-21<br>21-60 | Layer I: white, fine silty sandy clay, semi-compact, no cultural material present<br>Layer II: brown, fine to medium grained sandy clay<br>Layer III: dark grey, medium, granular sand, wet, semi-compact to loose consistency |
| 4 | 3 x 0.40 | Layer I: 10 YR 8/1<br>Layer II: 10 YR 5/3<br>Layer III: 10 YR 4/1 | 0-9<br>9-15<br>15-42 | Layer I: white, fine silty sandy clay, semi-compact, no cultural material present<br>Layer II: brown, fine to medium grained sandy clay<br>Layer III: dark grey, medium, granular sand, wet, semi-compact to loose consistency |
| 5 | 3 x 0.55 | Layer I: 10 YR 8/1<br>Layer II: 10 YR 5/3<br>Layer III: 10 YR 4/1 | 0-12<br>12-25<br>25-55 | Layer I: white, fine silty sandy clay, semi-compact, no cultural material present.<br>Layer II: brown, fine to medium grained sandy clay<br>Layer III: dark grey, medium, granular sand, wet, semi-compact to loose consistency |
| 6 | 3 x 0.70 | Layer I: 10 YR 6/3<br>Layer II: 10 YR 8/1<br>Layer III: 10 YR 5/3<br>Layer IV: 10 YR 4/1 | 0-25<br>25-37<br>15-42<br>42-70 | Layer I: previously disturbed<br>Layer II: white, fine silty sandy clay, semi-compact (Layer I elsewhere)<br>Layer III: brown, fine to medium grained sandy clay (Layer II elsewhere)<br>Layer IV: dark grey, medium, granular sand, wet, semi-compact to loose consistency (Layer III elsewhere) |

[13] In meters
[14] cmbs = Centimeters below surface
[15] There were no significant material culture remains located during backhoe testing on the project area.



**Table 2 cont.**

| | | | | |
|---|---|---|---|---|
| 7 | 3 x 0.70 | Layer I: 10 YR 6/3<br>Layer II: 10 YR 8/1<br>Layer III: 10 YR 5/3<br>Layer IV: 10 YR 4/1 | +65<br>0-10<br>10-21<br>21-70 | Layer I: previously disturbed – berm<br>Layer II: white, fine silty sandy clay, semi-compact (Layer I elsewhere)<br>Layer III: brown, fine to medium grained sandy clay (Layer II elsewhere)<br>Layer IV: dark grey, medium, granular sand, wet, semi-compact to loose consistency (Layer III elsewhere) |
| 8 | 3 x 0.85 | Layer I: 10 YR 6/3<br>Layer II: 10 YR 8/1<br>Layer III: 10 YR 5/3<br>Layer IV: 10 YR 4/1 | 0-40<br>40-45<br>45-50<br>50-85 | Layer I: previously disturbed – fill/berm<br>Layer II: white, fine silty sandy clay, semi-compact (Layer I elsewhere)<br>Layer III: brown, fine to medium grained sandy clay (Layer II elsewhere)<br>Layer IV: dark grey, medium, granular sand, wet, semi-compact to loose consistency (Layer III elsewhere) |
| 9 | 3 x 0.90 | Layer I: 10 YR 8/1<br>Layer II: 10 YR 6/2<br>Layer III: 10 YR 4/1 | 0-16<br>16-30<br>30-90 | Layer I: white, fine silty sandy clay, semi-compact, no cultural material present.<br>Layer II: brownish gray, compact medium grained sandy clay, very compact<br>Layer III: dark grey, medium, granular sand, wet, semi-compact to loose consistency |
| 10 | 3 x 0.70 | Layer I: 10 YR 6/3<br>Layer II: 10 YR 8/1<br>Layer III: 10 YR 4/1 | 0-43<br>28-30<br>43-70 | Layer I: previously disturbed<br>Layer II: white, fine silty sandy clay, semi-compact, no cultural material present<br>Layer III: dark grey, medium, granular sand, wet, semi-compact to loose consistency |

### Shovel Test Units (Figures 9-10)

There were four manually excavated 50 by 50 cm shovel test units excavated after the backhoe trenches were completed. These units were utilized to obtain a more controlled assessment of subsurface conditions on the study area. There were no significant cultural materials located during the testing process in STs 1-4. A total of 3 layers were identified during testing.

Layer I (0-10 cmbs) was composed of the common, compact, white (10 YR 8/1) silty sandy clay. Layer II (c. 10-20 cmbs) was made up of brown (10 YR 5/3) medium grained sand. Both strata appeared to have been previously disturbed and are interpreted as fill. Layer III (c. 20-35 cmbs) consisted of dark grey (10 YR 4/1) sand. Some of this stratum also appeared to have been previously disturbed. The groundwater table was encountered between 35 and 50 cmbs in all four units.

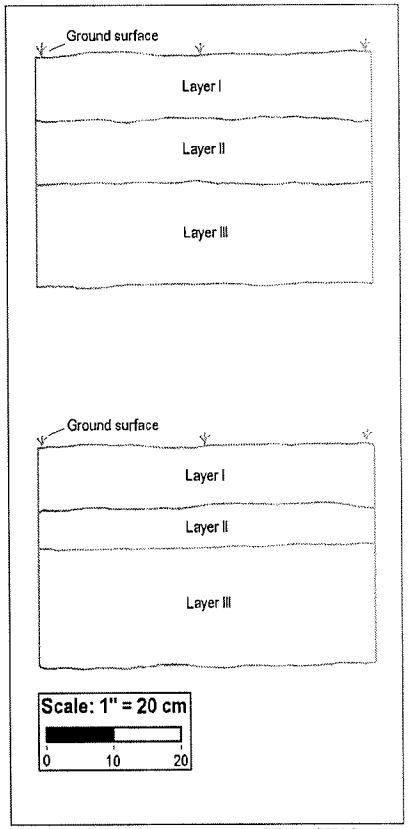


**Figure 9: ST 1 - SW face wall, ST 2 - SW face wall.**



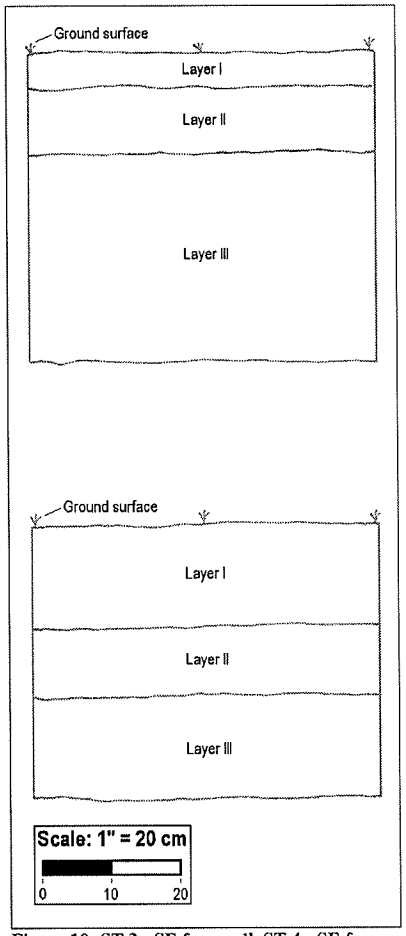


**Figure 10: ST 3 - SE face wall, ST 4 - SE face wall.**

### Soil Testing at Lot 8

Per previous discussions with Dr. Melissa Kirkendall, SHPD Maui staff archaeologist, Xamanek Researches, LLC monitored soil testing activities that were carried out on the project area. There were no significant cultural materials noted during the inspection of the recovered soil core samples. GEOLABS, Inc staff was cooperative and allowed our monitor to view and photograph the core samples that were recovered during testing (see Photographs 19-26).

## SUMMARY AND CONCLUSIONS

As previously discussed, a total of 10 backhoe trenches, 4 manually excavated shovel test units, and monitored soil sampling results were used to sample subsurface conditions on the study area. Test results suggest that portions of the project area have been impacted by previous earth moving activities associated with the construction of an existing drainage control canal, an access road, and previous fill activities. As noted above, there was no evidence of a cultural deposit or significant material culture remains located during this assessment survey.

### Site Significance Evaluations

The following significance evaluations are based on the Rules Governing Procedures for Historic Preservation Review (DLNR 1996; Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling and association and shall meet one or more of the following criteria:

**Criterion "a"**—Be associated with events that have made an important contribution to the broad patterns of our history;

**Criterion "b"**—Be associated with the lives of persons important in our past;

**Criterion "c"**—Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

**Criterion "d"**—Have yielded, or is likely to yield, important information for research on prehistory or history;



**Criterion "e"**—Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts.

As mentioned earlier in this report, we did not locate significant surface material culture remains during our walkover survey or a subsurface cultural deposit during testing of the study area. Consequently, there can be no site significance assessments made at this time.

### Site Mitigation Recommendations

Given the lack of cultural resources, no further archaeological work is recommended for the project area at this point in time, other than precautionary monitoring during construction.

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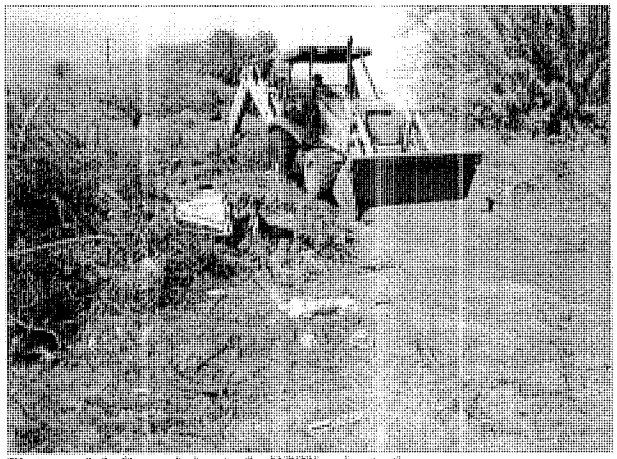
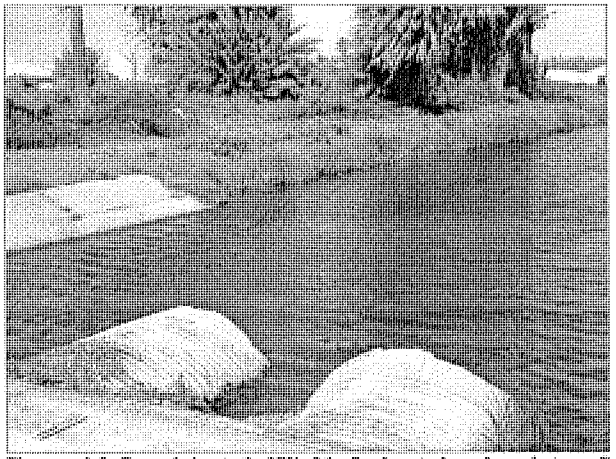
# APPENDIX A:
## Lot 8, Kanaha Industrial Subdivision II
## Project Photographs

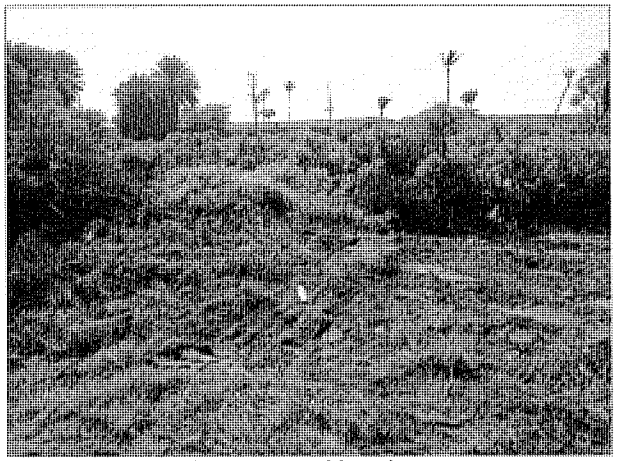


Photograph 1: General view to the WNW, prior grading.

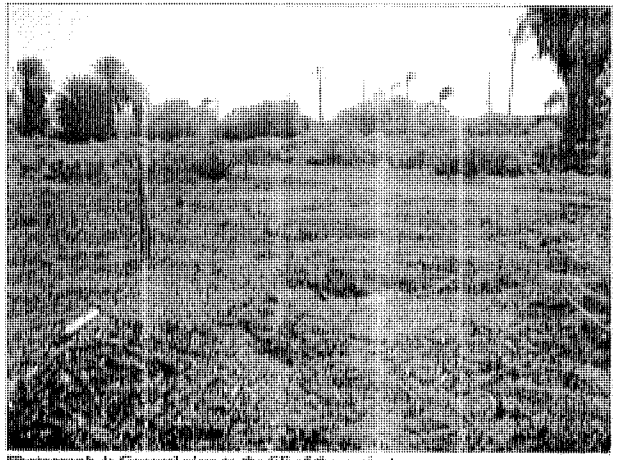




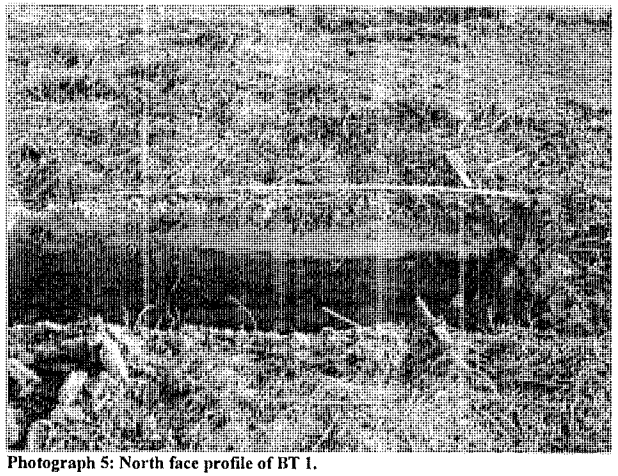
Photograph 2: General view to the NW of the flood control canal - project area lies at the left. Note: Kanaha Pond lies to the right, but is not visible in this photograph.



Photograph 3: General view to the south of the project area.

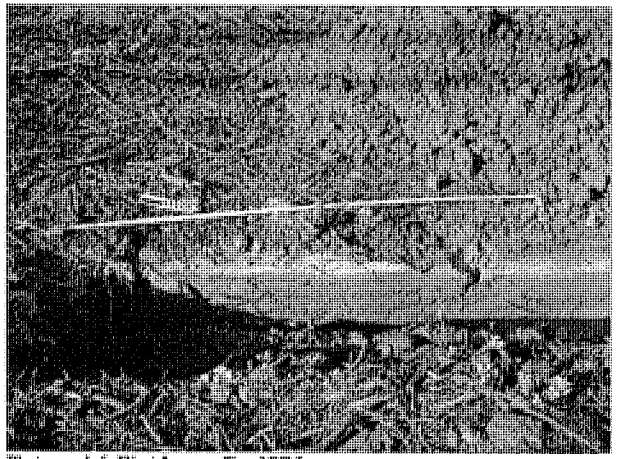


Photograph 4: General view to the SE of the project area.

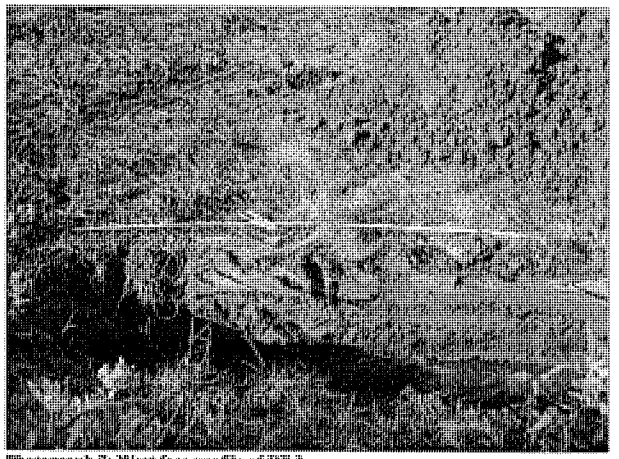


**Photograph 5: North face profile of BT 1.**

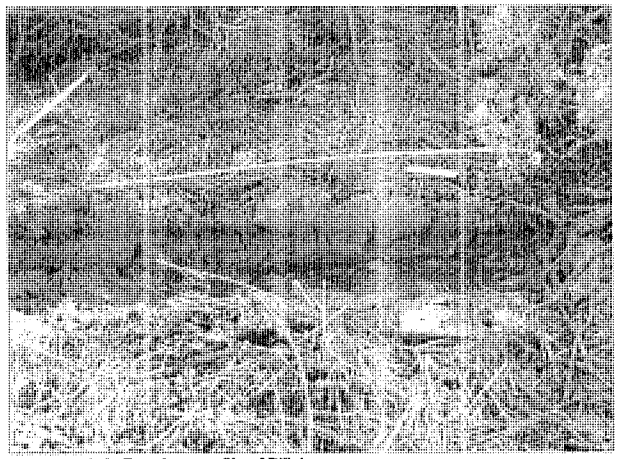




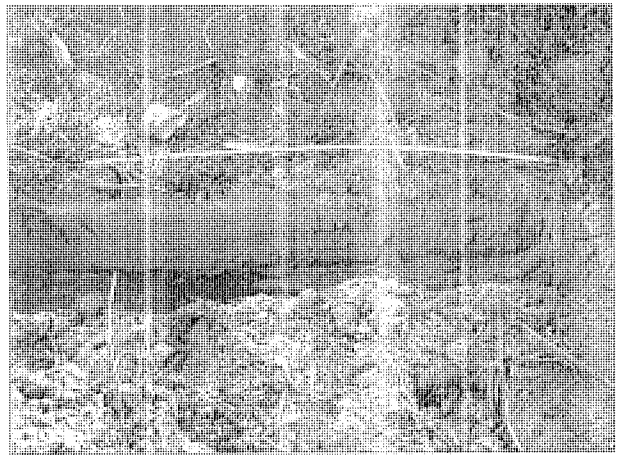
Photograph 6: West face profile of BT 2.



Photograph 7: West face profile of BT 3.

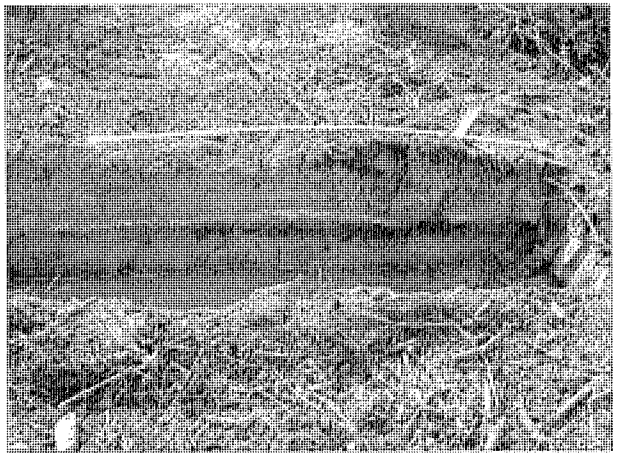


**Photograph 8: East face profile of BT 4.**

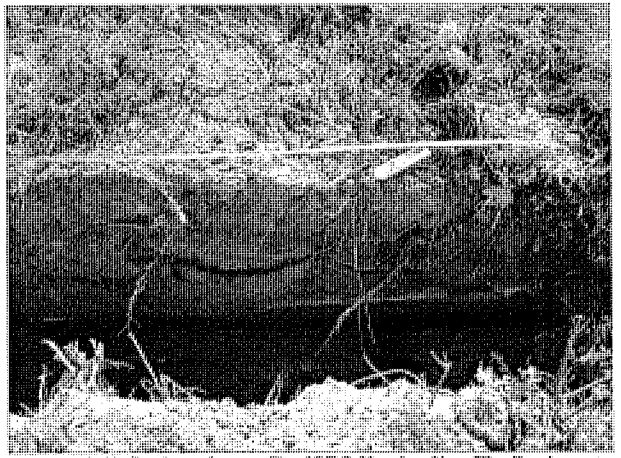


**Photograph 9: East face profile of BT 5.**

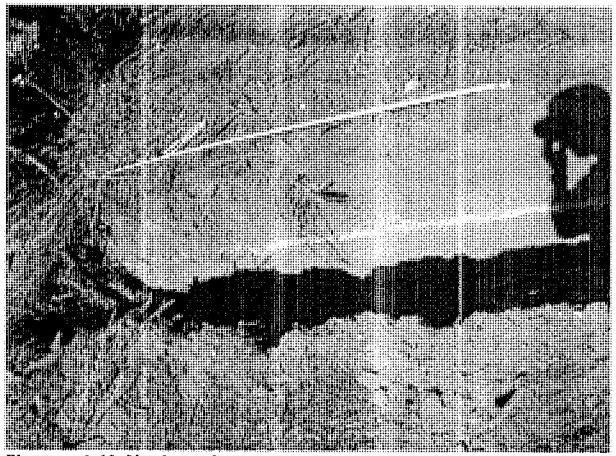




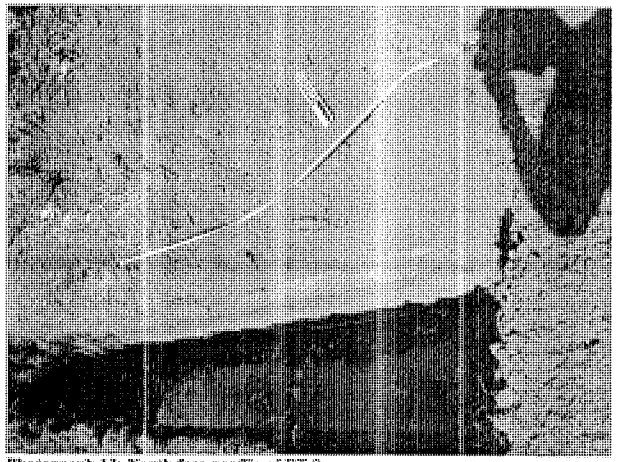
**Photograph 10: South face profile of BT 6.**



**Photograph 11: Southeast face profile of BT 7, Kanuku. Note fill collapsing out of the profile.**

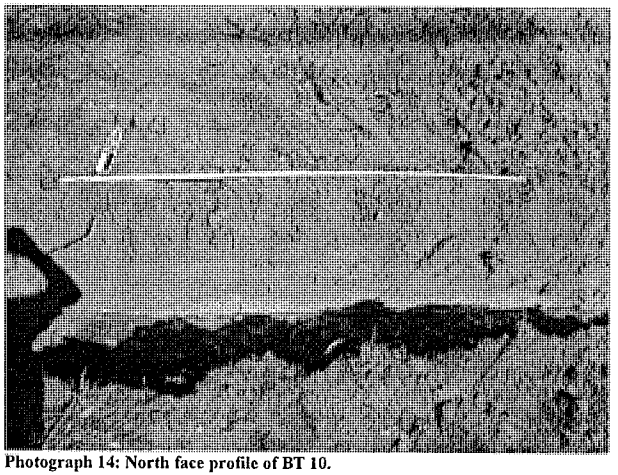


**Photograph 12: Northwest face profile of BT 8.**

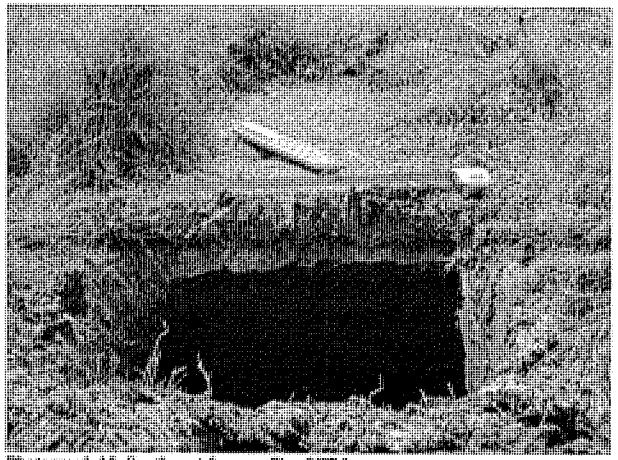


**Photograph 13: North face profile of BT 9.**

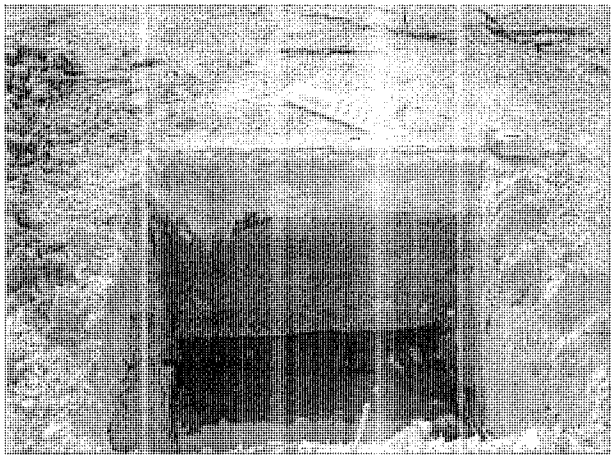




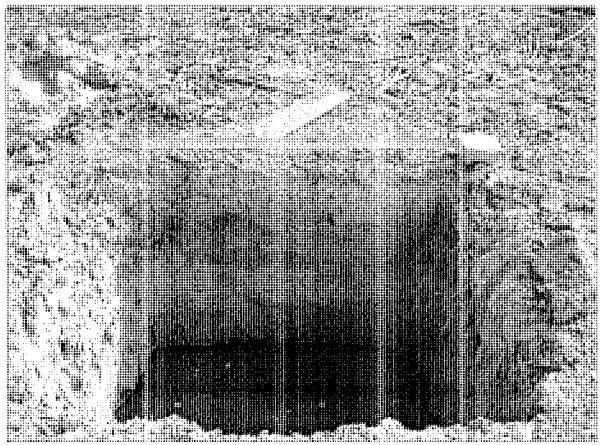
**Photograph 14: North face profile of BT 10.**



**Photograph 15: Southwest face profile of ST 1.**

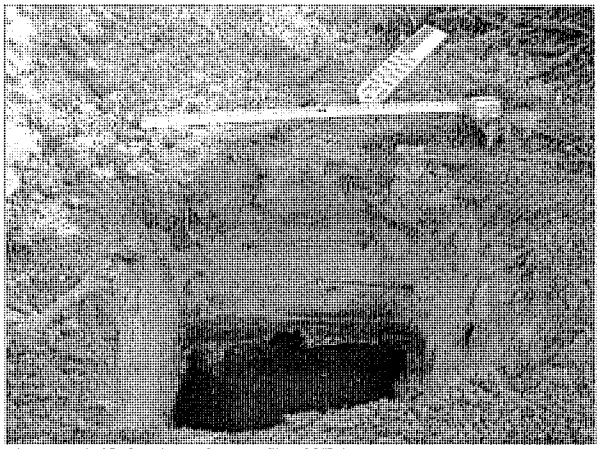


**Photograph 16: Southwest face profile of ST 2.**



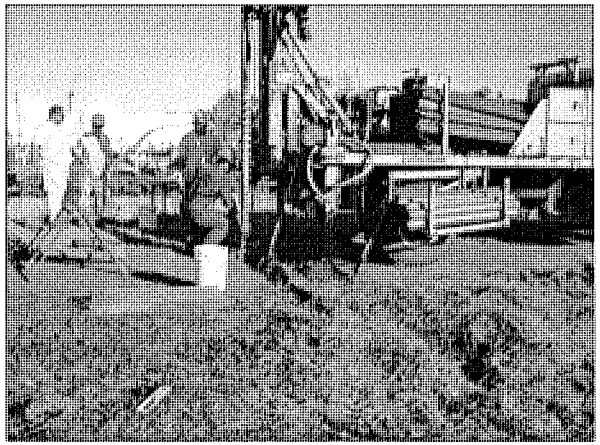
**Photograph 17: Southeast face profile of ST 3.**





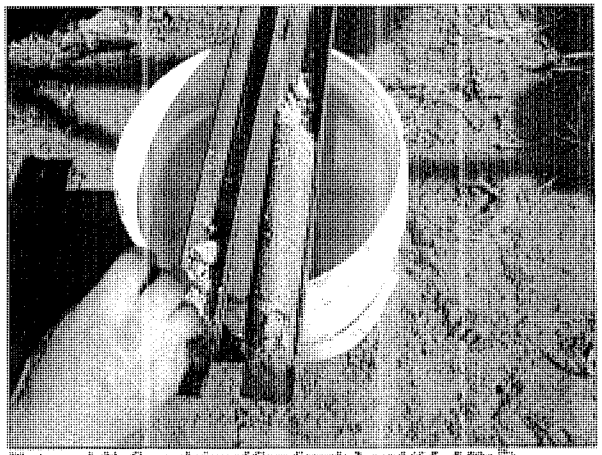
**Photograph 18: Southeast face profile of ST 4.**

## Soil Testing – Kanaha Lot 8 Industrial Subdivision II



**Photograph 19: General view to the N of GEOLABS, Inc drill rig.**

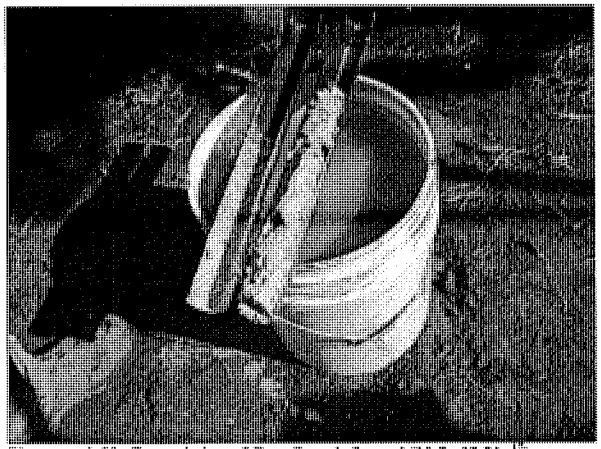
Photograph 20: General view to the E of Core 1 test location.



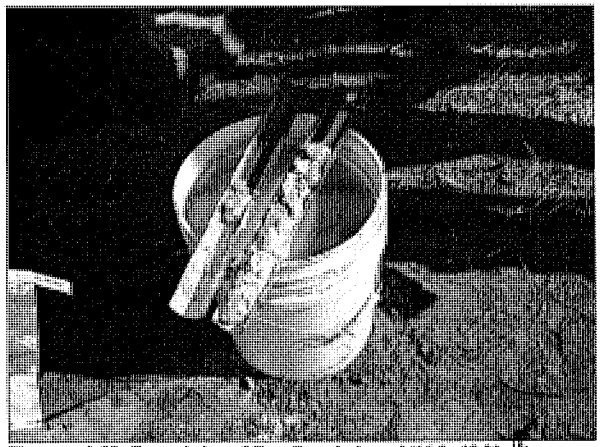
Photograph 21: General view of Core Sample 2, sand (6.5 - 8 ftbs [16]).

[16] Measurements are in feet below surface (c. 200–250 cmbs). Note: it was not possible to photograph Core Sample 1.





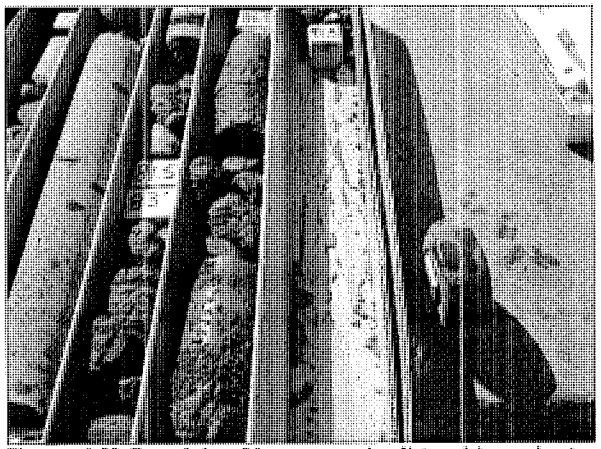
Photograph 22: General view of Core Sample 3, sand (11.5 - 13 ftbs [17]).



Photograph 23: General view of Core Sample 4, sand (16.5 - 18 ftbs [18]).

[17] Measurements are in feet below surface (c. 350–400 cmbs).
[18] Measurements are in feet below surface (c. 500–550 cmbs).

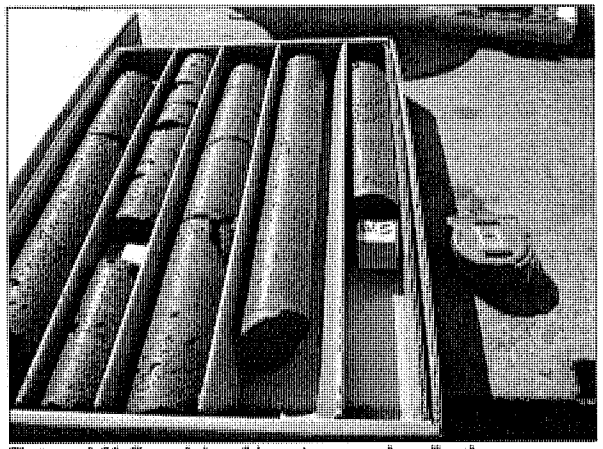
**Photograph 24: General view of Core Sample 8, possible alluvial deposit (36.5 - 38 ftbs[19]).**



**Photograph 25: General view of deep core samples. Note rock in samples at left.**

[19] Measurements are in feet below surface (c. 1100–1170 cmbs).





**Photograph 26: General view of deepest core samples - all rock.**

## APPENDIX B:
## Lot 8 Kanaha Industrial Subdivision II
## Project Backhoe Trench profiles



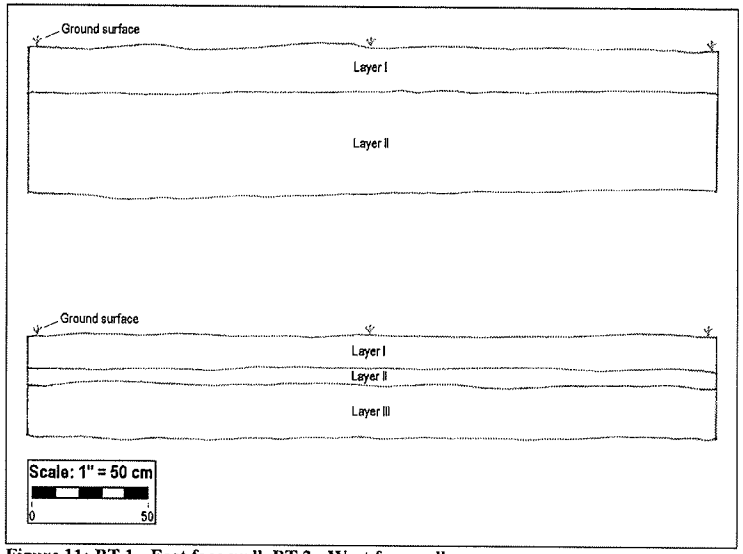



**Figure 11: BT 1 - East face wall, BT 2 - West face wall.**

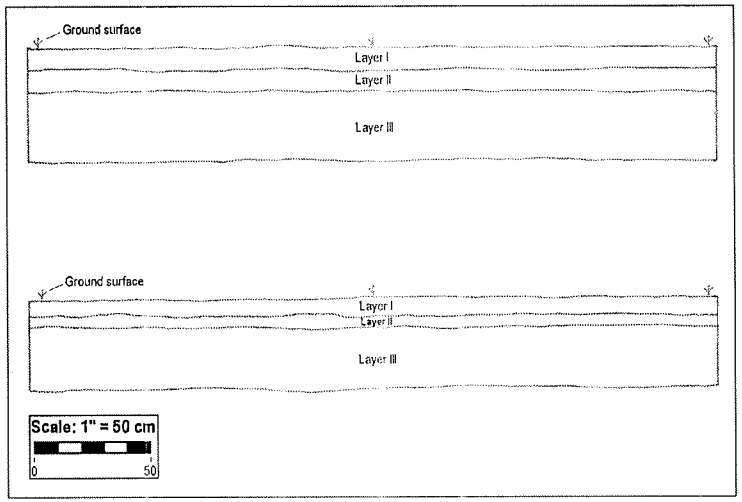



**Figure 12: BT 3 - West face wall, BT 4 - East face wall.**



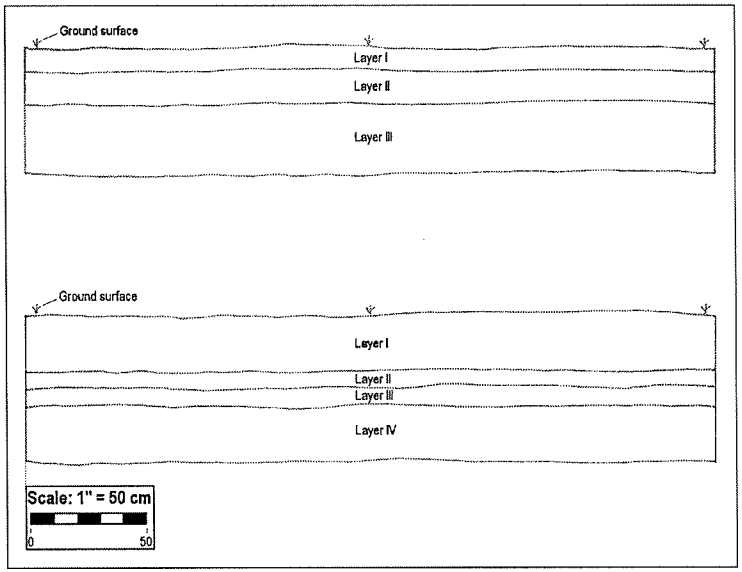



**Figure 13: BT 5 - East face wall, BT 6 - SE face wall.**

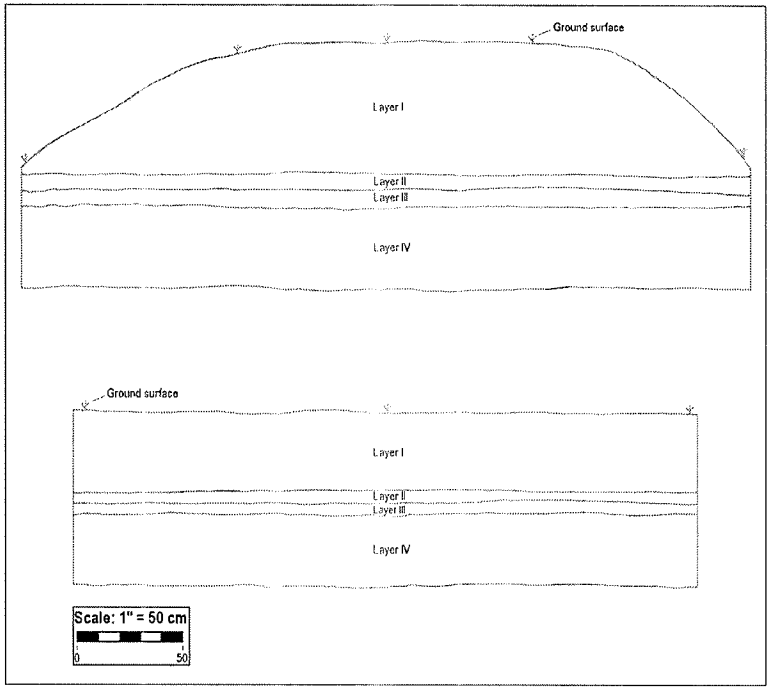



**Figure 14: BT 7 - SE face wall, BT 8, including cross section of berm - NW face wall.**



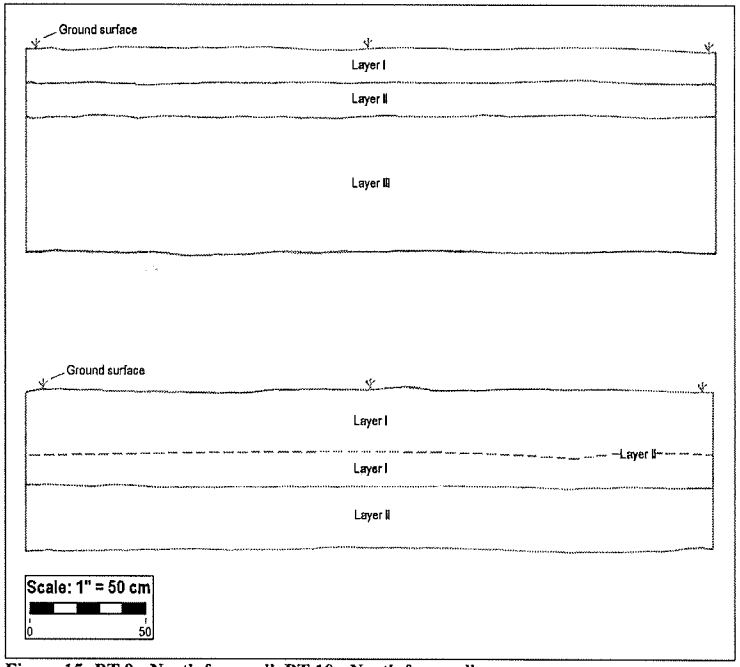



**Figure 15: BT 9 - North face wall, BT 10 - North face wall.**

# APPENDIX D-1.

# Letter from Department of Land and Natural Resources, State Historic Preservation Division Accepting Archaeological Assessment Survey

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
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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

July 13, 2008

Erik M. Fredericksen, M.A.
Xamanek Researches, LLC
P.O. Box 880131
Pukalani, Hawai'i 96768

LOG NO: 2008.2437
DOC NO: 0807PC02
Archaeology

Dear Erik:

**SUBJECT: Chapter 6E-42 Historic Preservation Review of an Archaeological Assessment Survey for Lot 8, Kanaha Industrial Subdivision II, Located on a c. 2.5 Acre Portion of Land in Wailuku Ahupua'a, Wailuku District, Maui Island**
**TMK: (2) 3-7-011:028**

Thank you for the opportunity to review this revised report, which our staff received on July 3, 2008 (Fredericksen 2008): *An Archaeological Assessment Survey for Lot 8, Kanaha Industrial Subdivision II*...Xamanek Researches, LLC.

The report was first reviewed by SHPD staff on May 4 of 2008, resulting in a series of requested revisions (SHPD LOG NO: 2007.1605; DOC NO: 0805PC05). The most recent version of the report was reviewed in hardcopy format to confirm completion of previously requested revisions and suggestions.

The report now contains the required information as specified in HAR §13-276-5 regarding the documentation of inventory level fieldwork resulting in an absence of culturally significant finds, and is acceptable.

Should you have any questions or comments regarding this letter, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

# APPENDIX D-2.

# Archaeological Monitoring Plan

# AN ARCHAEOLOGICAL MONITORING PLAN FOR LOT 8, KANAHA INDUSTRIAL SUBDIVISION II, A 2.499 ACRE PORTION OF LAND IN WAILUKU *AHUPUA`A*, WAILUKU DISTRICT, MAUI ISLAND

**(TMK: ([2] 3-7-11: 028)**

**Prepared on behalf of:**

**Mr. Benjamin Brown, Principal**
**Kanaha Professional Plaza, LLC**
**Kahului, Maui**

**Prepared by:**

**Xamanek Researches, LLC**
**Pukalani, Maui**
**Erik M. Fredericksen**

*06 August 2008 (FINAL)*

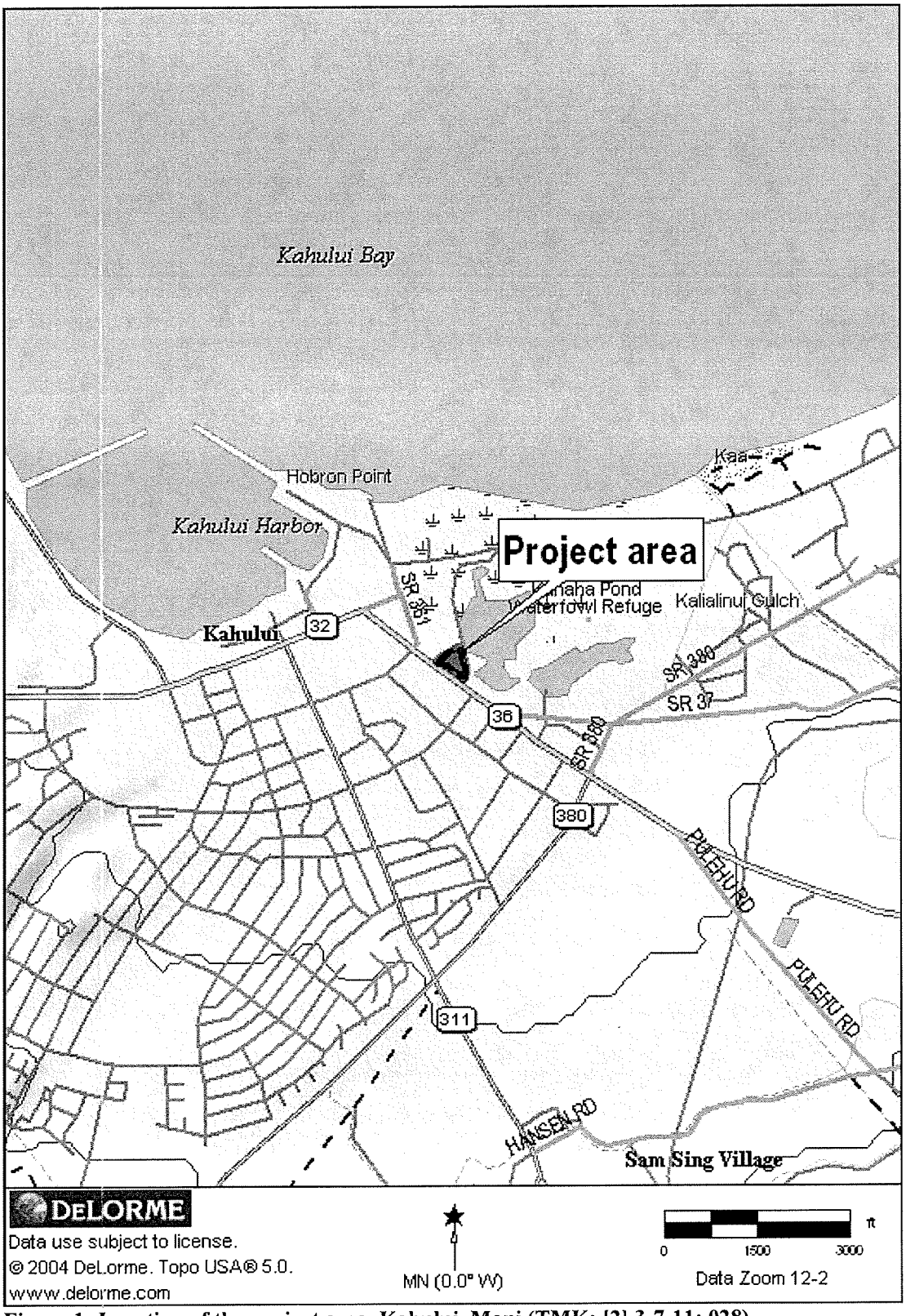



**Figure 1: Location of the project area, Kahului, Maui (TMK: [2] 3-7-11: 028).**

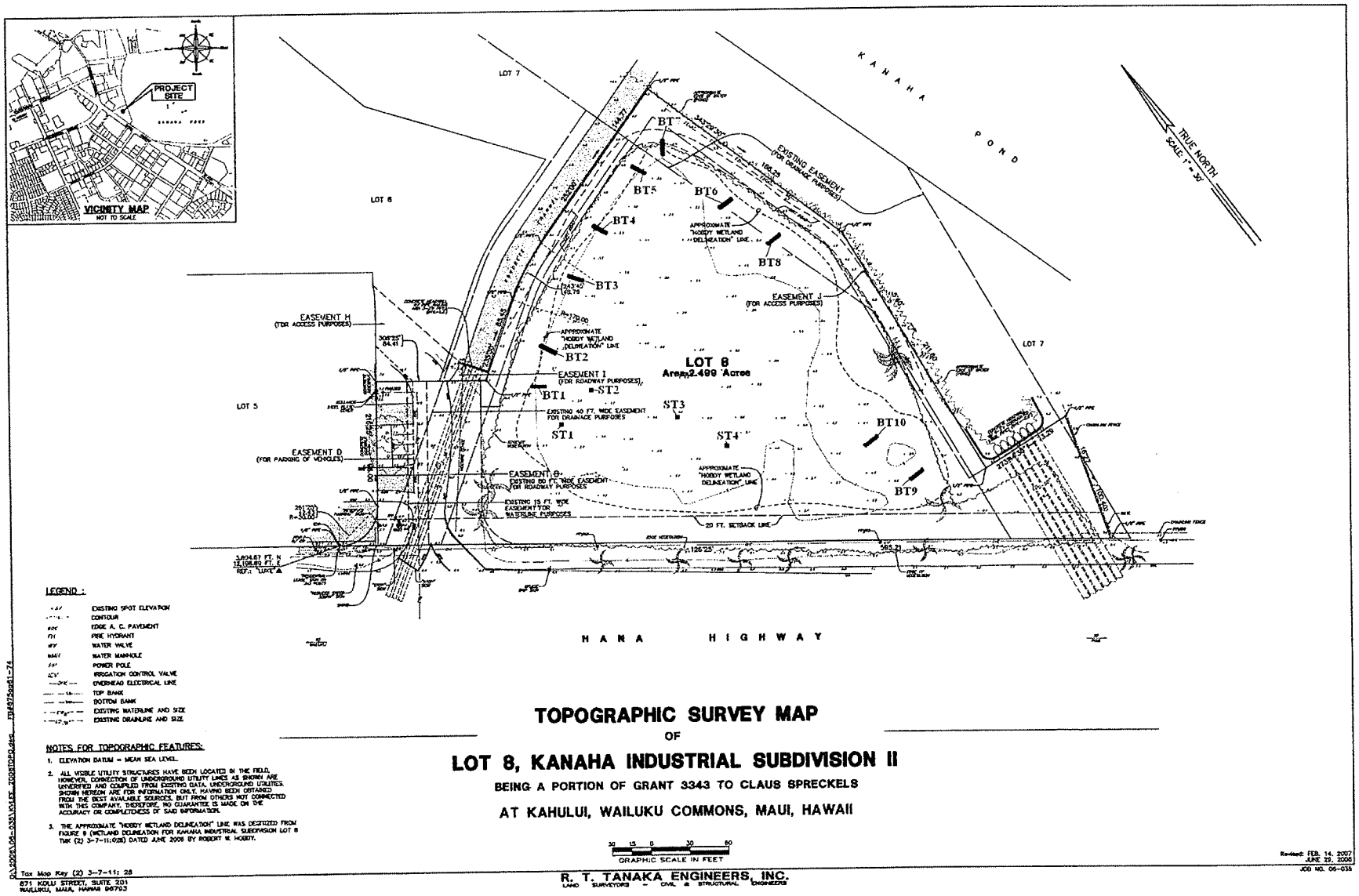



**Figure 2: Topographic map of Lot 8, Kanaha Industrial Subdivision II, including locations of BT 1 – BT 10, and ST 1 – ST 4. Note: Lot 7 is located between the project area and Kanaha Pond.**

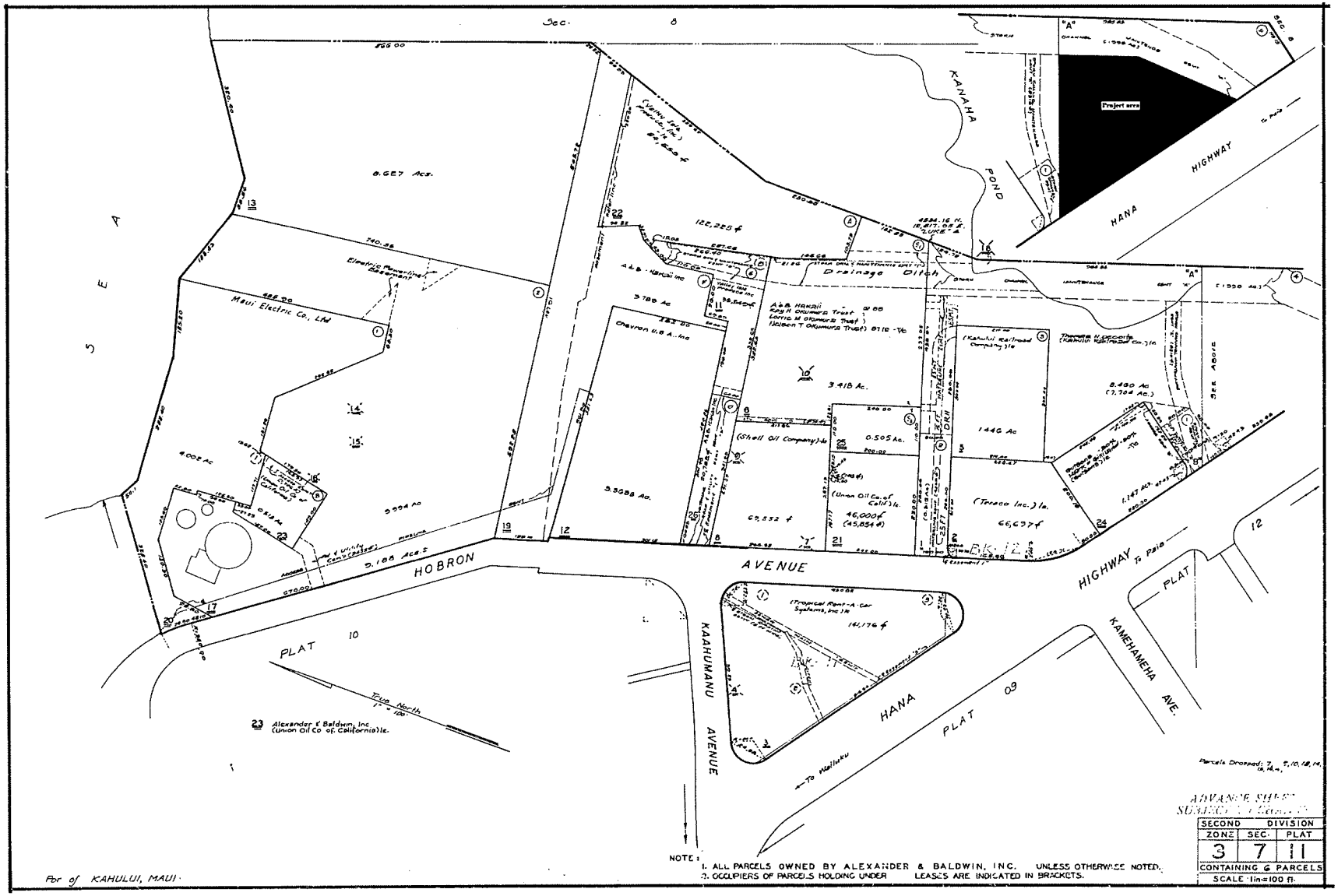



**Figure 3: Tax Key Map of Lot 8, Kanaha Industrial Subdivision II (TMK: [2] 3-7-11: 28).**

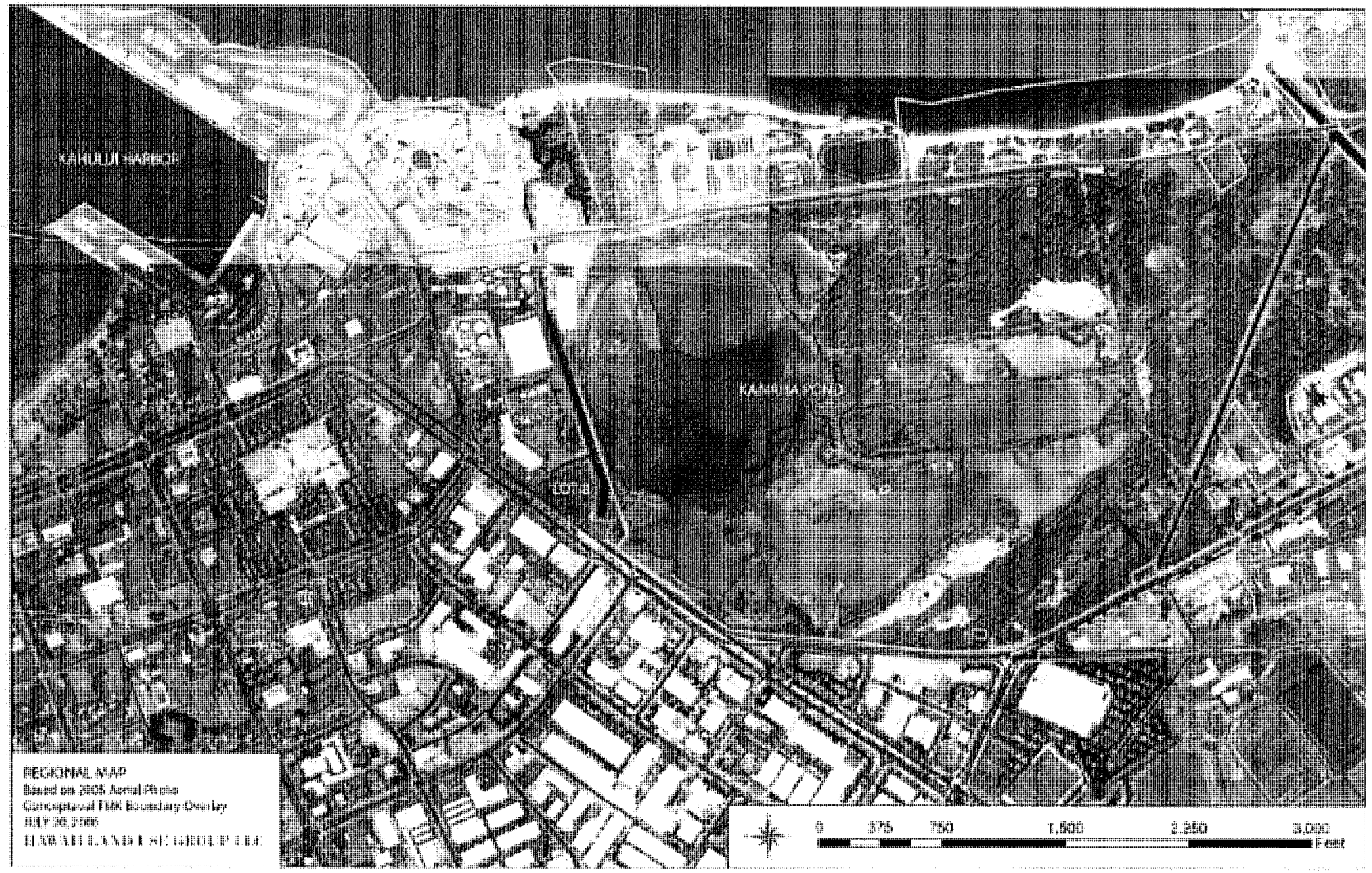



**Figure 4: Overall plan view of project area (Lot 8) in relationship to the adjacent Lot 7, Kanaha Pond and the general Kahului area. Note WWII era modifications to Kanaha Pond in upper center right of aerial photograph, along with 1970s flood control drainage canal, which is on Lot 7 to the right of Lot 8.**

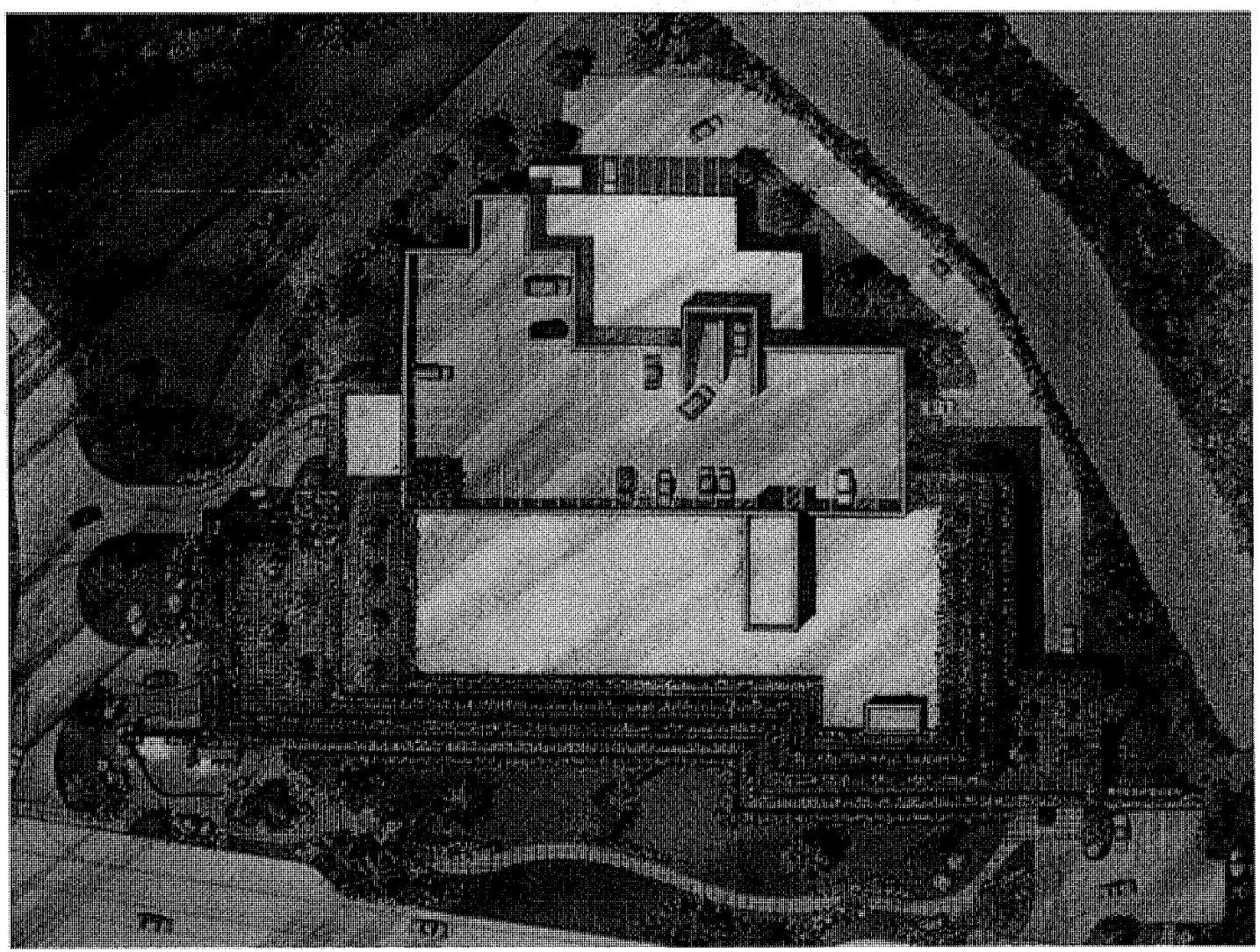


**Figure 5: Conceptual plan view of building on Lot 8 in relationship to the existing drainage channel. A section of the adjacent Lot 7 drainage canal, and a portion of Kanaha Pond are visible in the upper right of this figure, and Hana Highway is at the bottom of the figure.**

# INTRODUCTION

Xamanek Researches, LLC previously conducted an archaeological assessment survey of Lot 8, Kanaha Industrial Subdivision II, a c. 2.5 acre portion of land in Kahului, Wailuku Commons, Maui during December of 2006 (TMK [2] 3-7-11: 028). The study area consists of a portion of land (known as Lot 8) that is separated from Kanaha Pond by Lot 7, which contains a drainage canal. The property is located in Wailuku *Ahupua`a*, Wailuku District, Maui. The subject parcel is a portion of a large central Maui land grant—Grant 3343 to Claus Spreckels. The earlier assessment survey was conducted on behalf of Mr. Benjamin Brown, Principal, Kanaha Professional Plaza, LLC. Project plans call for the construction of a multi-story medical facility that will be leased to medical professionals, along with other on-site improvements, including a parking structure.

There were no significant material culture remains located during the walk-over or subsurface testing of Lot 8. No further archaeological work was recommended for this parcel of land in Kahului, Maui at this time. However, precautionary monitoring was stipulated. given the location of the proposed project area (SHPD DOC NO: 0807PC02). At the writing of this archaeological monitoring plan, the proposed facility is known as the Maui Medical Plaza.

# STUDY AREA

As previously noted, the project area consists of Lot 8, Kanaha Industrial Subdivision II, which is located in Kahului, Maui. The c. 2.5 acre parcel is bordered along its eastern side by a c. 50 ft (15 m) wide drainage canal/levee (Lot 7), which separates the study area from the Kanaha Pond Wildlife Sanctuary. A portion of the Lot 8 northern boundary is defined by a 20 ft (6 m) wide drainage canal/levee, while a portion of a previously developed parcel bounds the lot on its northwestern side. Finally, Hana Highway borders the property along its southern side.

The c. 2.5 acre parcel is essentially level. Project elevations range from c. 3 ft AMSL in the central portion of the parcel to c. 5 ft AMSL along the levees and to a bit over 6 ft AMSL along portions of Hana Highway. The project area is located within a larger parcel of land in Kahului, Wailuku Commons, Maui (TMK [2] 3-7-11: 028). The project area lies an estimated 0.7 km from the Kahului coastline.

This windward portion of Maui is typical of much of the low lying near coastal inland Kahului region, with soil components consisting of Jaucas Sand, Saline, 0-12% (JcC) (Foote et al., 1972). This soil type is encountered near the ocean where ground water is near the surface and where salts have accumulated over time. These soils are subject to inundation after periods of heavy precipitation. Annual precipitation in this windward area ranges from c. 20-30 inches, with the majority of rainfall occurring between November and March (Juvic and Juvic, 1998).

A biological resources survey of Lot 8 was carried out by Mr. Robert Hobdy in 2006. In his report, Hobdy notes that the parcel is heavily overgrown. Noted species include the non-native shrub sourbush (Plucea indica), seashore saltgrass (Distichlis spicata), and a few scattered trees such as *kiawe* (Prosopis pallida), and date palm (Phoenix x dactylifera).

# ARCHAEOLOGICAL MONITORING PLAN

## Scope of monitoring

The scope of this monitoring plan includes having an archaeological monitor present during all subsurface earthmoving activities scheduled for the Maui Medical Plaza in Kahului. Actual on-site time and specific actions to be followed in the event of inadvertent discoveries will be discussed and agreed upon by the general contractor and the archaeological consultant at a pre-construction meeting held for this purpose. Additional meetings may be called, if either the monitoring archaeologist or contractor believes that other relevant information should be disseminated. The following monitoring plan covers this current project area as well as any off-site improvements for the medical facility (TMK [2] 3-7-11: 028).

## Monitoring methodology

Given the location of the proposed medical facility, there is a possibility that significant material culture remains may be inadvertently disturbed during earthmoving activities in this portion of Kahului, Maui. Possible cultural materials could include subsurface habitation deposits (such as Site 4753 to the northwest near Kahului Harbor), human burials and/or human skeletal remains (such as Site 5496 also near the harbor).

Close cooperation between the monitoring archaeologist and construction personnel is important to a successful monitoring program. The monitoring program will follow the 12 conditions listed below:

1) The contractor shall be responsible for ensuring that the archaeological consultant is aware of all pertinent construction schedules and that the monitor is present for all subsurface excavation activities on this near coastal parcel.

2) Both the archaeological consultant and the contractor are responsible for ensuring that on-site work is halted in an area of significant findings and to protect any such find from any further damage (i.e., construction fencing, protective covering, etc.). The State Historic Preservation Division will recommend appropriate mitigation actions. The SHPD Burial Sites Program, the SHPD Maui office, and the Maui/Lana`i Islands Burial Council (MLIBC) will be consulted in the event that human remains are found. (Change work order)

3) In the event of the discovery of human remains, work shall cease in the immediate find area. The monitoring archaeologist will be responsible for notifying the SHPD Maui office and the Historic Preservation Division Burial Sites Program, which, in consultation with the Maui/Lana`i Islands Burial Council, will determine the appropriate mitigation measures. This notification will include accurate information regarding the context and composition of the find. (Change work order)

4) The archaeological consultant will work in compliance with Hawai`i Revised Statutes Chapter 6E (procedures Relating to Inadvertent Discoveries).

5) The monitoring archaeologist will have the authority to closedown construction activities in areas where potentially significant discoveries have been made until they have been properly evaluated. Normally, construction activities may continue in unaffected portions of the project area. (Change work order)

6) Field procedures to be followed for documentation of discovered cultural features or human skeletal remains: a) standard field methods including recordation of profiles showing stratigraphy, cultural layers, etc.; b) mapping and photographing of finds other than human remains; c) and excavation of cultural materials and/or exposed features.

7) The SHPD Maui office shall be notified and consulted with regarding treatment of identified features such as cultural layers, artifact or midden concentrations, structural remains, etc., considered to be of significance under S13-279-2 (definitions).

8) The contractor should take into account the necessity for machine excavation at a speed slow enough to allow for reasonable visual inspection of the work. The monitoring archaeologist must make a "best effort" to search for significant material culture remains (i.e. artifacts, features, midden, skeletal remains, etc.). Machine excavation speed will need to be slowed in an area where significant material culture remains have been identified. (Change work order)

9) Significant archaeological discoveries, if they occur, shall be protected and identified by construction "caution" tape, fencing, or other reasonable means, until the SHPD Maui office and the archaeological consultant decide appropriate mitigation actions. All recovered material culture remains—with the possible exception of charcoal samples for radiometric analysis—will remain on Maui. Standard laboratory methods shall be utilized by the consulting archaeologist in the event that cultural materials are recovered during monitoring and/or mitigation work. Cultural materials will be curated by archaeological consultant. (Change work order)

10) One monitor in most instances will carry out the necessary fieldwork. Tasks will include observation of grubbing and earth-moving activities. However, the SHPD and the MLIBC require that one archaeological monitor be assigned to each piece of major earthmoving equipment in sand dune areas or other culturally sensitive locations. (Change work order)

11) In the event of night work, the general contractor shall supply adequate lighting for the onsite monitor.

12) Chapter 6E-11 (a) specifies the following "It shall be unlawful for any person or corporate, to take, appropriate, excavate, injure, destroy, or alter any historic property or aviation artifact located on the private lands of any owner thereof without the owner's written permission being first obtained. It shall be unlawful for any person, natural or corporate, to take, appropriate, excavate, injure, destroy, or alter any historic property located upon lands owned or controlled by the State or any of its political subdivisions, except as permitted by the department."

Field methods utilized shall include photographic recordation (where appropriate), artifact excavation (recovery and recordation), profile documentation of cultural layers and stratigraphy, excavation and recordation of exposed features, and mapping of all pertinent features on an appropriate site map. A daily log (field notes) of

activities and findings will also be kept. Gathered information shall be utilized in the preparation of the monitoring report to be submitted to the SHPD.

In the event human skeletal remains are inadvertently disturbed, the SHPD Maui office, the SHPD Burial Sites Program and the Maui/Lana`i Islands Burial Council shall be notified, and appropriate mitigation actions determined (photographs of human skeletal remains will not be taken).

A supervisory archaeologist may periodically visit the monitoring site as often as is necessitated by the nature of the construction activities and archaeological findings. If significant discoveries are made, appropriate mitigation measures will be discussed with the SHPD Maui office.

The archaeological consultant shall curate all cultural materials recovered from this monitoring project on Maui, with the exception of radio carbon samples that will need to be sent off-island for analysis. When analysis is completed, recovered material culture remains will be turned over to the appropriate parties. Long-term curation arrangements of such materials will be approved by the SHPD.

A draft monitoring report detailing the results of the monitoring program will be prepared. This draft report shall be submitted to the State Historic Preservation Division within 180 days of the completion of fieldwork, for comment and approval. Approved changes and corrections will result in the final monitoring report for the proposed Maui Medical Plaza on TMK [2] 3-7-11: 028.

# APPENDIX D-3.

# Letter from Department of Land and Natural Resources, State Historic Preservation Division Accepting Archaeological Monitoring Plan

LINDA LINGLE
GOVERNOR OF HAWAII

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

September 6, 2008

Erik M. Fredericksen, M.A.
Xamanek Researches, LLC
P.O. Box 880131
Pukalani, Hawai'i 96768

LOG NO: 2008.3536
DOC NO: 0809PC08
Archaeology

Dear Erik:

**SUBJECT: Chapter 6E-42 Historic Preservation Review –**
**Archaeological Monitoring Plan for On- and Off-Site Improvements Related to Lot 8, Kanaha Industrial Subdivision II, Located on a c. 2.5 Acre Portion of Land in Wailuku Ahupua'a, Wailuku District, Maui Island**
**TMK: (2) 3-7-011:028**

Thank you for the opportunity to review this plan, which our staff received on August 8, 2008 (Fredericksen 2008): *An Archaeological Monitoring Plan for Lot 8, Kanaha Industrial Subdivision II*...Xamanek Researches, LLC.

Precautionary archaeological monitoring was recommended by your firm upon completion of an archaeological inventory survey (assessment), for which a final report was accepted in July of this year (SHPD LOG NO: 2008.2437; DOC NO: 0807PC02). While no significant cultural resources were identified during the survey, such resources may be impacted during ground altering disturbance associated with the proposed project.

As specified in the monitoring plan, there will be one archaeological monitor on site during all ground altering disturbance and for excavation within sandy substrates or culturally sensitive areas, there will be one archaeologist per piece of heavy equipment in use, as per the recommendation of the Maui/Lana'i Islands Burial Council (MLIBC). A coordination meeting with the construction crew and all other pertinent parties to explain monitoring procedures and that the monitoring archaeologist has the authority to halt work in the vicinity of a culturally significant find will be undertaken, and should anything of cultural significance be identified, the SHPD will be consulted for mitigation recommendations. The plan further states that in the event human remains are inadvertently exposed, both the SHPD and MLIBC will be notified and appropriate burial protocol followed. A report detailing the findings of the monitoring will be prepared and submitted to our office for review within 180 days after the completion of the project.

The plan contains the required information as specified in HAR §13-279-4(a) regarding the contents of monitoring plans in general and is acceptable.

Should you have any questions or comments regarding this letter, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy McMahon, Archaeologist and Historic Preservation Manager
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793
Lance Nakamura, Engineer, DPWEM, 250 S. High Street, Wailuku, Hawai'i 96793
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

# APPENDIX E.

# Cultural Impact Assessment Report

**Maui Medical Plaza at Kanahā**

**Cultural Impact Assessment**

for

Kanahā Lot 8 Project
Kanahā, Kahului, Maui

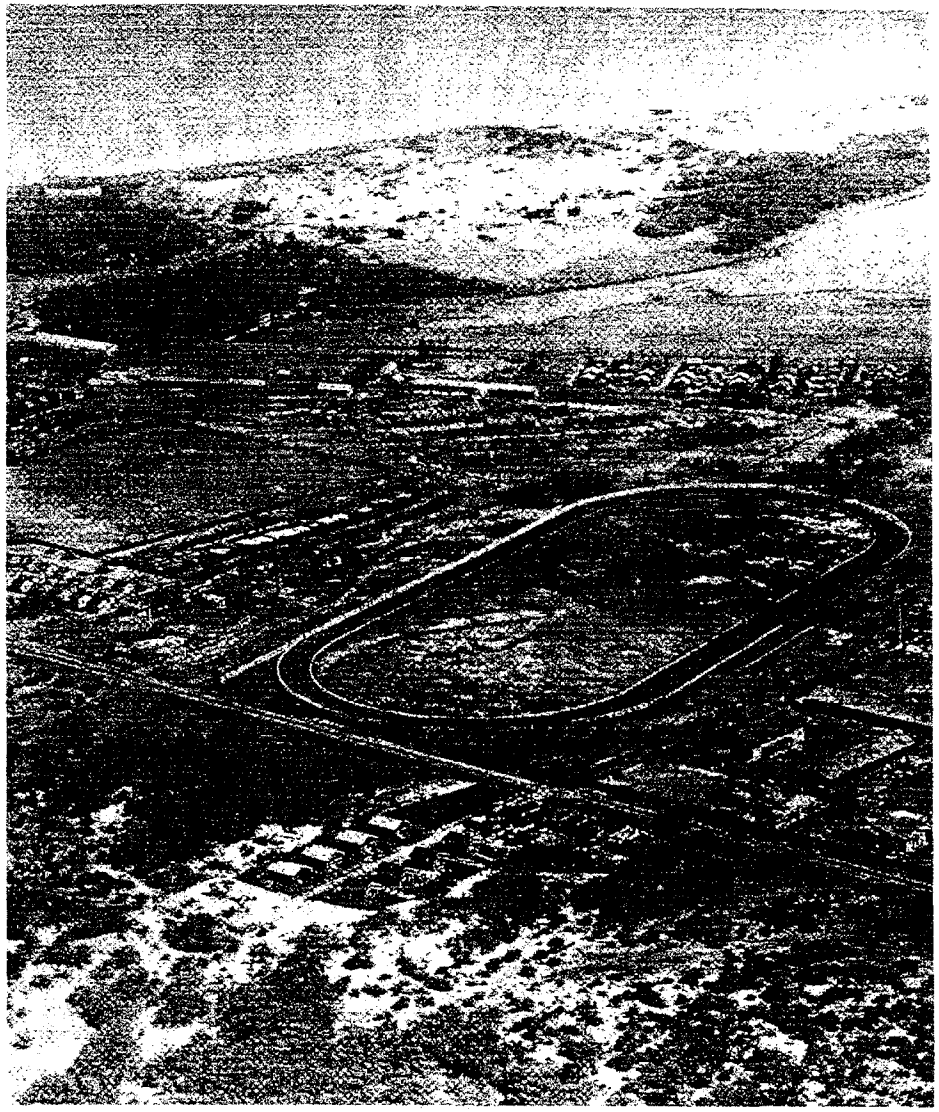
by

Jill Engledow
Historical Consultant
Wailuku, Maui
March 2008

Prepared for
Maui Medical Plaza
350 Hukilike Street, Suite D
Kahului, Maui, HI 96732



Cultural Impact Assessment
Table of Contents





Kahului circa 1926, in a photo reproduced in Alexander & Baldwin Inc.'s *Ninety Years a Corporation, 1900-1990.* Note Kanahā Pond at top right.

2005 aerial photo of area around subject property, which is indicated by an arrow

Maui Medical Plaza at Kanahā

Cultural Impact Assessment

## I. Introduction

At the request of Maui Medical Plaza at Kanahā, researcher and writer Jill Engledow prepared this Cultural Impact Assessment of the property known as Kanahā Industrial Subdivision Lot 8, TMK (2 3-7-11:028). This 2.5-acre undeveloped property is bounded on the east by a 50-foot-wide drainage canal and levee that separates it from the Kanahā Pond Wildlife Sanctuary. It is bounded on the north by a 20-foot-wide drainage canal and levee, on the northwest by retail and light industrial businesses and on the southwest by Hana Highway.

The proposed action that requires this Cultural Impact Assessment is an application for a Special Management Area Permit.

## II. Report Methodology/Resource Materials Reviewed

Sources sited in archival research are listed in the attached bibliography. Additional searches included the Internet and the indexes of a variety of books on Hawaiian culture and history which were searched for the word *Kanahā*. Maui Historical Society and the Alexander & Baldwin Sugar Museum were contacted for information or pictures. Significant input came from previous reports on the archaeological, architectural and cultural land uses in the area from Kahului Harbor to Kahului Airport, and from the *Biological Resources Survey* and *Wetland Determination* conducted for this project by environmental consultant Robert W. Hobdy and the *Archaeological Survey Assessment* by Xamanek Researches. Engledow also conducted interviews with residents who remember uses in the area over the past 50 years. The nearby Kanahā Pond Wildlife Sanctuary was designated in 1952, and has not been available for traditional fishing uses since then, so it is unlikely that many contemporary Mauians ever participated in such uses. Several who did recall traditional uses, however, were interviewed for *An Evaluation of Traditional and Customary Land Uses in the Kahului Airport Area*, a report produced in 1999 which included interviews with several kūpuna who have since passed on, and their memories are referenced in this assessment.

## III. Study Area Description

The property is on the low-lying coastal plain where Maui's commercial center, Kahului, is located. It is an undeveloped lot between buildings that house retail and light industrial businesses and a drainage canal that separates the property from Kanahā Pond. It has been densely overgrown with shrubs, primarily Indian fleabane *(Pulchea indica)*. Of the 32 plant species recorded during a botanical survey, only five were indigenous to Hawai'i



as well as to other areas, and all are of common occurrence. (Hobdy, *Biological Resources Survey*, 3-4) "From a vegetation standpoint there is little of interest or concern regarding this property in its current state, and any proposed land-use changes are not expected to have a significant negative impact on the botanical resources in this part of Maui," Hobdy's survey report said. Until recent efforts by the developers of Maui Medical Plaza to clear the area, it was a dumping ground for trash and often a camping site for homeless individuals. Other land uses in the surrounding area include Kahului Airport to the east, harbor and shipping facilities to the west, the ocean and the Kahului Wastewater Reclamation Facility to the north, and the Hāna Highway and the town of Kahului to the south.

The drainage ditch separating the property from Kanahā Pond includes a levee made of materials dredged in the creation of the ditch, its raised level preventing the mixing of waters from the ditch with those in the pond. Vuich Environmental Consultants, in a 2006 environmental study of the property, said: "Historically, the land has had fill material placed over its surface from drainage canal improvements and drainage canal maintenance (dredging). This has raised the land level of the subject property, which, historically, was likely part of the Kanaha pond (wetland)." Vuich concluded that "This assessment has revealed no evidence of *recognized environmental conditions* in connection with the property," and said a records review did not discover any current investigation of the subject site under any programs conducted by a federal, state, or local environmental agency.

Though the subject property is near Kanahā Pond Wildlife Sanctuary, the *Biological Resources Survey* found no endangered species on or using the property, although the *ae'o*, or Hawaiian stilt, was observed flying overhead. Birds in the pond have adapted to human activities that now surround it, the drainage channel constructed to remove excess groundwater from Kahului industrial area provides a wide buffer between the subject property and the pond, and the property is not suitable as water bird habitat in its present condition, Hobdy wrote. "In light of the above discussion it is felt that, should this property be developed, it would not result in significant negative impacts to the adjacent wetland habitats and species if carefully designed and constructed." (*Biological Resources Survey*, 11-12)

Similar conclusions were reached in a 2007 archaeological study by Xamanek Researches LLC, which found no significant surface material or subsurface deposits and recommended no further archaeological work other than precautionary monitoring during construction. (Xamanek, 2007, 20-21)

## IV. Study Area History

The subject property is located within the traditional ahupua'a of Wailuku in the district of Wailuku, which is part of a larger area known as Na Wai 'Eha, "The Four Waters," after the four major streams that fed the taro-growing areas of Waikapū, Wailuku, Waiehu and Waihe'e. An article in *Paradise of the Pacific* (September 1900) includes a

description of this area based on that by a native Hawaiian of "considerable age."

> The district was called Nawaieha (the four streams) and was famous throughout the group, not only for the magnificence of Kahekili's court but for the vastness of its products. The shores of Kahului harbor, from Waihee point to Haiku, were surrounded with the grass huts of the fisherman and of those connected with the innumerable war canoes of the king. Myriads of cocoanut trees lined the beach from Kahakuloa to Wailuku, the trunks of many of which are found in the marshes at Wailuku at this day, the trees having been destroyed by a conquering army from Hawaii.

The marshes referred to covered much of what became Kahului town in the 20th century, when the coastal flat area was filled with materials dredged in the development of Kahului Harbor. Within these marshes, early chiefs developed two large fishponds called Kanahā and Mau'oni. Two stories are recorded about the building of the ponds.

The ponds may have been built by Kiha-a-Pi'ilani, who lived in the early 16th century and who, with his father, Pi'ilani, built the King's Highway that circles Maui. According to Kamakau (1992:42) the Hawai'i Island chief Keawe-nui-a-'Umi sailed to Wailuku and met Kiha-a-Pi'ilani, who "was building the walls of the pond of Mau'oni."

Another story was recorded by J.G. F. Stokes, as told by Puea-a-Makakaualii (Mrs. Rosalee Blaisdell). The story says that "Kapiiohookalani, king of Oahu and half of Molokai, built the banks of *kuapa* [walls] of Kanaha and Mauoni, known as the twin ponds of Kipiioho." Laborers passed stones from hand-to-hand, and there were so many of them that "at times the men had only one *nehu* [anchovy] each for a meal and had to fill up with seaweed and salt. . ." Kapiiohookalani was killed by Alapainui of Hawai'i before the ponds were finished, leaving a daughter, Kahamaluihiikeaoihilani, and a son, Kanahaokalani. The princess later traveled on Maui, searching for her young brother, and learned that Maui chief Kamehamehanui was going to proclaim a kapu on the *kuapa* of the twin ponds. She appeared at the event, "stripped off her pa'u and stepped upon the center kuapa of the ponds. Around her waist was flying the *pola* of a white malo called the 'malokea,' a special malo worn by the high priest of the blood royal." Though the crowd who had come to watch the ceremony shouted that the kapu had been broken, normally an occasion for severe punishment, the king recognized the princess, welcomed her and let her name the ponds. The princess "named the pond makai, Kanaha, in honor of her brother Kanahaokalani, and the mauka pond Mauoni," the name she had used in her incognito travels. (Sterling, 1998: 87-88)

Both Kanahā and Mau'oni ponds were *loko wai*, "an inland freshwater fish pond which is usually either a natural lake or swamp, which can contain ditches connected to a river, stream, or the sea and which can contain sluice gates"; Kanahā's shape had been altered by man. (Kikuchi 1973: 228-229)

Wailuku was the site of several battles among the chiefs of Maui, Hawai'i and O'ahu during the 1700s. Around 1781, Maui forces defeated the invading Hawai'i Island chief Kalani'opu'u, and Kalani'opu'u and his chiefess Kalola sent the sacred chief Kiwala'o to



seek peace with Kalola's brother, Kahekili, the paramount chief of Maui. Protected by the kapu that required the Maui soldiers to prostrate themselves before him, Kiwala'o was able to approach the Maui chief at his headquarters in Wailuku. Kahekili responded positively, and told his followers, "Take the fish of Kanaha and Mau'oni and the vegetable food of Nawaieha down to Kiheipuko'a," where Kalaniopu'u and Kalola were waiting. (Kamakau, 1992:88-89)

A decade later, Kahekili's army was defeated in 'Īao Valley by another Big Island chief, who became Kamehameha I. At the time of the Great Māhele, the ali'i nui Victoria Kamāmalu was granted most of the lands in the area. In 1882, Claus Spreckels acquired fee simple title from his friend King Kalākaua to all of the Wailuku ahupua'a through Grant 3343. (Welch, Morgan, Magnuson and Prasad 2004: 8-9) In 1898, Spreckels' Hawaiian Commercial & Sugar Company was taken over by the Alexander & Baldwin group, and in 1899 A&B acquired Maui Railroad & Steamship Co. a separate Spreckels corporation that controlled much of the land around Kahului and the harbor itself, including the fishponds. (Alexander and Baldwin,1990:10, 32) Mrs. Blaisdell (interviewed in 1923) said, "The chiefess Kaipuula and her son Pumaia were the custodians of the fishponds from the time of K. I & III. . . Today it is neglected." (Sterling, 1998: 87-88)

Freshwater streams fed the ponds, where mullet were found into the early 1900s. In 1924, the *Maui News* reported that "Fine catches of large mullet are being made in Kanaha ponds since the pumping in of material dredged from the harbor bottom began. It appears that the seawater which goes with the filling material attracts the mullet to the vicinity of the pipe outlet and there they are gathered into nets, put into gunny sacks and taken away." (*Maui News,* Sept. 10, 1924)

Meanwhile, Kahului had begun to develop along the shore to the west of the ponds, and the dredging of Kahului Harbor, expanded several times during the first three decades of the 20th century, provided fill material that made it possible for the town to spread inland on former wetlands. The exact extent of the filling is not clear, but parts of Kanahā and perhaps all of Mau'oni ponds were filled, as well as areas that later became the County Fairgrounds and race track and now are shopping, business and residential areas. In 1924, the *Maui News* reported that it was hoped that reclamation of the ponds and creation of a larger canal to carry water from the ponds to the sea would lower the water table beneath Kahului. Once the new canal was completed, it was expected that the existing canal draining the ponds would be closed up. By August 1931, several rounds of dredging had resulted in a harbor deep enough for large vessels. (*Maui News,* Feb. 5, 1924; Dec. 12, 1931)

The area around Kanahā in these prewar years were largely a "bare waste where little existed besides the prickly pear, the razor back hog and the wild indigo" (Baldwin 1915:47). Maui writer Inez Ashdown noted on photos of Hawaiian stilts in Kanahā (preserved in the Maui Historical Society archives) that "the HC&S horses used to graze here. They ate the underwater grasses with water up to their eyes. All Kahului town once was part of the swampland fishpond. . . it was from the sluice gates on the beach near the

wharf to the racetrack and all across Spreckelsville beach to the Maui Country Club area." The undated notes add: "Mr. C.S. Childs and the Hui Manu saved this and made it into a bird sanctuary."

Following the attack on Pearl Harbor in December 1941, the U.S. government annexed land at Kahului for the construction of Naval Air Station Kahului, commonly called NASKA. The boundaries of NASKA extended along the stretch of Haleakalā Highway between Kahului and the Hana Highway, touching the Hana Highway at their easternmost point, and more or less followed the shoreline from Spreckelsville to a western edge just past Kanahā Pond. The subject area of this report was just outside this military-controlled property. (Yoklavich, Tomonari-Tuggle and Welch, 1997:2) Aviation facilities developed for the air station beginning in late 1942 eventually were turned over to the Territory of Hawai'i to become Kahului Airport. Remains of some of the many military buildings within the NASKA area still exist, including concrete ammunition storage structures in the Kanahā Pond area on areas that were filled and segmented by the military. (Yoklavich, Tomonari-Tuggle and Welch, 1997:12-14)

In 1951, the Territorial Board of Agriculture designated Kanahā Pond a Waterfowl Sanctuary. In 1962, the state Department of Land and Natural Resources was given a permit to manage 143 acres as a Wildlife Sanctuary by the Hawai'i Department of Transportation Airports Division, with Federal Aviation Administration approval. In 1971, the National Park Service designated Kanahā as a National Natural Landmark. In 1973, HDOT/Airports transferred management of the area to DLNR. More area was added to DLNR management in 1994; there are now 235 acres under management. "Kanaha Pond Wildlife Sanctuary (KPWS) is not only a primary wetland which is managed as habitat for Hawaii's three endangered water birds, the Hawaiian Stilt, Hawaiian Coot and Hawaiian Duck, but it is also site of intense ongoing ecosystem restoration. Its location, description and its history provide a background for the current largely volunteer driven projects which are converting the alien plant dominated landscape back to the original plant communities," wildlife biologist Fern Duvall said at a 2002 workshop on wetland management in the Hawaiian Islands. (Duvall, 2002)

Meanwhile, the development of Kahului continued, with parcels between the subject property and the harbor now developed for uses that range from retail to light industrial.

## V. Oral Interviews

### *Methodology, Procedures, and Interviewee Biographical/Organizational Information*

Contacts with a number of individuals who might have some knowledge of cultural uses in the immediate vicinity of the subject property yielded relatively little information, probably because much of this area has been set aside as a wildlife sanctuary during the lifetime of most living informants, while the rest has been in the process of urban development for decades. In addition to personal contact with individuals listed below, letters briefly outlining the development plans along with an aerial photo of the project site were sent to organizations whose jurisdiction includes knowledge of the area, asking



for input on this report. Letters were sent to Thelma Shimaoka, coordinator of the Maui branch of the Office of Hawaiian Affairs, Samuel Kalalau, chairman of the Maui County Cultural Resources Commission, and the Central Maui Hawaiian Civic Club.

Earlier studies assessing cultural impacts on traditional uses at Kahului Harbor included valuable information collected from informants who are no longer alive or are not well enough to be interviewed. *An Evaluation of Traditional and Customary Land Uses in the Kahului Airport Area* (Prasad, Tomonari-Tuggle and Welch, 1999) draws on information from a number of interviewees, in particular Charlie Keau (then aged 72), Aaron Brown (then 81), and Rene Sylva (then aged 70+). These three and others interviewed for the airport report indicated that "several types of subsistence activities related to fishing took place along the shores of Kahului, and the ponds, and nearby areas. Among these are:

1. Fishing in Kanahā Pond;
2. Shellfish gathering;
3. *Limu* gathering;
4. Turtle hunting;
5. *Hukilau,* along the coast from Kū'au to Lower Pā'ia;
6. Gathering salt from salt pans."

Keau told interviewers that Kanahā Pond and the reef area of Kahului were widely used for fishing and gathering shellfish. He remembered that Mau'oni Pond extended all the way to the old County Fairgrounds area, and that the ponds sometimes smelled from the *limu*. Aaron Brown, a fisherman for most of his life, said Piers 1 and 2 in Kahului were popular for fishing, diving and swimming in water that was very clean before the town developed. "Aaron had fished in Kanahā Pond. Along with his brothers and neighbors, he used to catch *'o'opu* and *āholehole* from the ponds; but there was also sometimes *pāpio* in the pond. They used old pipes to bring up the fish since there wasn't any need for nets. The water in the pond was very clean and the fish were visible. Depending on the season, there could be an abundance of fish in Kanahā. Aaron also recalls picking *limu* along the shoreline, and gathering salt inland of Kanahā Pond." Keau and Brown said they thought it likely taro farming had taken place alongside the ponds, although they had not actually witnessed taro growing in Kahului. Keau remembered that old-timers used to launch their canoes from "Kalo Grounds," now the location of the Maui Beach Hotel. (Prasad, Tomonari-Tuggle and Welch, 1999: 16-18)

The airport report said that while few traditional plant species are now found in the area, and there appears to be no mention of gathering from around the project area in written accounts, Rene Sylva, an expert on native Hawaiian plants, was "certain that many other species of traditional plants were found in the area but that some either have become extinct or have been displaced by plants as such as *haole koa* and *kiawe* that now surround Kanahā Pond." (ibid.: 19)

Habitation in the area was primarily related to fishing. Along with Raw Fish Camp in Wailuku (built for employees of Kahului Railroad, which was headquartered at the harbor), Hawaiian families inhabited houses along Kahului waterfront and the site of the county Wastewater Treatment Plant adjacent to Kanaha Pond. (ibid.: 20)

Contemporary informants contacted by Engledow for this report included a telephone interview with Wes Wong, a retired state forester and Wailuku resident. Wong said his grandfather, Wong Nung, moved to Maui from Kailua, O'ahu, in 1908, and obtained a government lease on the entire Kanahā Pond, where he raised ducks. Water circulated naturally between the pond and the ocean, so that fish came in and spawned and Mr. Wong was able to catch them. He held the lease until about 1916, so Wes Wong's father grew up around that area. Wes Wong say he never heard stories of native plant gathering, but *makaloa,* a sedge used for making fine mats in ancient times, grows in the pond. He said he does not know of any traditional gathering or uses of the pond today.

Another informant, attorney Guy Haywood, moved to Hawai'i in 1946 as a one-year-old. His father, a physician, worked at the Pu'unēnē and Pā'ia hospitals and helped start the Maui Clinic. Haywood recalls that the family lived in a two-story house near the present site of the Maui Beach Hotel, where there were about six houses occupied mostly by railroad supervisors, and that there were another 10 or 15 houses closer to the harbor. Later, the family moved to a house at the junction of Ka'ahumanu and Hobron avenues. When the family lived in their first house on the beach, the kids had "about a half-mile range," went fishing off the pier and could dive from the pier or the breakwater. By the time they moved to the second house, access to the pier at the beach area was getting more restricted. "We didn't go into the pond or that area," Haywood recalls. The triangle where their house was situated had two or three houses, and "everything else was kiawe trees. People didn't go in there [to Kanahā], because that wasn't the way to the beach," and there was no public access to Kanahā Pond. He said there are still concrete military bunkers in the pond where the county was storing materials when Haywood was County Corporation Counsel in the early 1990s. (Haywood, personal communication)

Lani Medieros, now on staff at Maui Historical Society, lived on Palapala Drive (between Kanahā Pond and Kahului Airport) in 1972. She said people didn't use the area around the pond at that time: "It was just weeds and grass and water."

**VII. Confidential information withheld; Conflicts in information or data**

No confidential information was withheld. There were no conflicts in information or data within the reports consulted for this Cultural Impact Assessment.

**VIII. Affects on Plan**

Because the subject property has long been surrounded by urban development on one side and a wildlife sanctuary on the other, there appear to be few if any cultural resources that might be impacted by the building of a medical office building on the site.

**IX. Individuals and Groups Contacted**

Efforts to contact individuals with personal knowledge of cultural beliefs and practices resulted in relatively few successful interviews. Many of those with traditional



knowledge have passed away, leaving what one informant called "the lost generation" who were raised as "modern Hawaiians."

Individuals contacted for possible contribution to this report or for referrals to others with knowledge included the following individuals. Most could add little to the information already included in the report:

Leslie Kuloloio, cultural specialist
Guy Haywood, former resident of the Kahului Harbor Area
Paul Gammie, former resident of the Kahului Harbor Area
Wes Wong, whose grandfather leased the pond in 1908
Robert Hobdy, environmental consultant
Charles Villalon, county worker with possible suggestions for other contacts (none of whom could be reached during the time this report was being prepared)
Lani Medieros, former resident of the Kanahā/airport area

Groups contacted were:

Office of Hawaiian Affairs, Maui Office
Central Maui Hawaiian Civic Club
Maui County Cultural Resources Commission

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# APPENDIX F.

# View Analysis

Bounty Music, Hana Highway

Project Site

Looking East


Jim Collins-Architectural Illustration
Todd Perkins-Photography

Looking North From 24 Hour Fitness Building, Hana Highway

FIRST FLOOR ELEVATION OF THE FACILITY IS 7.6'
ELEVATION OF HANA HWY CENTER OF WESTBOUND LANES IS 7.2'
ELEVATION OF CENTER OF MEDIAN IS 6.6'
ELEVATION OF HANA HWY CENTER OF EASTBOUND LANES IS 6.7'
HIGHEST POINT OF THE FACILITY – THE TOP OF THE ELEVATOR TOWER ON TOP OF THE ROOF IS 93' 1"
TAKEN FROM TANAKA TOPOGRAPHIC SURVEY 3.27.2008

Jim Collins-Architectural Illustration
Todd Perkins-Photography

76'

# APPENDIX G.

# Traffic Impact Analysis Report

# Maui Medical Plaza at Kanaha

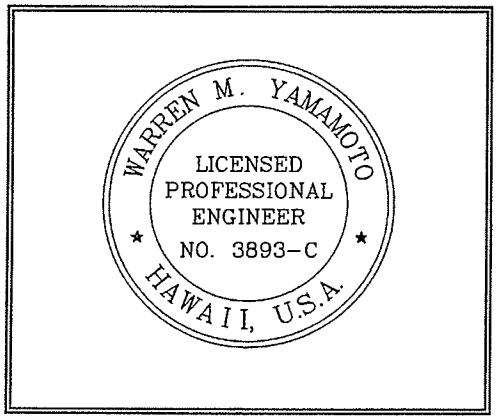
Kahului, Island of Maui, Hawai'i

## *Traffic Impact Analysis Report*

## TMK (2) 3-7-011: 028

## FIRST REVISION

January 2010




Expiration Date:
April 30, 2010

This work was prepared by me or under my direct supervision.

Signature
AECOM

27 JAN 2010
Date

# Traffic Impact Analysis Report
# First Revision

for

## Maui Medical Plaza at Kanaha
Kahului, Island of Maui, Hawai'i

**Tax Map Key Number *(2)3-7-011: 028***

**JANUARY 2010**

***Prepared for:***

**Maui Medical Plaza at Kanaha**
**350 Hukiliki Street, Suite 3D**
**Kahului, HI 96732**

***Prepared by:***

AECOM
Davies Pacific Center, 841 Bishop Street
Suite 1900, Honolulu, Hawai'i 96813

# Table of Contents

# List of Figures

# List of Tables

# TRAFFIC IMPACT ANALYSIS REPORT
# for the
# MAUI MEDICAL PLAZA AT KANAHA
# First Revision

A medical office plaza is being planned for Kahului, Maui, Hawai'i. The traffic impact analysis report dated December 2009 identified the traffic impacts of the proposed project and recommended traffic mitigating measures. This revised report responds to comments made by the State of Hawai'i Department of Transportation (HDOT).

## PROJECT DESCRIPTION

The Maui Medical Plaza at Kanaha, a professional medical plaza, is being proposed in Kahului, Maui, Hawai'i. The proposed project is intended to provide a contemporary medical facility where local health care professionals can administer improved medical services to members of the community. The medical plaza would include a six-story structure of 131,500 square feet (sf), of which 100,000 sf would be leasable space for medical doctors and technicians. This space can expect to accommodate up to 200 medical professionals and staff. The proposed project is expected to be fully occupied by 2013.

The proposed project site is situated makai of Hana Highway, approximately between the Kamehameha Avenue/Hobron Avenue and the Wakea Avenue intersections as shown on **Figure 1**. The project site is on a 2.5 acre parcel identified as TMK: (2)3-7-011: 028. The project site is bounded by long established commercial and industrial properties on its northwest boundary and by a drainage canal network owned by Mike Kitagawa on its northeast boundary. The Kanaha Pond Wildlife Sanctuary lies beyond the drainage canal networks.

The site plan and internal roadway network for the proposed project are shown on **Figure 2**. The main medical plaza building would be at the front of the property facing the Hana Highway. A six-story parking garage to match the height of the main building

would be located adjacent to and behind the main building. The parking structure would be approximately 121,800 sf and would provide approximately 360 off-street parking stalls. The proposed footprint of all proposed structures is approximately 240,000 sf. Related improvements include site grading and landscaping and the installation of underground utilities.

Two roadways would provide access to Hana Highway. The northwest roadway would be built over the existing alignment of Kanaha Place that currently serves the commercial complex northwest of the project site. The new roadway design would have the same permitted traffic movements currently permitted on Kanaha Place:

- Inbound right turns from Hana Highway,
- Inbound left turns from the median break of Hana Highway, and
- Outbound right turns onto Hana Highway.

Traffic islands would delineate these movements at the Hana Highway intersection. This roadway would provide access to the existing commercial complex and the new parking garage. All of the traffic entering the project site would have to use this access roadway. Lane striping would prohibit vehicles leaving this roadway from entering the left turn lane on Hana Highway into Kamehameha Avenue due to the proximity of these two roadway elements.

A new second roadway would be built along the southeast boundary of the property to serve as a right turn out only exit driveway. This would create a clockwise traffic pattern within the project site. Based on the project design, management expects about 70% of the outbound traffic to use this exit roadway.

Several improvements would be made to Hana Highway to accommodate the above traffic movements. The northwest bound approach of Hana Highway would be widened from two to four lanes to provide a third through lane and an acceleration/deceleration lane. The third through lane would be designed to accommodate the future widening of Hana Highway and would provide an additional lane for traffic exiting the project site to merge onto Hana Highway. The acceleration/deceleration lane would be a continuous lane beginning at the new exit driveway and terminating at the northwest access

roadway. A shuttle bus stop would also be located in the acceleration/deceleration lane to encourage transit access to the project. This design would minimize the reconstruction activity fronting the project site when Hana Highway is widened. A left turn lane in the median of Hana Highway would accommodate the left turn movements from southeast bound Hana Highway into the project site. U-turns would not be permitted at this median opening. A landscaped median with a four foot high hedge would be installed to form a physical barrier to prevent pedestrians from jaywalking across Hana Highway.

Other off-site improvements include converting the single right turn lane on the Kamehameha Avenue approach to double right turn lanes to accommodate the very high number of turns currently being made. Also, a left turn storage lane would be added to the existing U-turn median opening on Hana Highway on the Wailuku side of the Hobron Avenue/Kamehameha Highway intersection.

The intersections analyzed in this study include Hana Highway and Dairy Road, Hana Highway and Wakea Avenue, Hana Highway and Kamehameha Avenue/Hobron Avenue, Ka'ahumanu Avenue and Wharf Street/Maui Mall driveway, Ka'ahumanu Avenue and Pu'unene Avenue, Kamehameha Avenue and Pu'unene Avenue, and the two project access roadways. These study intersections are identified on **Figure 1** in relation to the proposed project site.

## EXISTING CONDITIONS

A survey of the existing roadway and traffic conditions was made in April and May 2009.

### Existing Roadways

Three highways under the jurisdiction of the State of Hawai'i Department of Transportation (HDOT) serve the project site. Kamehameha Avenue is a local road in the study area.

Hana Highway is a four-lane highway (Route 36) providing access between Paia and Kahului. Most of the intersections on the highway are channelized with separate turning lanes. The posted speed limit is 45 miles per hour (mph) east of the project site and changes to 30 mph at the project site. The Hana Highway alignment becomes Ka'ahumanu Avenue at the Hobron Triangle where the roadway turns from a northwest to southeast alignment to an east to west alignment.

There are two intersections on Hana Highway in the study area controlled by traffic signals. The traffic signal at the Dairy Road intersection operates on an eight-phase timing plan. The traffic signal at the Hobron Avenue/Kamehameha Avenue intersection operates with a split-phase for the two side streets. The southeast bound approach of Hana Highway does not permit left turns into Hobron Avenue. Left turn movements can be made at an uncontrolled median break south of the intersection. Left turns can be made into Kanaha Place or U-turns onto northwest bound Hana Highway or Hobron Avenue.

The Wakea Avenue intersection at Hana Highway is currently unsignalized. The Wakea Avenue eastbound approach is currently operating as separate left and right turn lanes, although it is not wide enough to be striped as such. Inbound left turns from Hana Highway and outbound left turns from Wakea Avenue are made through the median and are stop sign controlled within the median. Traffic signals have been proposed at this intersection; however, there is no definite schedule for their installation. Hence, two sets of forecasts were made assuming the current unsignalized condition and with the future traffic signals.

The Statewide Transportation Improvement Program (STIP) for FY 2008 thru 2013 lists the widening of Hana Highway from Ka'ahumanu Avenue to Airport Access Road with the following dates:

- FY 2009 – Design ($300,000)
- FY 2010 – Right-of-Way ($100,000)
- FY 2013 – Construction ($6,000,000)

The STIP notes that projects listed in FYs 2012 and 2013 are "informative only" and there is no definite date for start of construction. This project is not expected to change traffic patterns, but would improve traffic operations when implemented. HDOT is preparing for the highway widening project by reserving right-of-way along the project route, as it is doing for this proposed project.

Ka'ahumanu Avenue is a six-lane highway (Route 36) that provides access between Kahului and Wailuku. Its intersections with Wharf Street/Maui Mall driveway and Pu'unene Avenue are signalized and have separate left turn lanes on the highway approaches. The Wharf Street/Maui Mall driveway traffic signal has simultaneous signal phases for the side street approaches. The Pu'unene Avenue traffic signal operates on a split phase.

Pu'unene Avenue is four-lane collector (Route 350) that connects Ka'ahumanu Avenue with Kuihelani Highway and Mokulele Highway. The intersection with Kamehameha Avenue is signalized with separate left turn lanes on all approaches and an eight-phase traffic signal timing plan. The STIP lists several improvements for Pu'unene Avenue in the study area that are not expected to change traffic patterns:

- FY 2011 – Construction of bicycle improvements, Ka'ahumanu Avenue to Kuihelani Highway ($1,500,000)
- FY 2010 – Construction of safety improvements, Ka'ahumanu Avenue to Kamehameha Avenue ($500,000)

Kamehameha Avenue is a four-lane County roadway providing east-west access from Hana Highway to Pu'unene Avenue and to the residential community west of Pu'unene Avenue. Kamehameha Avenue serves the adjoining commercial uses from Hana Highway to Pu'unene Avenue.

The STIP lists another project which would impact the study intersections. The proposed Kahului Airport Access Road project has the following schedule:

- FY 2008 – Right-of-Way ($200,000)
- FY 2010 – Construction ($20,000,000)

This proposed project would divert traffic from Hana Highway and Dairy Road resulting in improved traffic operations on these two roadways. The impact of these traffic diversions was not analyzed in this study.

Traffic Volumes

Traffic turning movement counts were taken at the study intersections in two groups. Traffic counts were taken at the four Ka'ahumanu Avenue and Kamehameha Avenue intersections on April 21 and 23, and May 7 and 14, 2009, while the Maui Community College was in session. Traffic turning movement counts were taken at the Hana Highway intersections of Dairy Road and Wakea Avenue on May 20 and 21, 2009, while the college was in recess. Traffic turning movement counts require a traffic surveyor to observe traffic flow and record the movements of each vehicle crossing the intersection as either through or by their turning movements in 15 minute intervals. The worksheets from these traffic counts are included in **Appendix A**.

The current morning and afternoon peak hour traffic volumes are shown on **Figure 3**. The volumes are rounded to the nearest five vehicles per hour (vph). Traffic volumes at the Hana Highway intersections of Dairy Road and Wakea Avenue were lower as they were counted when the college was not in session. These traffic counts were adjusted upward to match the higher traffic counts taken at the Hana Highway and Hobron Avenue/Kamehameha Avenue intersection while the college was in session. The original counted volumes and the adjusted volumes are shown on **Figure 3**.

The traffic volumes at the project access intersection were not counted, but were obtained from other studies. The traffic volumes turning into/from Kanaha Place, the median break, and the roadway on the mauka side of the highway were obtained from the *Draft Traffic Impact Analysis Report, Maui Medical Plaza in Kahului, Maui, Hawaii,* by Phillip Rowell and Associates (February 2009). These traffic counts were taken three years ago but are thought to be unchanged and still applicable to this study. The through traffic volumes on Hana Highway were derived from the traffic counts taken at the Hana Highway and Hobron Avenue/Kamehameha Avenue intersection while the college was in session.

The peak direction of traffic flow on Hana Highway and Ka'ahumanu Avenue is toward Wailuku in the morning peak hour and in the opposite direction toward Paia in the afternoon peak hour. The existing traffic operations at the study intersections are discussed in the **Level of Service Analysis** section of this report.

## TRAFFIC FORECASTS

The proposed project is expected to be fully occupied by 2013. During the four year period from the traffic count date to full occupancy, ambient traffic on the area roadways can be expected to increase due to regional growth and new projects in the area. The traffic that would be generated from the proposed project was added to the ambient traffic forecast to obtain the total with project traffic forecast.

### Ambient Traffic Forecast

Traffic growth in the study area will come from regional growth in other areas whose traffic passes the project site and other projects planned in the vicinity of the proposed project. Therefore, the traffic which would be generated by these future projects was added to the estimate of regional traffic growth to obtain the ambient traffic forecast.

Several projects are planned in the Kahului area including:

- Hobron Triangle Phase 1
- Hobron Triangle Phase 2
- Maui Lani
- Kane Street Commercial Mixed Use Project
- Maui Business Park Phase 2
- Lono Avenue Student Housing
- Kahului Town Center
- Kitagawa Metal Recycling Warehouse

The traffic forecasts for these proposed projects adjacent to the project site were obtained from traffic impact analysis reports for the respective projects. The cumulative traffic assignments for the first seven projects were reported in the *Draft Traffic Impact Analysis Report, Maui Medical Plaza in Kahului, Maui, Hawaii,* by Phillip Rowell and Associates (February 2009) and are shown on **Figure 4**. The traffic volumes forecast to

be generated by the Kitagawa project, as reported in the traffic impact assessment letter for the project, are negligible and would not add to the volumes shown on **Figure 4**. The afternoon generated traffic volumes are higher than the morning generated volumes.

The *Maui Long Range Land Transportation Plan,* prepared by Kaku Associates, Inc., (February 1997), forecasts an annual island-wide growth rate of 1.6% in its 20-year forecast. Compounding this annual growth rate for a four year period resulted in a 6.6% growth factor. The current morning and afternoon peak hour traffic volumes shown on **Figure 2** were increased using the 6.6% factor. The results are summarized on **Figure 5**, with volumes rounded to the nearest five vph. The traffic forecasts from **Figure 4** for the future adjacent projects are also included on **Figure 5**. The traffic operations at the study intersections with the ambient traffic forecasts are discussed in the **Level of Service Analysis** section of this report.

Project Generated Traffic

The traditional three-step process of trip generation, trip distribution, and trip assignment was used to forecast the future traffic which would be generated by the proposed project. The trip generation step forecasts the number of new trips that would be produced in each of the two study periods. The trip distribution step allocates these new trips by direction of travel. Finally, the trip assignment step assigns the trips to the specific turning movements at the study intersections.

The trip generation step forecasts the volume of vehicle trips that would be generated by the proposed project during the morning and afternoon peak periods. The Institute of Transportation Engineers' Trip Generation report (Seventh Edition, 2003) has trip generation equations or rates to calculate the number of morning and afternoon peak hour trips that would be generated by various land uses. Two sets of trip generation rates for the Medical Office Building (ITE Land Use 720) were utilized for the proposed project.

- 131,500 sf Medical Office Building
  Morning Peak Hour - 2.48 trips per 1,000 sf
  Afternoon Peak Hour - 3.72 trips per 1,000 sf

- Medical Office Building with 200 employees
  Morning Peak Hour - 0.53 trips per employee
  Afternoon Peak Hour - 1.06 trips per employee

The proposed medical office building is expected to generate 326 and 489 morning and afternoon peak hour trips, respectively, based on its floor area. It is expected to generate 106 and 212 morning and afternoon peak hour trips, respectively, based on proposed employees. The trip generation rates based on employees result in one-third the number of trips in the morning peak and one-half the number of trips in the afternoon peak hour in comparison to the number of trips generated based upon floor area. Both trip generation rates are used in the analysis to determine if different mitigating measures would be required for each. The trips based on employees are referred to as the low rate while the trips based on building area are referred to as the high rate.

The Trip Generation report also lists the percentage of inbound and outbound trips in each peak hour. The number of generated trips was divided into inbound and outbound trips based on the information from the report, as shown on **Table 1**. Typical of commercial developments, about three-fourths of the trips are inbound in the morning peak and outbound in the afternoon peak.

The project generated trips were then distributed by direction of travel to and from the project site. The four major directions of travel and the percentage of trips in each direction are shown below:

- Ka'ahumanu Avenue – 31%
- Kamehameha Avenue – 19%
- Dairy Road (inbound) – 19%
- Kamehameha Avenue to Pu'unene Avenue (outbound) – 19%
- Hana Highway – 31%

The Ka'ahumanu Avenue route would serve Wailuku and the communities west of Kahului. The Kamehameha Avenue route would serve the Kahului community. The Dairy Road and Kamehameha Avenue/Pu'unene Avenue routes would serve traffic from Kuihelani Highway and Mokulele Highway. The Hana Highway route would serve the communities east of Kahului. The trip distribution factors were then used in the trip distribution analysis on **Table 1**. The same factors were used for the morning (AM) and afternoon (PM) peak hours.

The project generated traffic volumes were assigned to the study area network, assuming that the Wakea Avenue intersection would remain unsignalized. Incoming trips on the Ka'ahumanu Avenue route would need to make a left turn through the median break of Hana Highway to access the project site. Outgoing trips would make a right turn onto Hana Highway and continue to Ka'ahumanu Avenue. Incoming trips on Kamehameha Avenue would make a right turn onto Hana Highway and make a left turn through the median. Outgoing trips would make a left turn from Hana Highway to Kamehameha Avenue. Incoming trips on the Dairy Road route would make a left turn onto Hana Highway and then make a right turn into the project site. Outgoing trips would make a left turn from Hana Highway to Kamehameha Avenue, and then a left turn onto Pu'unene Avenue to return to Kuihelani Highway or Mokulele Highway. Incoming trips on the Hana Highway route would make a right turn into the project site. Outgoing trips would have to turn onto Hana Highway and continue to Ka'ahumanu Avenue, make a U-turn through the median break, and return to Hana Highway. The results of the traffic assignment analysis are shown on **Figure 6** with the volumes not rounded. Four different scenarios are shown in **Figure 6**:

A - AM peak hour with low trip generation based on number of employees

B - PM peak hour with low trip generation based on number of employees

C - AM peak hour with high trip generation based on building area

D - PM peak hour with high trip generation based on building area

Total Forecast Volumes

The four project generated traffic assignment volumes from **Figure 6** were added to the ambient traffic forecasts from **Figure 5** to obtain the four total with project traffic forecasts shown on **Figure 7**. The traffic volumes are rounded to the nearest five vehicles per hour. As with the project generated traffic assignment figures, four figures are show for the total with project forecasts.

Two adjustments to the traffic assignments were made. First, 70% of the outbound trips from the project were assumed to use the project exit driveway. This adjustment is not shown on **Figure 7**. Second, an adjustment was made for the traffic pattern changes that would be required when a traffic signal is installed at the Wakea Avenue intersection, such as the closure of the median break. The second adjustment is included as an inset on **Figure 7**. It was assumed that traffic assignment changes would not occur with the addition of traffic signals (i.e. a greater number of left turns made from Wakea Avenue).

## LEVEL OF SERVICE ANALYSIS

The concept of level of service is used to quantify the quality of traffic flow on roadway facilities. The Transportation Research Board (TRB) has developed procedures to calculate level of service value(s) by measuring traffic volumes against the capacities of different types of roadway facilities. Their Highway Capacity Manual 2000 (HCM2000) describes the various procedures developed for freeways, highways, signalized and unsignalized intersections, etc. The study intersections include both signalized and unsignalized intersections.

This section discusses the changes in quality of traffic operations at the study intersections with and without the proposed project. The forecast scenarios which were analyzed included:

- 2009 Existing Traffic
- 2013 Ambient Traffic Forecast
- 2013 Total with Project based on Employees (Low) Trip Generation
- 2013 Total with Project Low Trip Generation and Wakea Avenue Traffic Signal (for unsignalized intersection only)
- 2013 Total with Project based on Floor Area (High) Trip Generation
- 2013 Total with Project based on Floor Area (High) Trip Generation and Hana Highway widening.
- 2013 Total with Project High Trip Generation with off-site improvements.

**Table 2** summarizes the signalized intersection level of service analysis while **Table 3** summarizes the unsignalized intersection level of service analysis. Each table shows the existing, ambient forecast, and the several total with project forecast levels of service placed side by side for each of the two (AM and PM) study periods. This format facilitates a comparison of levels of service for the different forecast scenarios and can give an indication of the traffic impacts of ambient traffic growth and the proposed project.

Hana Highway generally runs in a northwest to southeast direction. However, as the highway capacity program has a limitation to stay with the four major directions of travel, within the program Hana Highway is modeled with a north-south alignment and its side streets in with an east-west alignment. Ka'ahumanu Highway is described as running in an east-west direction and its side streets in a north-south direction. Pu'unene Avenue is described as running in a north-south direction and Kamehameha Avenue in an east-west direction.

Signalized Intersection Analysis

The methodology for analyzing signalized intersections calculates the levels of service for individual movements, approaches, and the intersection as a whole based on the average stopped delay per vehicle. The results range from level of service A (best with average delays less than ten seconds) to F (worst with average delays longer than 80 seconds), described as follows:

| SIGNALIZED INTERSECTION LOS | |
|---|---|
| **LEVEL OF SERVICE** | **CONTROL DELAY PER VEHICLE (Seconds/Vehicle)** |
| A | < 10.0 |
| B | 10.1 to 20.0 |
| C | 20.1 to 35.0 |
| D | 35.1 to 55.0 |
| E | 55.1 to 80.0 |
| F | > 80.1 |

Many jurisdictions consider levels of service A to D as acceptable for areas like Maui, with levels of service E and F indicating the need for mitigating measures. For signalized intersections, the major streets can be designed to have a higher level of service than the side streets or turning lanes.

The five existing signalized study intersections include:

- Ka'ahumanu Avenue and Pu'unene Avenue
- Ka'ahumanu Avenue and Wharf Street/Maui Mall driveway
- Hana Highway and Hobron Avenue/Kamehameha Avenue
- Hana Highway and Dairy Road
- Pu'unene Avenue and Kamehameha Avenue.

The Hana Highway and Wakea Avenue intersection is currently unsignalized but is programmed for the installation of traffic signals in the near future. For the total with project high rate forecast scenario, the intersection was analyzed as an unsignalized and signalized intersection.

The results of the signalized intersection analysis shown on **Table 2** include the level of service, average delay, and volume/capacity (v/c) ratio for the intersection only. The traffic statistics for the individual approaches and movements are included on the worksheets in **Appendix B**. The traffic operation statistics for the signalized intersections were calculated with the Synchro 7 software program that simulates and optimizes traffic signal timings in a roadway network.

The Ka'ahumanu Avenue and Pu'unene Avenue intersection is currently operating at level of service C in the morning peak and is forecast to remain the same for the future scenarios. The intersection is currently operating at level of service D in the afternoon peak and is forecast to change to level of service E for the future conditions. This change in level of service would occur with the increase in ambient traffic and would remain at the same level of service E with the project generated traffic, except in the "with off-site improvements" scenario.

The Ka'ahumanu Avenue and Wharf Street/Maui Mall driveway intersection is currently operating at level of service A in the morning peak and is forecast to remain the same for the future scenarios, with the exception of the "with off-site improvements" scenario. The intersection is currently operating at level of service B in the afternoon peak and is forecast to remain the same or better for all of the forecast conditions. The above results indicate that traffic operations at these two Ka'ahumanu Avenue intersections would not be adversely affected by traffic generated from the proposed project.

The Hana Highway and Hobron Avenue/Kamehameha Avenue intersection is the closest signalized intersection to the proposed project, and all traffic exiting the project would have to pass through it. The intersection is currently operating at level of service C in the morning peak and is forecast to change to level of service D or remain at level of service C for the future scenarios. Hobron Avenue is the only approach operating at an unacceptable level of service E in the morning peak. This approach is forecast to change from level of service E to F with the increase in ambient traffic, with slight increases in delay due to traffic from the proposed project.

The intersection is currently operating at level of service F in the afternoon peak and is forecast to experience longer delays as increases in ambient traffic and project generated traffic are added. The Hana Highway eastbound, Hobron Avenue, and Kamehameha Avenue approaches are currently operating at level of service F. The Kamehameha Avenue approach is operating at level of service F in part due to the long delays caused by the high traffic volumes on the right turn lane. Delay on the Kamehameha Avenue single right turn lane would lengthen with the increased ambient traffic and lengthen further with the additional project generated traffic. Delay on the eastbound approach of Hana Highway would increase with the additional traffic from the ambient traffic and the proposed project. Delay on the Hobron Avenue approach would increase with the ambient traffic but remain unchanged with the additional project generated traffic.

The proposed widening of Hana Highway would mitigate some of the traffic problems at the Hobron Avenue/Kamehameha Avenue intersection by increasing the capacity of Hana Highway as evidenced by the reduced v/c value shown on **Table 2**. The intersection level of service during the PM peak would remain at level of service F; however, there would be reductions in delay on the two Hana Highway approach through lanes and a shorter cycle length would be possible. Other improvements which could improve traffic operations include converting the Kamehameha Avenue shared left turn/through lane into an exclusive left turn lane and changing the split-phase operation into an eight-phase traffic signal timing plan. Alternatively, the left turn movement from the Kamehameha Avenue approach could be prohibited to eliminate the split-phase. An eight-phase traffic signal timing plan is slightly more efficient than a split-phase, and can provide slightly greater traffic capacity.

The addition of a second right turn lane could be done without any right-of-way acquisition as shown on **Figure 8** to increase the capacity for this movement. The intersection level of service during the PM peak would still be at level of service F; however, the delay would be reduced as evidenced by the reduced v/c value shown on **Table 2**. The level of service for the right turn movement would improve from F to D.

The above improvements would widen the Kamehameha Avenue approach from two to three/four lanes and probably require right-of-way acquisition for the four lane improvements.

The Hana Highway and Dairy Road intersection is currently operating at level of service D in the morning peak and is forecast to change to level of service E for the future scenarios with the high trip generation rates. The intersection is currently operating at level of service E in the afternoon peak and is forecast to remain the same for the ambient forecast condition. However, it would change to level of service F for the future with project scenarios.

The construction of the two proposed roadway improvement projects would help to mitigate the existing and forecast traffic problems at this intersection. As previously discussed, the planned widening of Hana Highway to six lanes would need to be combined with other mitigating actions to bring about level of service D or better conditions, especially at the Hobron Avenue/Kamehameha Avenue intersection. The proposed Kahului Airport Access Road would divert traffic from Dairy Road and result in improved traffic operations at this intersection.

The Pu'unene Avenue and Kamehameha Avenue intersection is currently operating at level of service D in the morning peak and is forecast to remain the same for the future scenarios. The intersection is currently operating at level of service D in the afternoon peak and is forecast to remain the same for the future scenarios, with one exception. This result indicates that the traffic operations at this intersection would not be affected by traffic generated from the proposed project.

The Hana Highway and Wakea Avenue intersection would operate at level of service C in both peak periods with traffic signal control and the proposed project. The traffic operations at this intersection would not be adversely affected by traffic generated by the proposed project.

Unsignalized Intersection Analysis

The procedure used for analyzing unsignalized intersections calculates vehicle delays and levels of service based on the distribution of gaps in traffic on the major street and driver judgment in selecting gaps through which to execute turns. For two-way stop intersections where only the minor street traffic is controlled by a stop sign, levels of service are calculated for the critical turning movements including outbound movements from the stop-controlled approach and left turns from the main road to the minor road. The procedure does not calculate an overall intersection level of service.

The Highway Capacity Manual defines the relationship between level of service and delay (in seconds/vehicle) for unsignalized intersections as shown below:

| UNSIGNALIZED INTERSECTION LOS | |
|---|---|
| **LEVEL OF SERVICE** | **DELAY (Seconds/Vehicle)** |
| A | < 10.0 |
| B | 10.1 to 15.0 |
| C | 15.1 to 25.0 |
| D | 25.1 to 35.0 |
| E | 35.1 to 50.0 |
| F | > 50.1 |

Levels of service A to D are considered acceptable for unsignalized intersections. Level of service F (with average delays longer than 50 seconds) is considered undesirable for unsignalized intersections and would indicate the possible need for mitigation.

Three unsignalized intersections which were analyzed are located on Hana Highway and include:

- The proposed project access,
- The proposed project exit east of the project access, and
- Wakea Avenue.

Drivers leaving the project and wanting to travel eastbound on Hana Highway would need to make a U-turn in the existing median opening on Ka'ahumanu Avenue. The U-

turn movement was analyzed as a southbound left turn movement onto eastbound Ka'ahumanu Avenue.

The results of the unsignalized intersection analysis shown on **Table 3** include level of service, delay, and queue length. The traffic operations statistics were generated by the Highway Capacity Analysis Program (HCAP), as the Synchro program focuses on signalized intersections. The HCAP does not accurately calculate the level of service for the proposed project access and project exit roadways since it is limited to an analysis of three main roadway lanes. For the proposed project, the highway would have four lanes fronting the project site. Therefore, the procedure is expected to underestimate (calculate worse than actual) level of service for the outbound right turn movements from the two project roadways for the total with project scenarios. The affected level of service results are marked by an asterisk (*) to indicate that the actual levels are expected to be better than shown.

The current traffic movements analyzed by the HCAP at the project access intersection include the project access roadway, the left turns through the median break, and a roadway on the mauka side of Hana Highway across from the median break. The proposed project access roadway would be incorporated onto the existing Kanaha Place alignment serving the adjacent commercial center, as previously described. Only right turn movements are permitted out of the driveway as is currently the case. When the Wakea Avenue traffic signal is implemented, the median break would be closed and the left turn movements would be diverted to a U-turn lane at Wakea Avenue. The commercial center/project driveway (Kanaha Place) would then be restricted to right turn in, right turn out movements.

The analysis results shown on **Table 3** indicate that the outbound right turn movement at the project access driveway is currently operating at levels of service C and B in the morning and afternoon peaks, respectively, indicating acceptable traffic operations. The movement is forecast to be at an acceptable level of service C for the future scenarios, except in the PM peak with high trip generation and off-site improvement scenario. A still acceptable level of service D is forecast for this scenario. The proposed project

access roadway is expected to have acceptable traffic operations even with the calculation of worse than actual levels of service by the analysis program.

The left turn from the highway median break is currently operating at levels of service C and B in the morning and afternoon peaks, respectively, and is forecast to decline one level to D and C with the future scenarios. While levels of service B and C imply acceptable conditions, observations of highway traffic operations elsewhere indicate that left turns from the highway are difficult to make during levels of service B and C conditions and would probably require mitigation. The above analysis indicates that left turns from the highway median break would require mitigation for the current and all future peak hour conditions. The proposed implementation of traffic signals at Wakea Avenue would allow this median break to be closed and would be one form of mitigation.

The proposed project exit driveway would be located east of the project access driveway and would be present only for the total with project scenarios. The project exit driveway is expected to handle up to 70% of the traffic leaving the proposed project based on the site design. The exit driveway is forecast to operate at level of service C in the morning peak with the low trip generation rates, and level D with the high trip generation rates. The driveway is forecast to operate at level of service D in the afternoon peak with the low trip generation rates, and level F with the high trip generation rates, although the actual operations may be better than calculated. These results indicate the possible need for mitigation at this intersection with the high trip generation rates. A proactive plan to ensure that the trips produced by the proposed project are closer to the low trip generation rates would be one mitigating measure.

The Wakea Avenue eastbound approach is currently operating as separate left and right turn lanes although it is not wide enough to be striped as such. The right turn movement is operating at level of service B in the morning peak, and is forecast to remain at the same level for the future scenarios. This movement is operating at level of service F in the afternoon peak. The left turn movement at the eastbound approach is already operating at level of service F in both peak periods. The left turn movement

from the highway is currently operating at level of service C in the morning peak, and is forecast to remain at the same level in the future scenarios. It is currently operating at level of service D in the afternoon peak and is forecast to worsen to level F in the future. These results indicate the need for mitigation at this intersection. The proposed implementation of traffic signals would be one form of mitigation as previously discussed.

The existing U-turn on Ka'ahumanu Avenue would operate at level of service B in the morning peak and at level of service C or D in the afternoon peak with the project, indicating acceptable conditions. The longest calculated queue length is for three vehicles. A proposed design for the U-turn storage lane is shown on **Figure 9**.

## RECOMMENDATIONS AND CONCLUSIONS

The traffic impacts of the proposed project can be minimized with the implementation of adequate mitigation. Project management should pursue the implementation of their proposed project improvements as previously discussed in this report.

Project management should pursue its proposal to widen the northwest bound approach of Hana Highway to include three through lanes and an acceleration/deceleration lane fronting the entire project site. The third through lane would be designed to accommodate the future widening of Hana Highway and would minimize the reconstruction activity fronting the project site when Hana Highway is widened from Ka'ahumanu Street to Dairy Road. The acceleration/deceleration lane would provide a long length for traffic exiting the project to merge into the through lanes and would also provide space for a shuttle bus stop to encourage transit access to the project.

Project management should implement a Traffic Management Plan to minimize the volume of trips generated to and from the proposed project. Two distinct trip generation rates were analyzed based on number of expected employees and building floor area. The number of trips with the former rate was less than half the number of trips with the latter rate. The level of service analysis indicated that several intersections would be

more adversely affected with the higher number of trips. A proactive program to reduce the volume of vehicle trips made to the proposed project to be closer to the lower rate could mitigate some of the problems associated with the high trip rates.

Several roadway improvement projects proposed for the study area by the State and County would mitigate existing and ambient traffic problems as well as the additional traffic generated by the proposed project. These roadway improvement projects include:

1. Widening of Hana Highway from Ka'ahumanu Avenue to (new) Airport Access Road.
2. New Kahului Airport Access Road.
3. Installation of traffic signals at the Hana Highway and Wakea Avenue intersection.

In addition to the Hana Highway widening, other improvements could be made on the Kamehameha Avenue approach. Project management is proposing to add a second right turn lane to increase the roadway traffic capacity. Alternatively, the shared left turn lane could be made into a separate left turn lane so that the current split-phase signal timing could be replaced with an eight-phase traffic signal timing plan. An eight-phase traffic signal timing plan is slightly more efficient than a split-phase timing plan and can provide more capacity along the roadway.

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# *Figures*

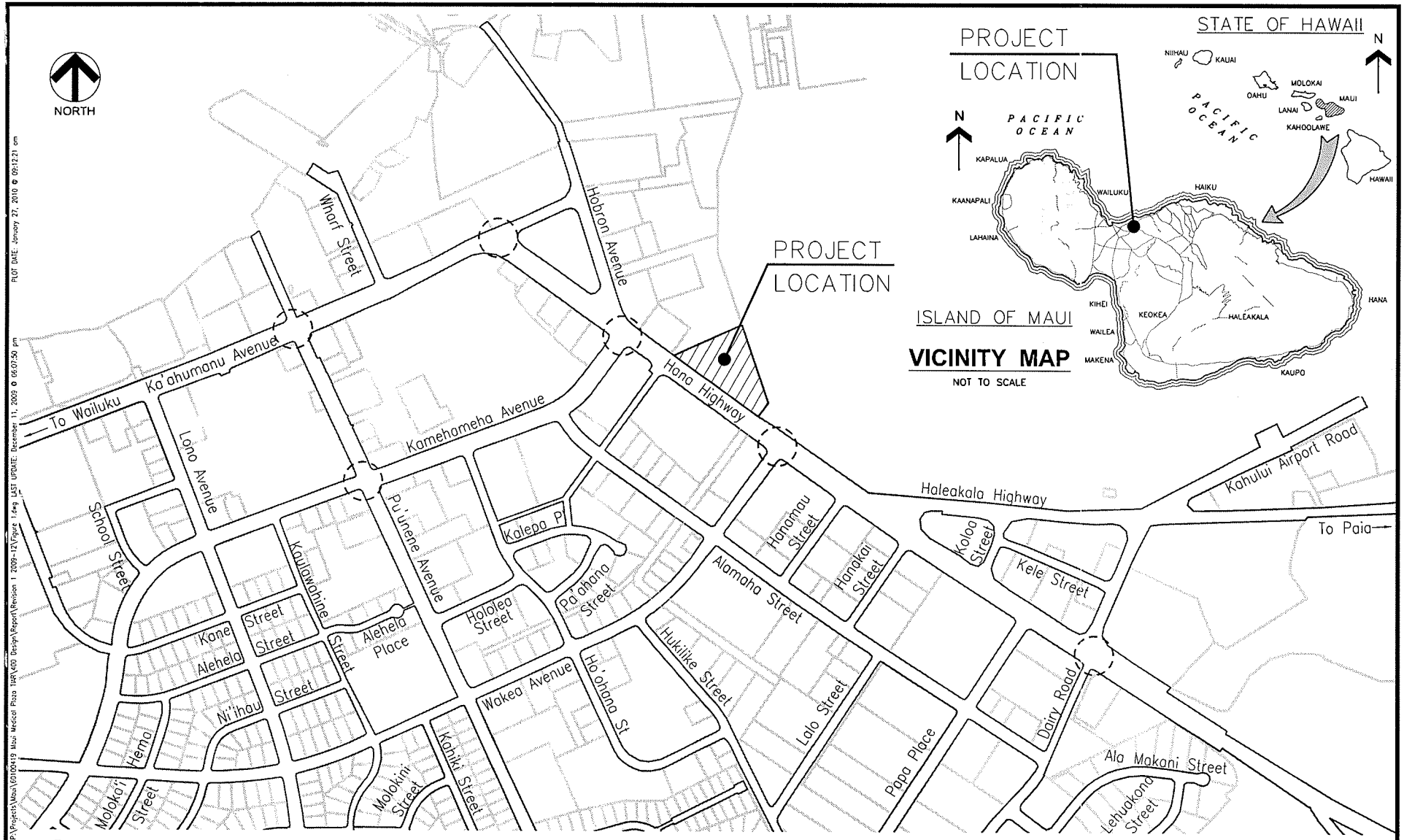


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**Figure 1**
**LOCATION MAP**
TRAFFIC IMPACT ANALYSIS REPORT, FIRST REVISION
MAUI MEDICAL PLAZA AT KANAHA
KAHULUI, MAUI, HAWAII

JANUARY 2010

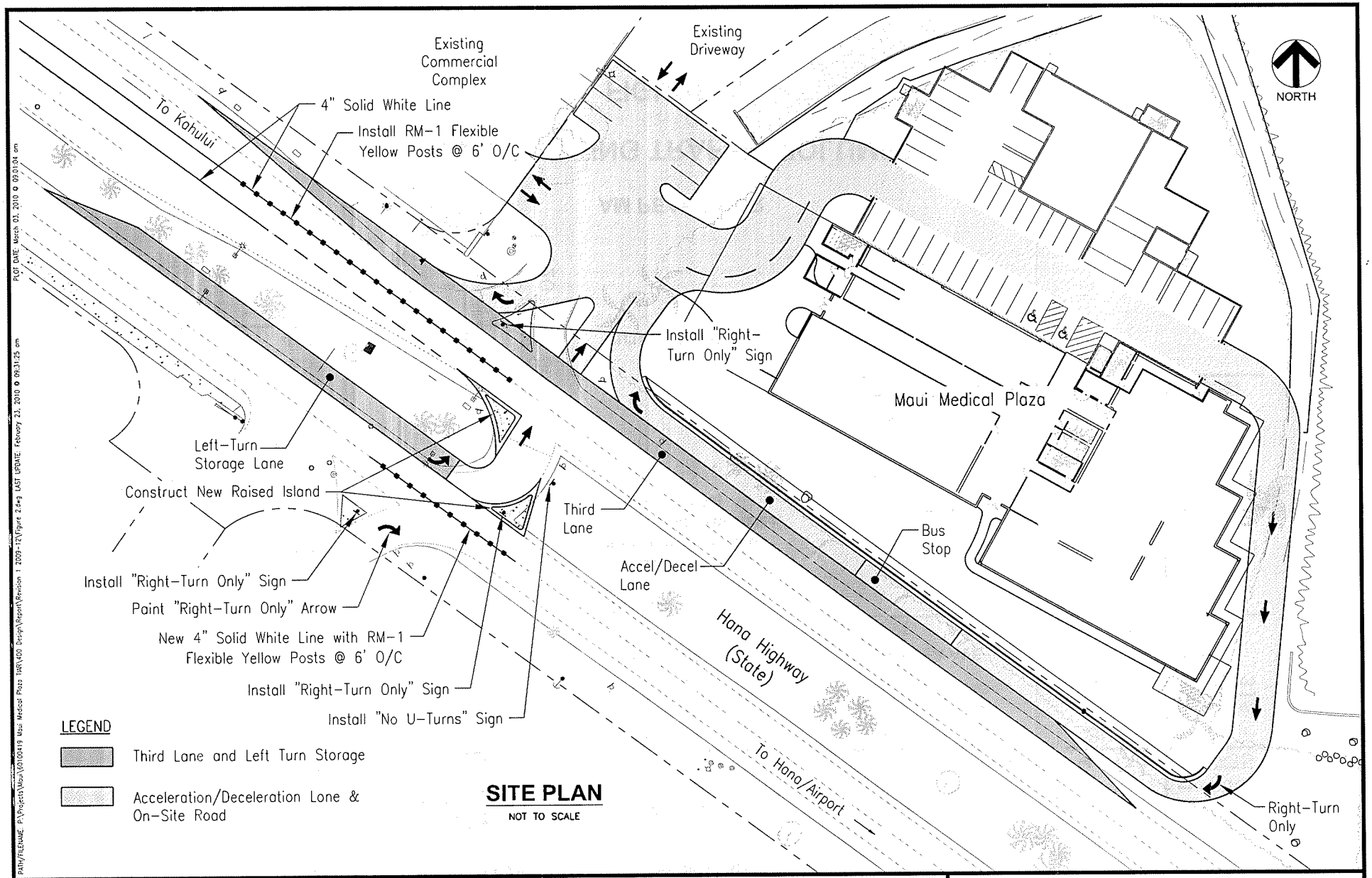


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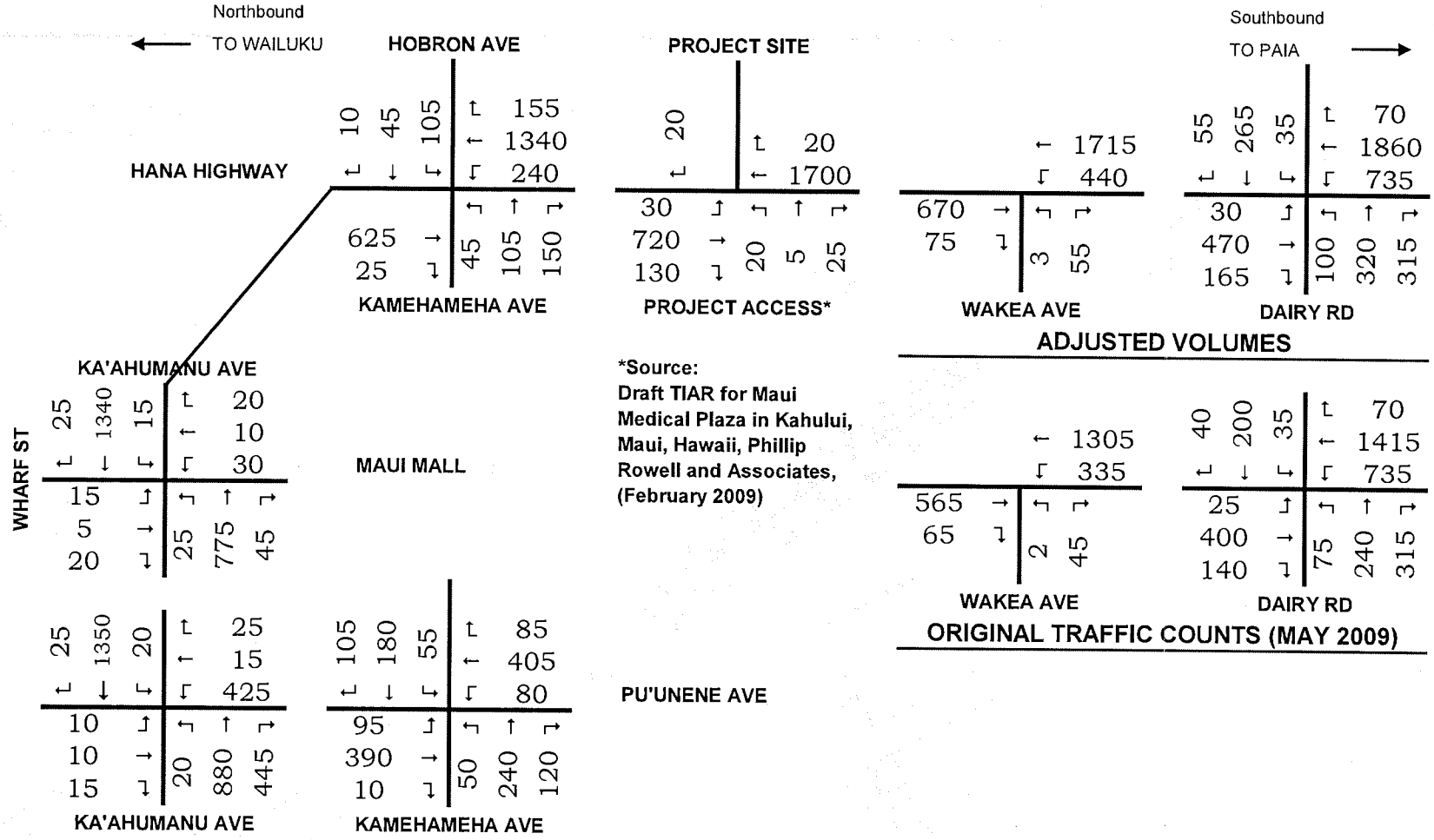
**Figure 2**
**SITE PLAN**
TRAFFIC IMPACT ANALYSIS REPORT, FIRST REVISION
MAUI MEDICAL PLAZA AT KANAHA
KAHULUI, MAUI, HAWAII

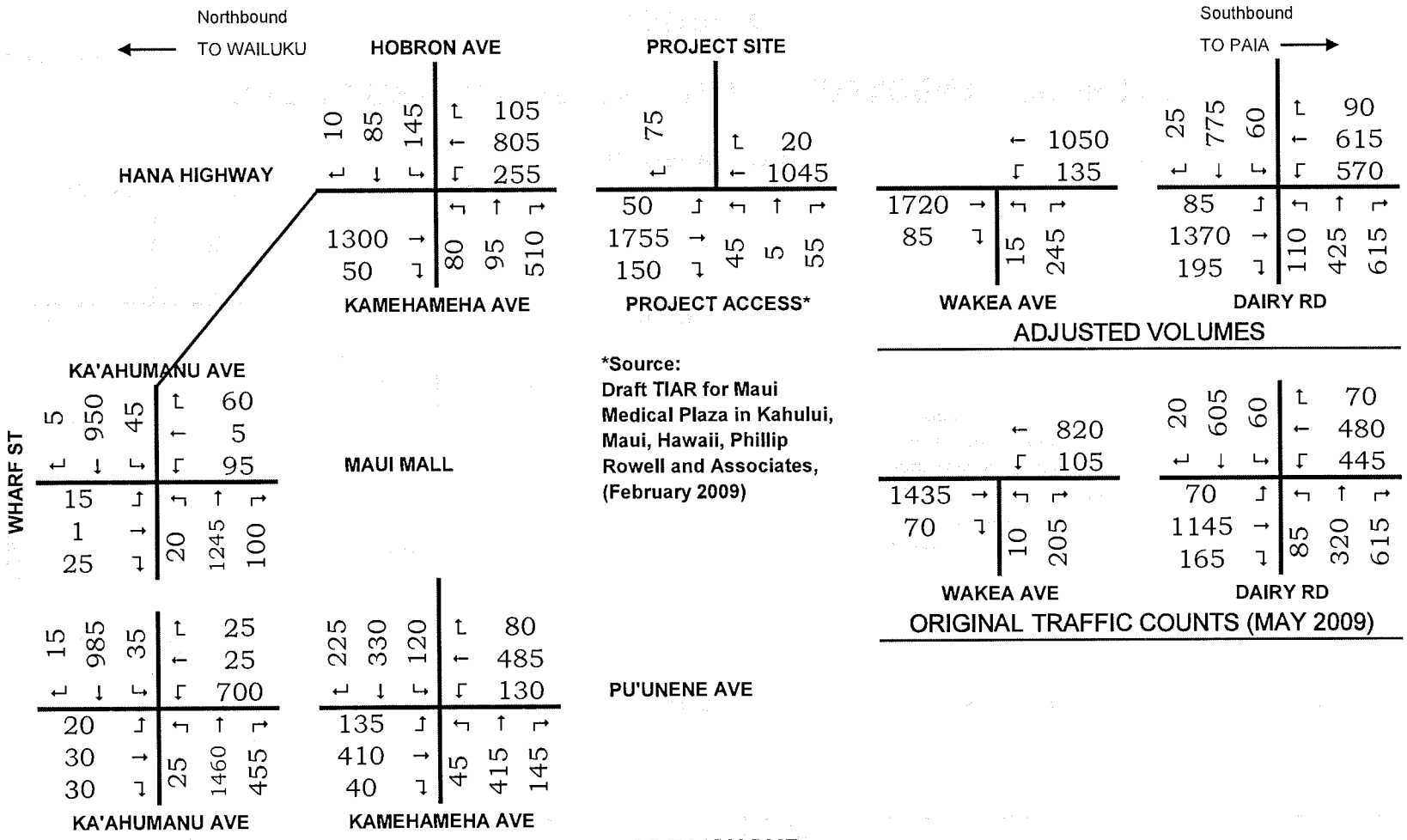
JANUARY 2010




# 2009 EXISTING TRAFFIC VOLUMES

Not to scale

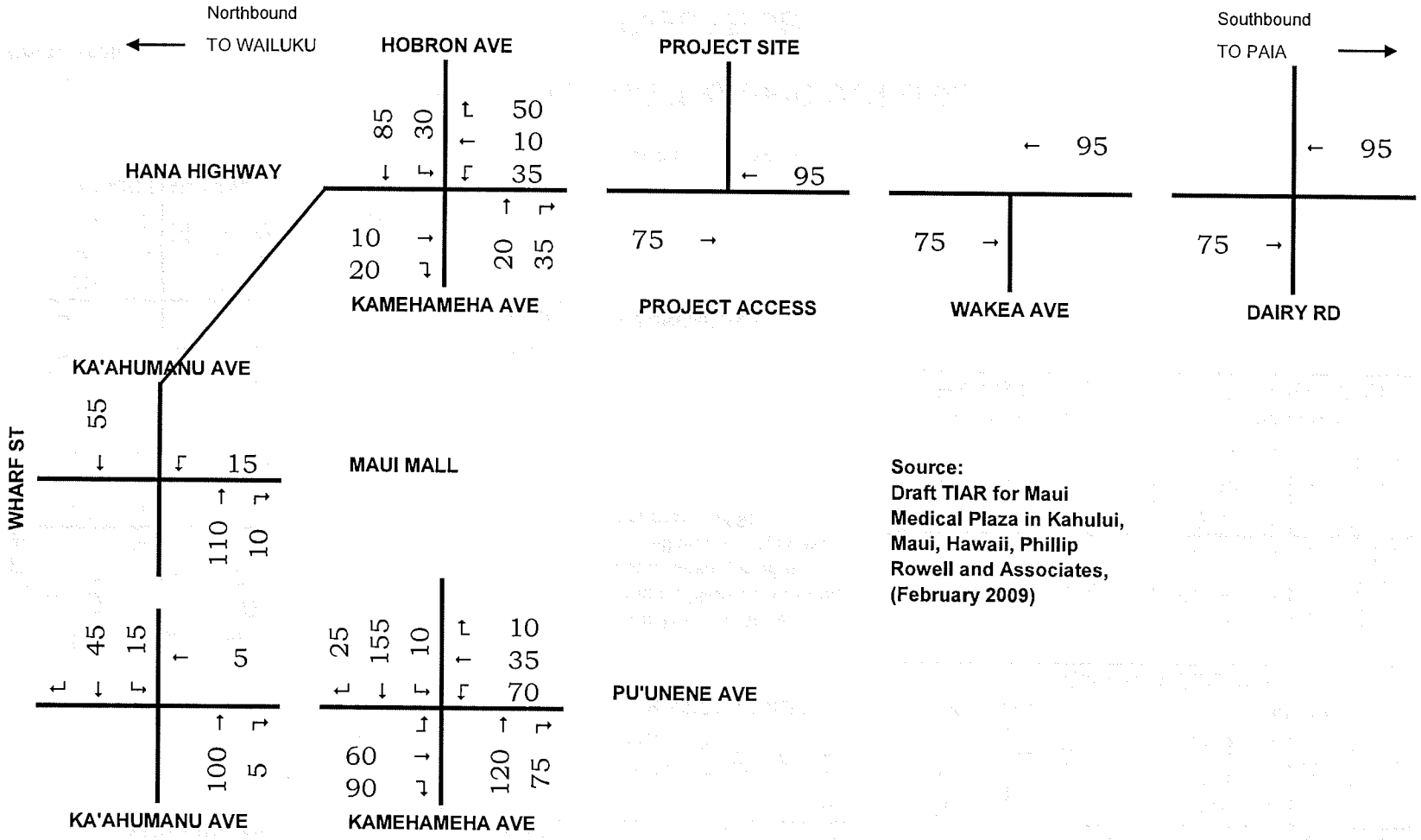
# FIGURE 3A




# 2009 EXISTING TRAFFIC VOLUMES

Not to scale

# FIGURE 3B



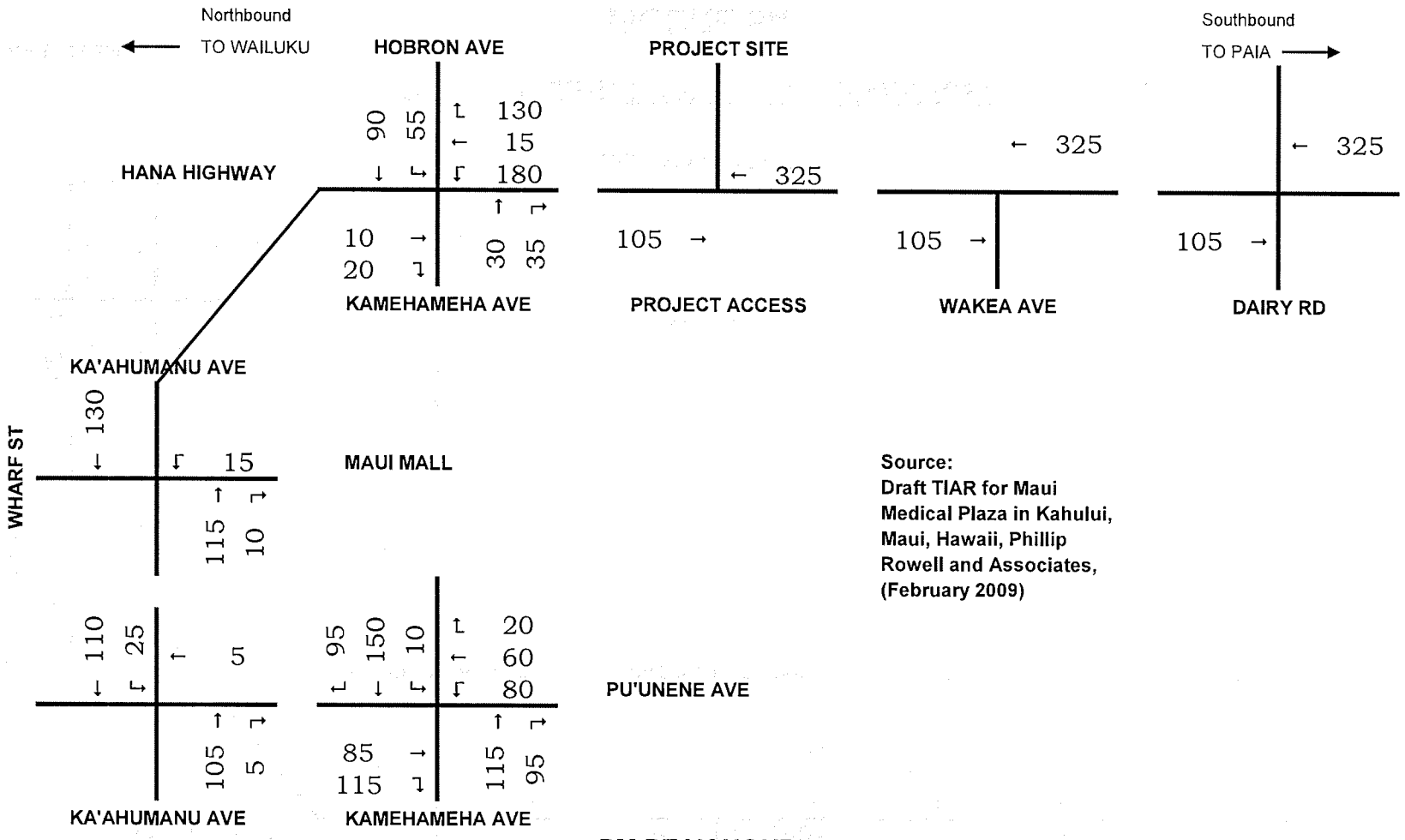

Source:
Draft TIAR for Maui Medical Plaza in Kahului, Maui, Hawaii, Phillip Rowell and Associates, (February 2009)

AM PEAK HOUR

# TRAFFIC GENERATED BY FUTURE ADJACENT PROJECTS

Not to scale

# FIGURE 4A

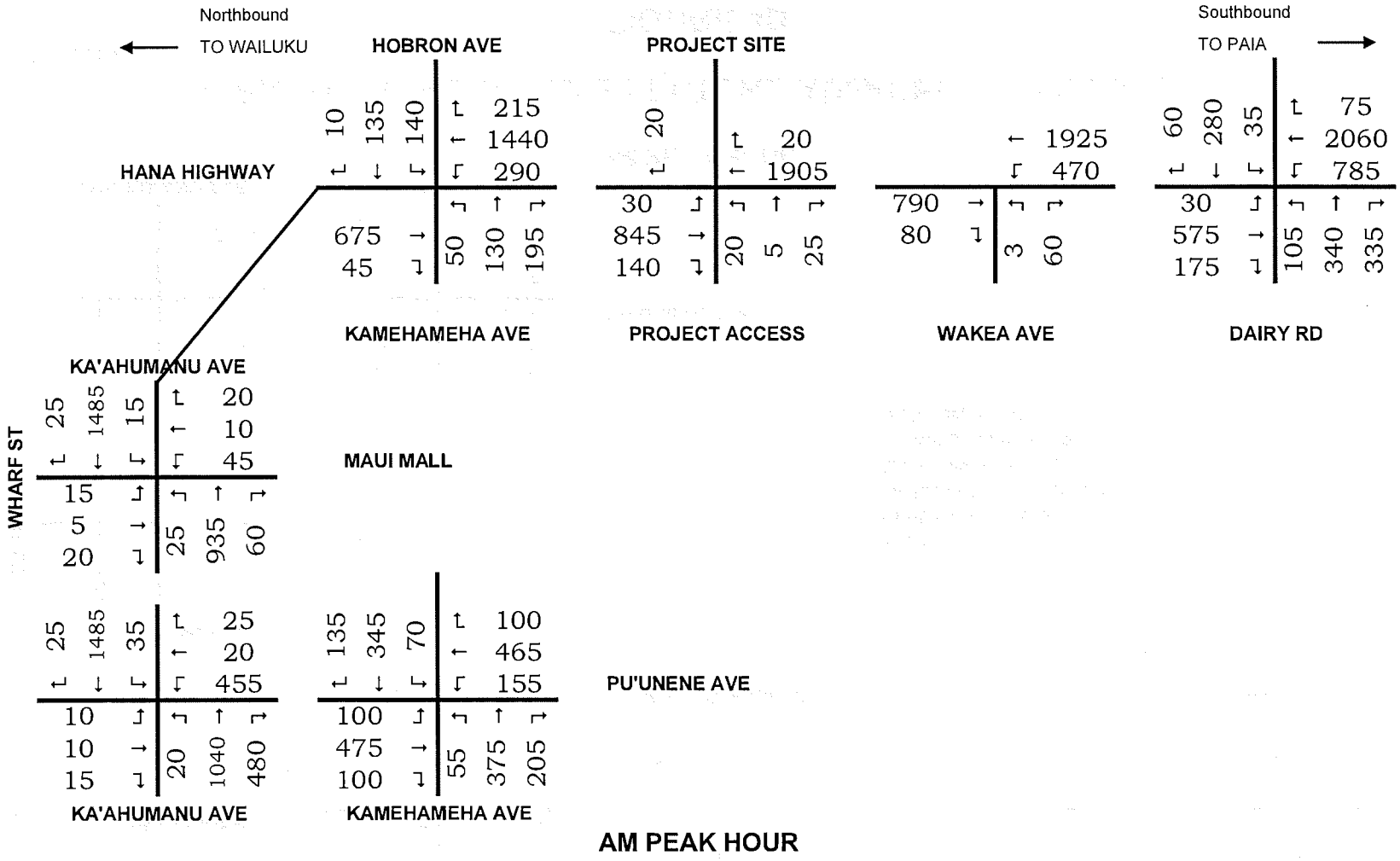



Source:
Draft TIAR for Maui Medical Plaza in Kahului, Maui, Hawaii, Phillip Rowell and Associates, (February 2009)

# TRAFFIC GENERATED BY FUTURE ADJACENT PROJECTS

Not to scale

# FIGURE 4B

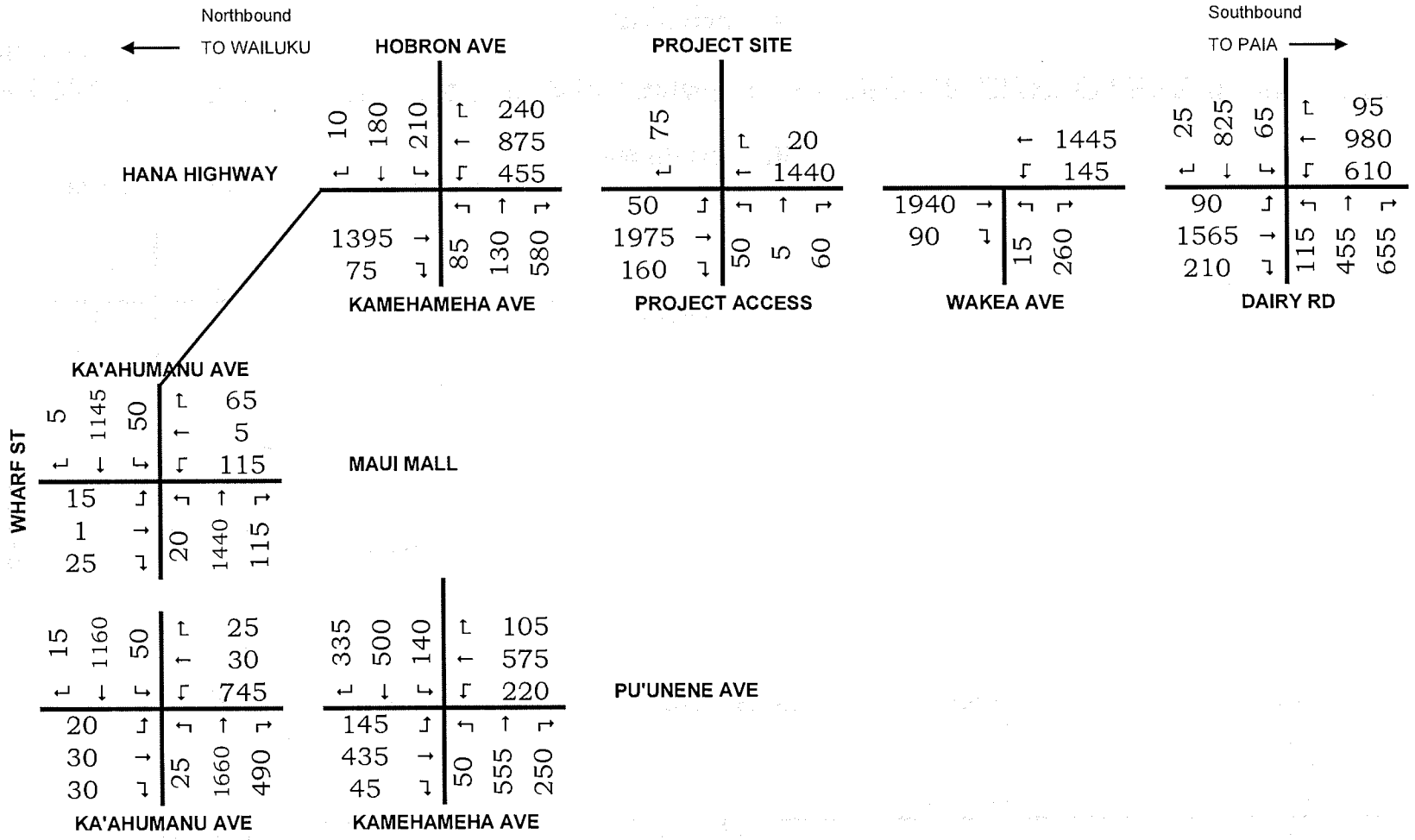



AM PEAK HOUR

# 2013 AMBIENT TRAFFIC FORECAST

Not to scale

# FIGURE 5A

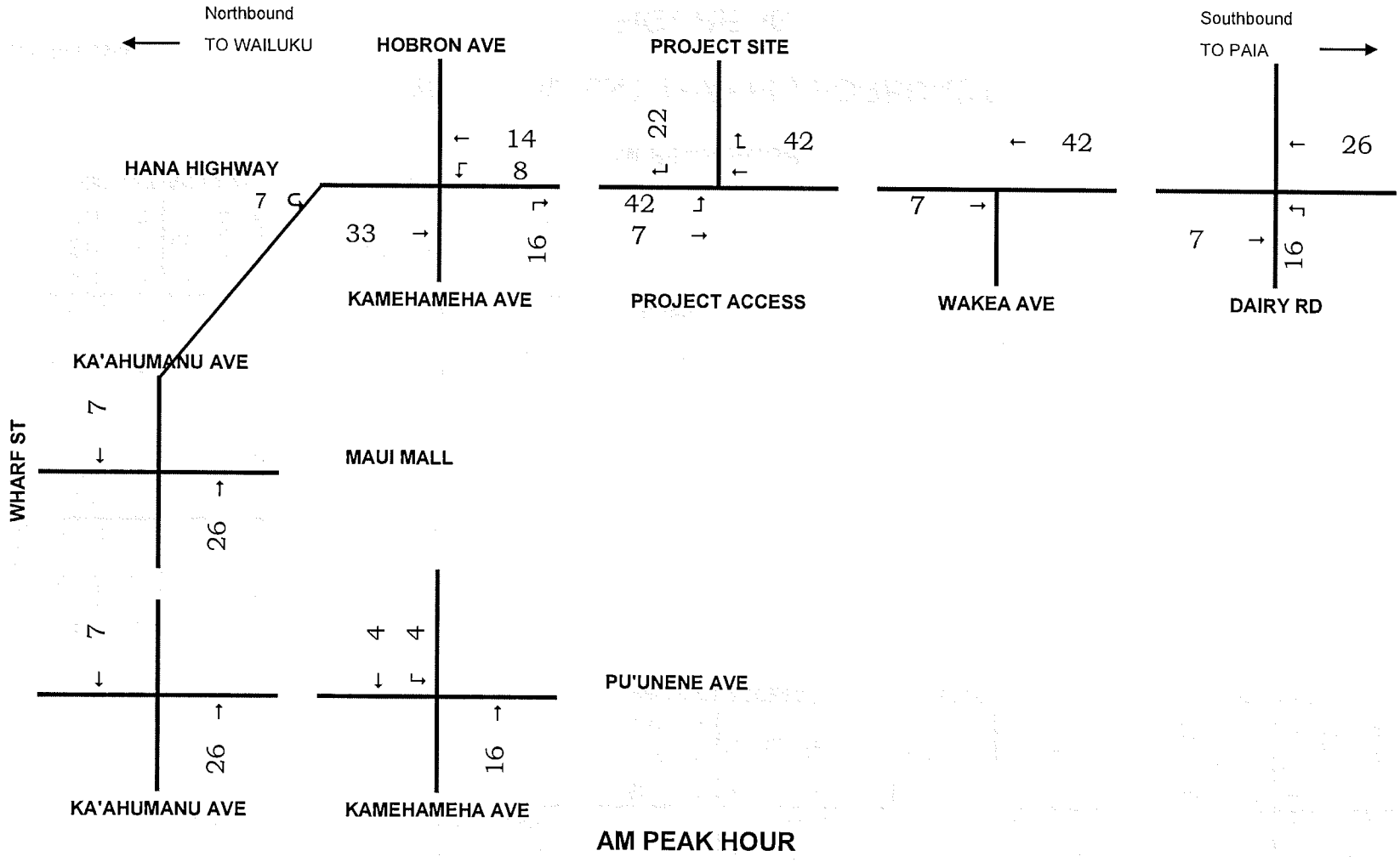



PM PEAK HOUR

# 2013 AMBIENT TRAFFIC FORECAST

Not to scale

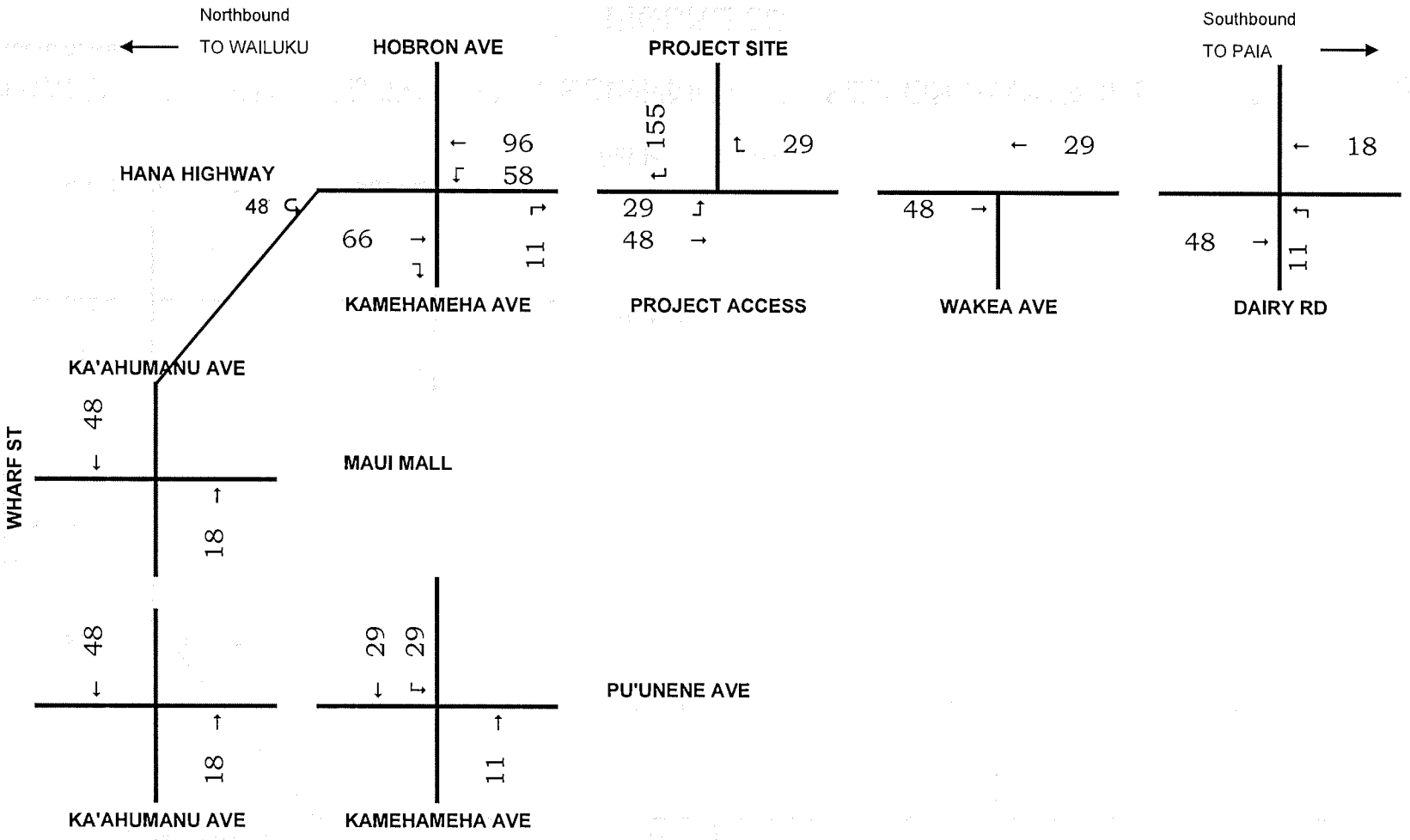
# FIGURE 5B




## PROJECT GENERATED TRAFFIC ASSIGNMENT BASED ON EMPLOYEES (LOW RATE)

Not to scale

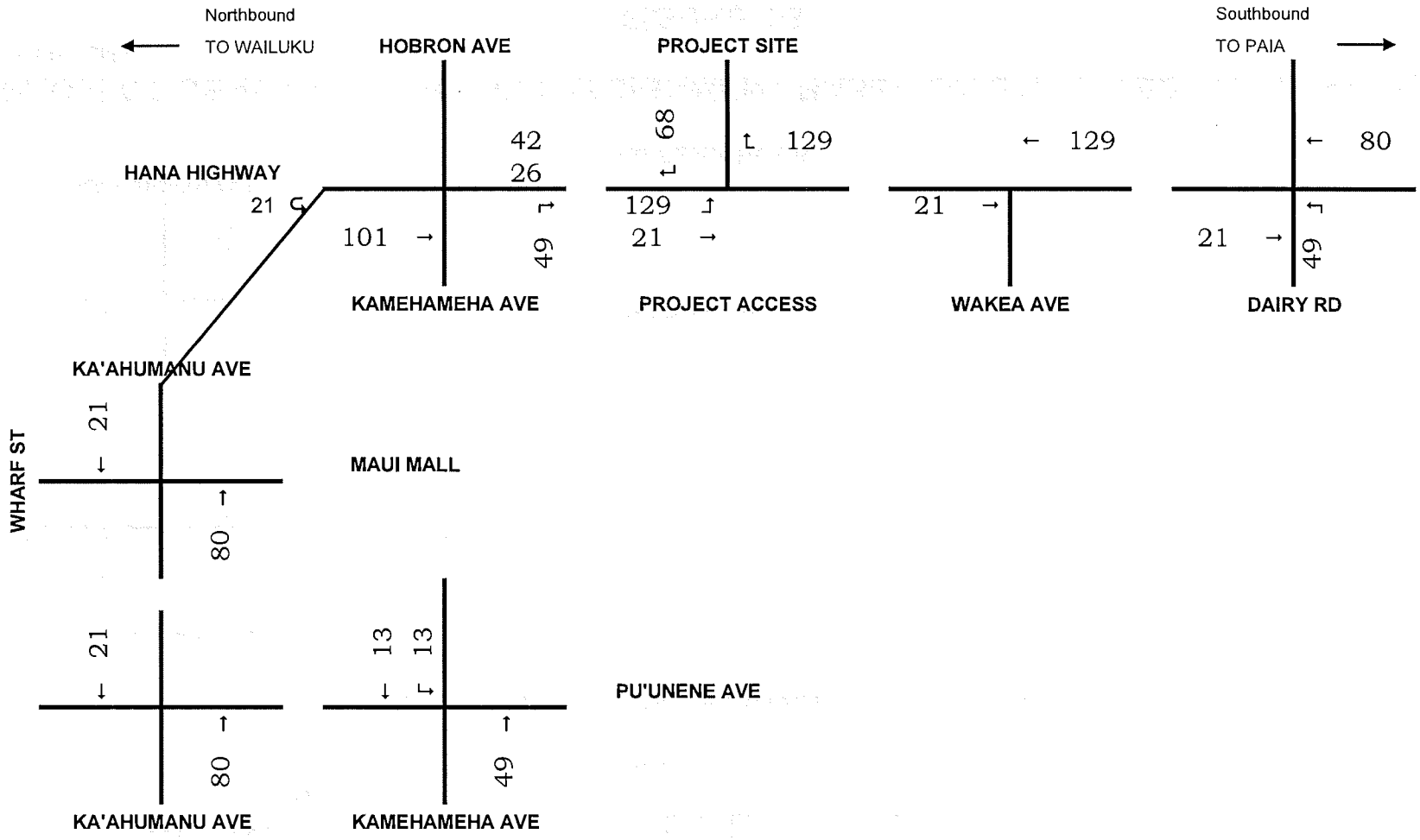
## FIGURE 6A




## PROJECT GENERATED TRAFFIC ASSIGNMENT BASED ON EMPLOYEES (LOW RATE)

Not to scale

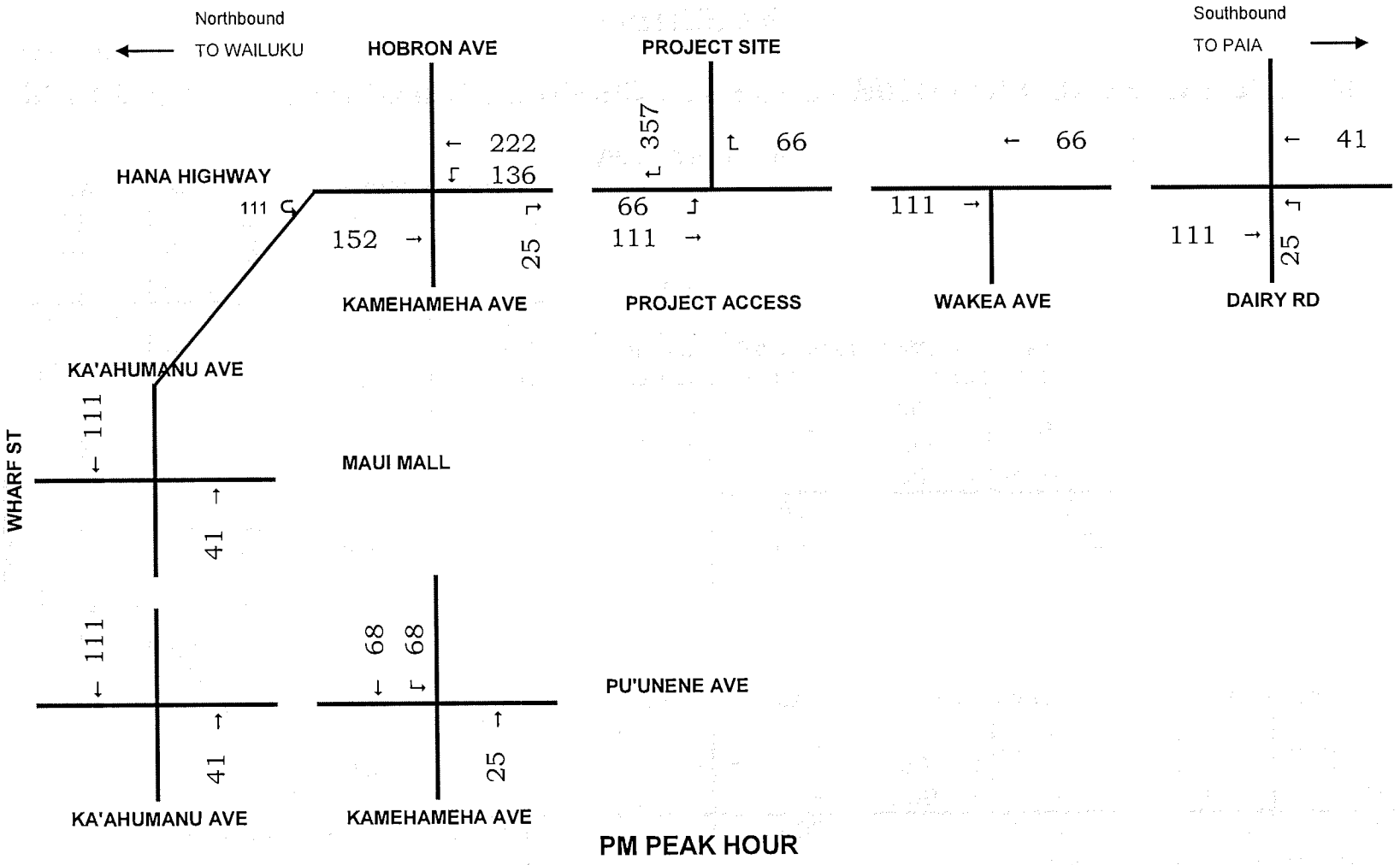
## FIGURE 6B




## PROJECT GENERATED TRAFFIC ASSIGNMENT BASED ON FLOOR AREA (HIGH RATE)

Not to scale

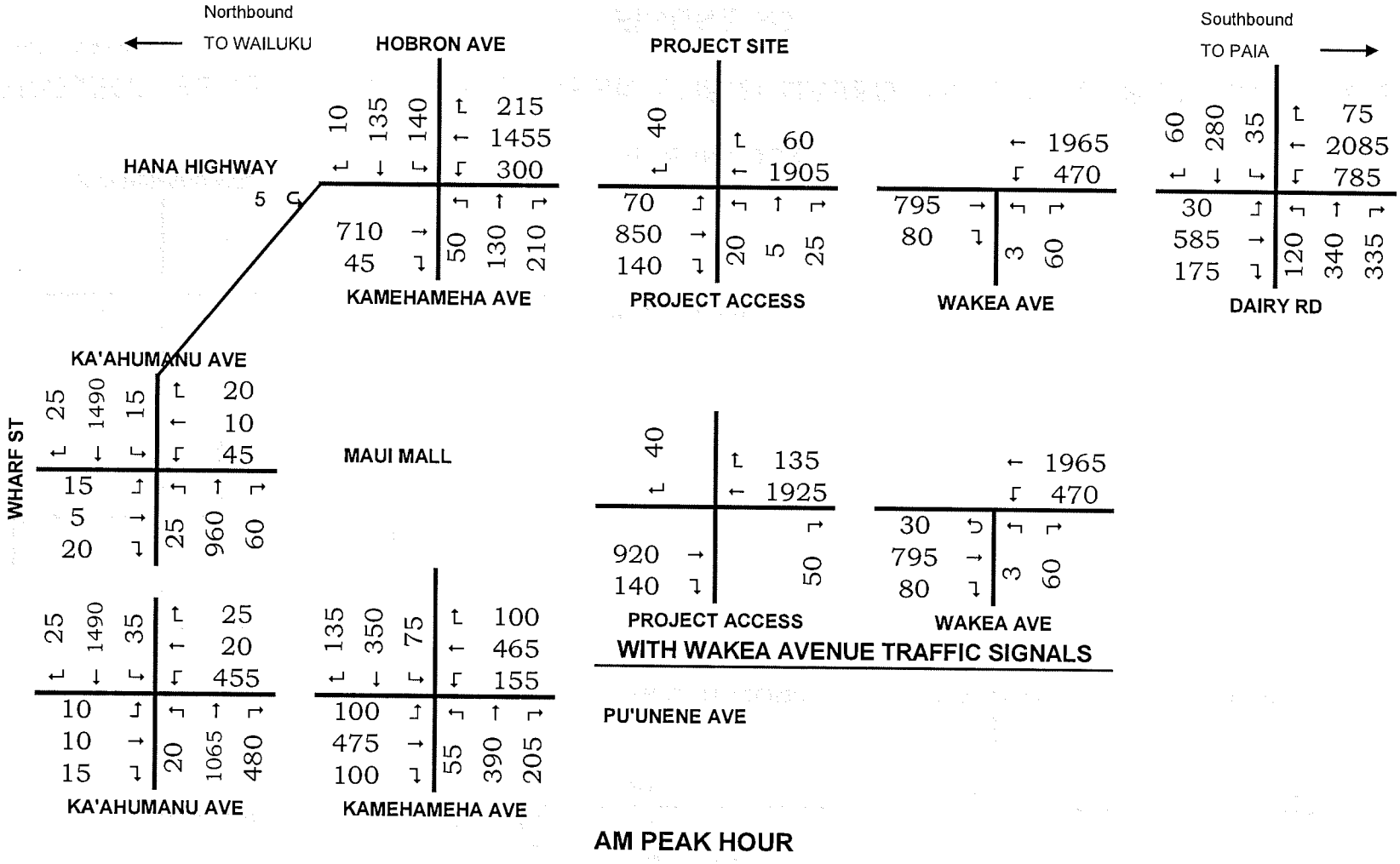
## FIGURE 6C




**PROJECT GENERATED TRAFFIC ASSIGNMENT BASED ON FLOOR AREA (HIGH RATE)**

Not to scale

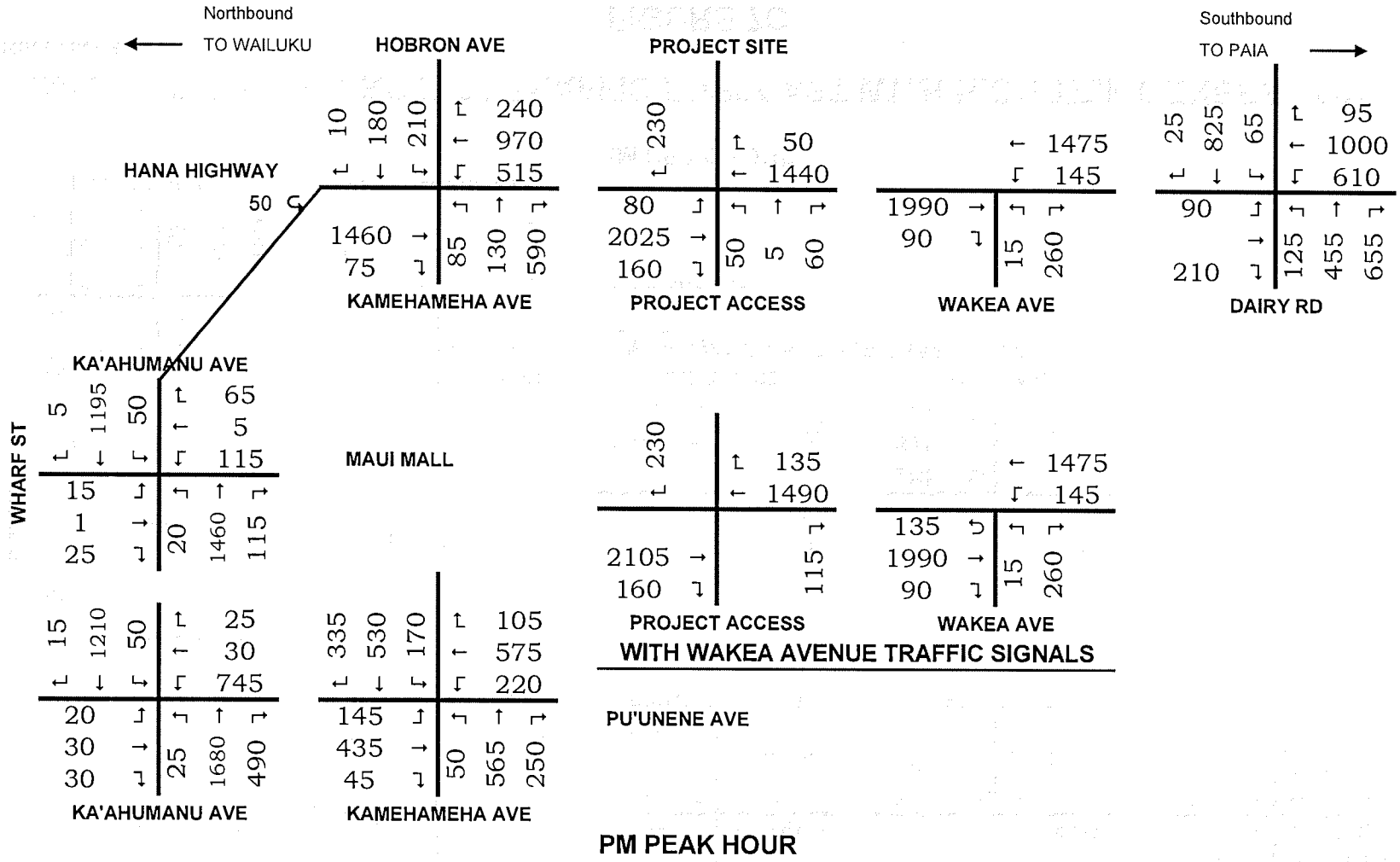
**FIGURE 6D**




## 2013 TOTAL WITH PROJECT TRAFFIC FORECAST WITH LOW TRIP GENERATION

Not to scale

## FIGURE 7A

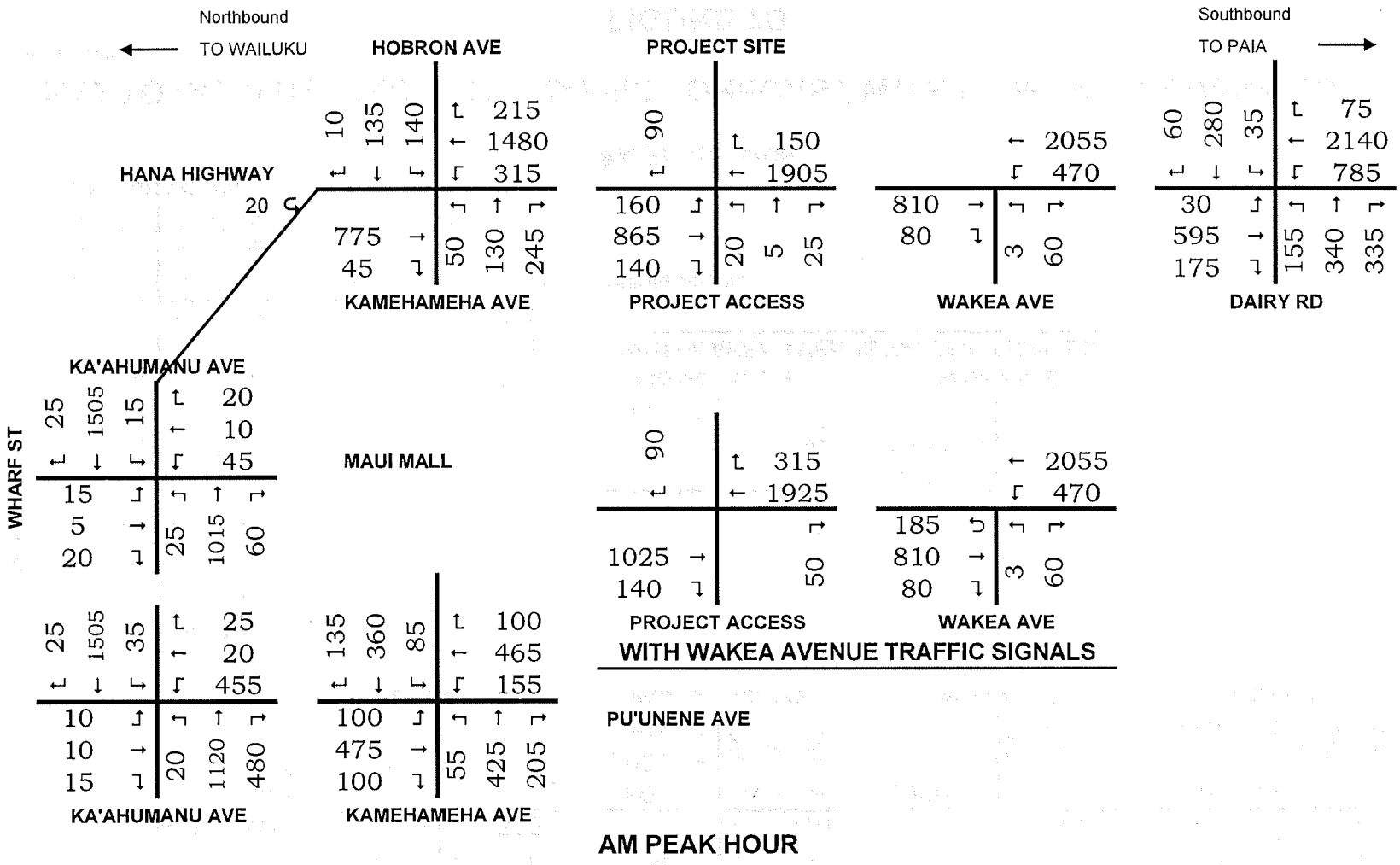



PM PEAK HOUR

## 2013 TOTAL WITH PROJECT TRAFFIC FORECAST WITH LOW TRIP GENERATION

Not to scale

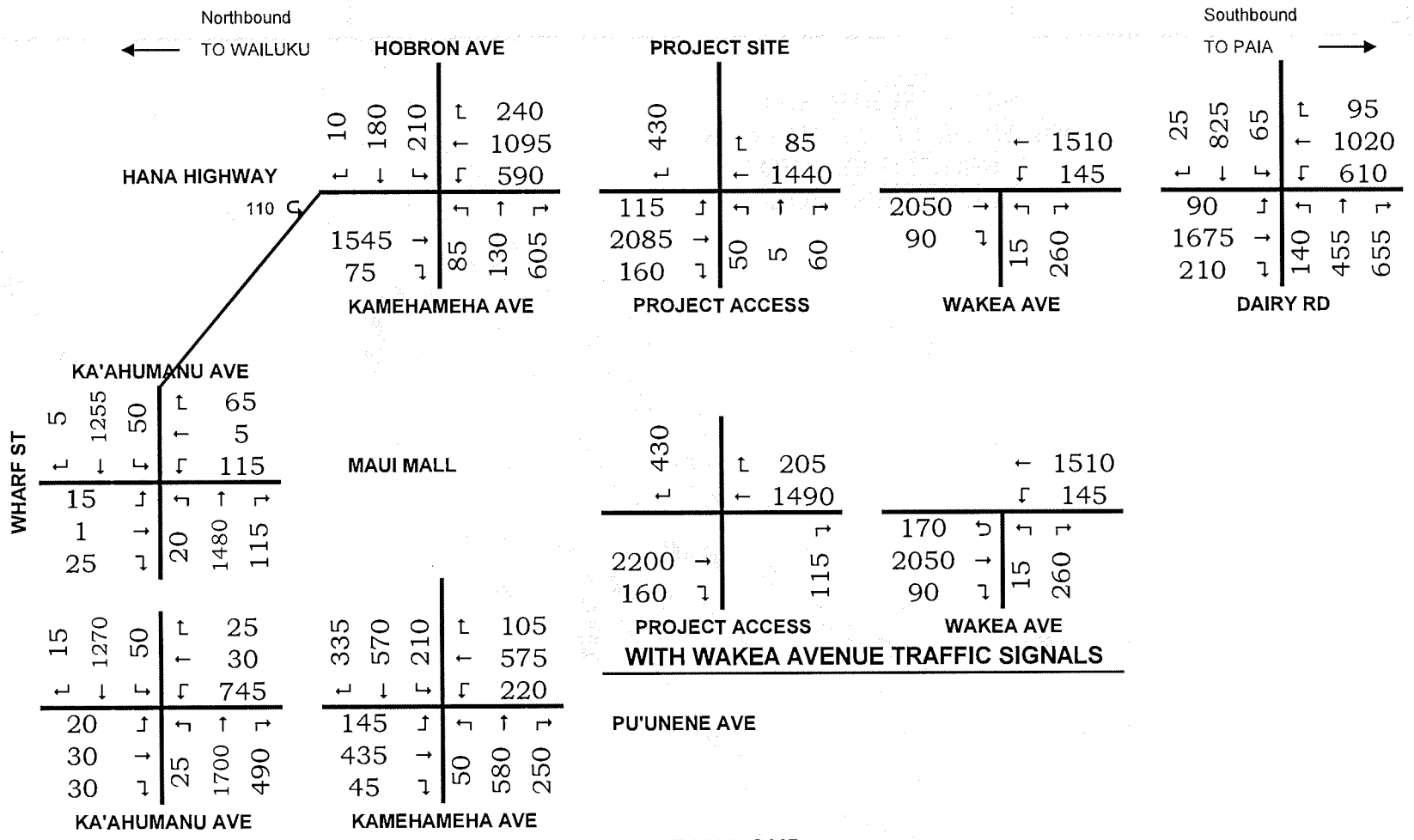
## FIGURE 7B




## 2013 TOTAL WITH PROJECT TRAFFIC FORECAST WITH HIGH TRIP GENERATION

Not to scale

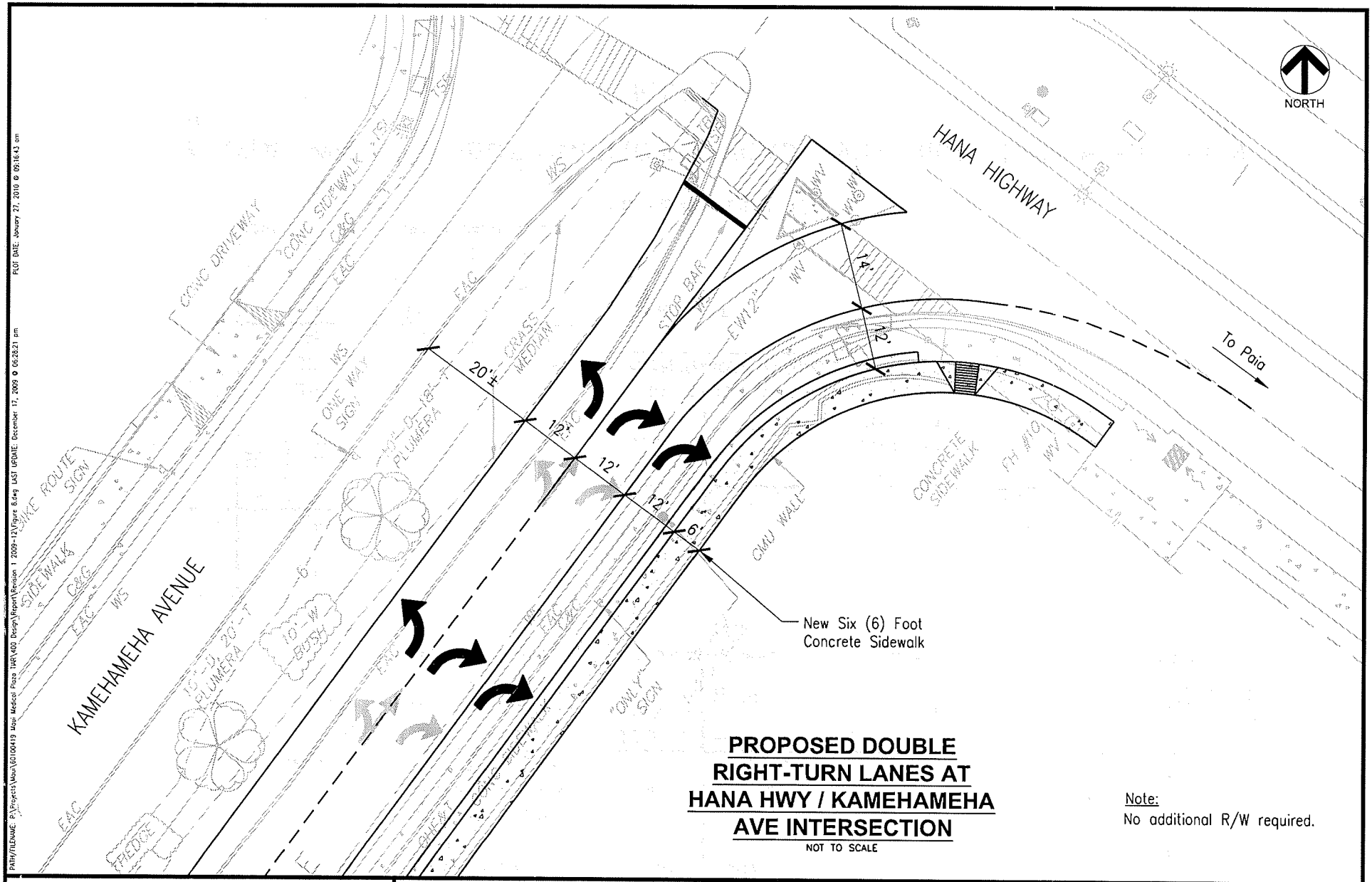
## FIGURE 7C




## 2013 TOTAL WITH PROJECT TRAFFIC FORECAST WITH HIGH TRIP GENERATION

Not to scale

## FIGURE 7D




**PROPOSED DOUBLE RIGHT-TURN LANES AT HANA HWY / KAMEHAMEHA AVE INTERSECTION**

NOT TO SCALE

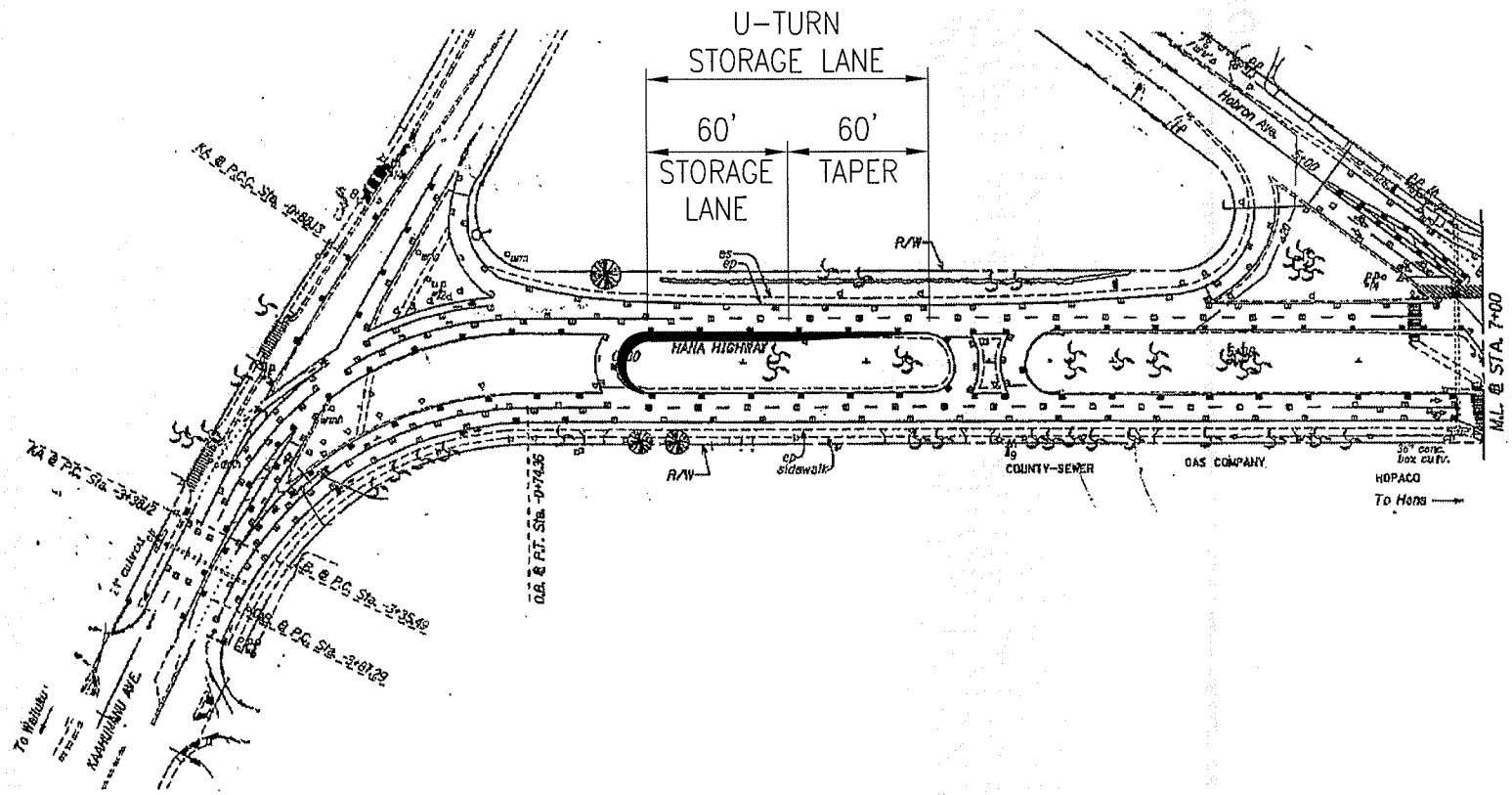
Note:
No additional R/W required.

PATH/FILENAME: P:\Projects\Maui\60100419 Maui Medical Plaza THRV400 Design\Report\Revision 1 2009-12\Figure 8.dwg LAST UPDATE: December 17, 2009 @ 06:28:21 pm PLOT DATE: January 27, 2010 @ 09:16:43 am

AECOM
DAVIES PACIFIC CTR, STE 1900 · 841 BISHOP ST, HONOLULU, HAWAII 96813

**Figure 8**
**PROPOSED DOUBLE RT-TURN LANES**
TRAFFIC IMPACT ANALYSIS REPORT, FIRST REVISION
MAUI MEDICAL PLAZA AT KANAHA
KAHULUI, MAUI, HAWAII

JANUARY 2010




**PROPOSED U-TURN STORAGE LANE**

NOT TO SCALE

PATH/FILENAME: P:\Projects\Maui\60102419 Maui Medical Plaza TIAR\600 Design\Report\Revision 1 2009-12\Figure 9.dwg LAST UPDATE: January 26, 2010 @ 04:02:33 pm PLOT DATE: January 27, 2010 @ 09:18:43 am

AECOM

DAVIES PACIFIC CTR, STE 1900 · 841 BISHOP ST, HONOLULU, HAWAII 96813

**Figure 9**
**PROPOSED U-TURN STORAGE LANE**
TRAFFIC IMPACT ANALYSIS REPORT, FIRST REVISION
MAUI MEDICAL PLAZA AT KANAHA
KAHULUI, MAUI, HAWAII

JANUARY 2010

# *Tables*

# TABLE 1
# TRIP GENERATION AND DISTRIBUTION ANALYSIS

**AM TRIP GENERATION**

131,500 sf Medical Office Building (LU 720)

| | TRIPS | Entering | Exiting |
|---|---|---|---|
| T = 2.48(X) | | 79% | 21% |
| T = | 326 | 258 | 68 |

**AM TRIP DISTRIBUTION**

| Direction | Trips | Ka'ahumanu Ave | Kamehameha Ave | Dairy/ Pu'unene | Hana Hwy |
|---|---|---|---|---|---|
| | | 31% | 19% | 19% | 31% |
| Entering | 258 | 80 | 49 | 49 | 80 |
| Exiting | 68 | 21 | 13 | 13 | 21 |

**PM TRIP GENERATION**

131,500 sf Medical Office Building (LU 720)

| | TRIPS | Entering | Exiting |
|---|---|---|---|
| T = 3.72(X) | | 27% | 73% |
| T = | 489 | 132 | 357 |

**PM TRIP DISTRIBUTION**

| Direction | Trips | Ka'ahumanu Ave | Kamehameha Ave | Dairy/ Pu'unene | Hana Hwy |
|---|---|---|---|---|---|
| | | 31% | 19% | 19% | 31% |
| Entering | 132 | 41 | 25 | 25 | 41 |
| Exiting | 357 | 111 | 68 | 68 | 111 |

**AM TRIP GENERATION**

Medical Office Building w/200 Employees (LU 720)

| | TRIPS | Entering | Exiting |
|---|---|---|---|
| T = 0.53(X) | | 79% | 21% |
| T = | 106 | 84 | 22 |

**AM TRIP DISTRIBUTION**

| Direction | Trips | Ka'ahumanu Ave | Kamehameha Ave | Dairy/ Pu'unene | Hana Hwy |
|---|---|---|---|---|---|
| | | 31% | 19% | 19% | 31% |
| Entering | 84 | 26 | 16 | 16 | 26 |
| Exiting | 22 | 7 | 4 | 4 | 7 |

**PM TRIP GENERATION**

Medical Office Building w/200 Employees (LU 720)

| | TRIPS | Entering | Exiting |
|---|---|---|---|
| T = 1.06(X) | | 27% | 73% |
| T = | 212 | 57 | 155 |

**PM TRIP DISTRIBUTION**

| Direction | Trips | Ka'ahumanu Ave | Kamehameha Ave | Dairy/ Pu'unene | Hana Hwy |
|---|---|---|---|---|---|
| | | 31% | 19% | 19% | 31% |
| Entering | 57 | 18 | 11 | 11 | 18 |
| Exiting | 155 | 48 | 29 | 29 | 48 |

# TABLE 2
# SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

| INTERSECTION | 2009 EXISTING | | | 2013 AMBIENT | | | 2013 TOTAL LOW | | | 2013 TOTAL HIGH | | | 2013 TOTAL HIGH W/ WAKEA SIGNAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOS | Delay | V/C | LOS | Delay | V/C | LOS | Delay | V/C | LOS | Delay | V/C | LOS | Delay | V/C |
| **AM PEAK HOUR** | | | | | | | | | | | | | | | |
| Ka'ahumanu Ave & Pu'unene Ave | C | 30.7 | 0.62 | C | 24.3 | 0.71 | C | 24.9 | 0.72 | C | 26.2 | 0.74 | C | 26.0 | 0.77 |
| Ka'ahumanu Ave & Wharf St/Maui Mall | A | 8.9 | 0.39 | A | 5.5 | 0.44 | A | 5.4 | 0.44 | A | 3.7 | 0.46 | B | 16.5 | 0.44 |
| Hana Hwy & Hobron/Kamehameha | C | 26.2 | 0.75 | D | 39.8 | 0.82 | D | 39.1 | 0.81 | C | 32.7 | 0.83 | C | 33.0 | 0.83 |
| Hana Hwy & Diary Road | D | 39.3 | 0.90 | D | 46.7 | 1.00 | D | 54.3 | 1.05 | E | 55 | 1.03 | E | 55.2 | 1.03 |
| Pu'unene Ave & Kamehameha Ave | D | 43.0 | 0.79 | D | 43.3 | 0.82 | D | 43.6 | 0.82 | D | 45.3 | 0.85 | D | 45.6 | 0.85 |
| Hana Hwy & Wakea Ave | | | | | | | | | | | | | C | 23.6 | 0.88 |
| **PM PEAK HOUR** | | | | | | | | | | | | | | | |
| Ka'ahumanu Ave & Pu'unene Ave | D | 40.6 | 0.91 | E | 57.8 | 1.01 | E | 56.9 | 1.02 | E | 55.1 | 1.03 | D | 52.6 | 1.03 |
| Ka'ahumanu Ave & Wharf St/Maui Mall | B | 12.4 | 0.61 | B | 12.1 | 0.70 | B | 13.5 | 0.71 | A | 9.1 | 0.72 | B | 12.0 | 0.72 |
| Hana Hwy & Hobron/Kamehameha | F | 91.7 | 1.18 | F | >100 | 1.36 | F | >100 | 1.39 | F | >100 | 1.46 | F | >100 | 1.46 |
| Hana Hwy & Diary Road | E | 66.5 | 1.02 | E | 76.7 | 1.08 | F | 81.9 | 1.11 | F | 85.2 | 1.19 | F | 89.3 | 1.19 |
| Pu'unene Ave & Kamehameha Ave | D | 50.6 | 0.85 | D | 51.6 | 0.92 | E | 56.6 | 0.92 | D | 51.3 | 0.94 | D | 52.2 | 0.94 |
| Hana Hwy & Wakea Ave | | | | | | | | | | | | | C | 26.2 | 0.94 |

# TABLE 3
# UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

| INTERSECTION | 2009 EXISTING | | | 2013 AMBIENT | | | 2013 TOTAL LOW | | | 2013 TOTAL LOW W/ WAKEA SIGNAL | | | 2013 TOTAL HIGH | | | 2013 TOTAL HIGH W/ WAKEA SIGNAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | LOS | Delay | Queue | LOS | Delay | Queue | LOS | Delay | Queue | LOS | Delay | Queue | LOS | Delay | Queue | LOS | Delay | Queue |
| **AM PEAK HOUR** | | | | | | | | | | | | | | | | | | |
| PROJECT ACCESS | | | | | | | | | | | | | | | | | | |
| Mauka Rdwy, EB LT | F | >100 | 5 | F | >100 | 6 | F | >100 | 7 | B | 14.2 | 1 | F | >100 | 8 | C | 15.1 | 1 |
| Proj. DW, WB RT | C | 20.3 | 1 | C | 23.6 | 1 | C* | 22.3 | 1 | C* | 22.6 | 1 | C* | 23.8 | 1 | C* | 24.2 | 1 |
| Hwy Median, SB LT | C | 18.4 | 1 | C | 21.9 | 1 | D | 27.5 | 1 | NA | | | D | 30.8 | 2 | NA | | |
| PROJECT EXIT | | | | | | | | | | | | | | | | | | |
| Proj. DW, WB RT | | | | | | | C* | 24.3 | 1 | C* | 24.7 | 1 | D* | 29.3 | 1 | D* | 29.9 | 1 |
| WAKEA AVE | | | | | | | | | | | | | | | | | | |
| Wakea Ave EB RT | B | 11.9 | 1 | B | 12.7 | 1 | B | 12.9 | 1 | NA | | | B | 13 | 1 | NA | | |
| Wakea Ave EB LT | F | >100 | 1 | F | >100 | 1 | F | >100 | 1 | | | | F | >100 | 1 | | | |
| Hana Hwy NB LT | C | 16.6 | 4 | C | 23.5 | 7 | C | 23.8 | 7 | | | | C | 24.7 | 7 | | | |
| **PM PEAK HOUR** | | | | | | | | | | | | | | | | | | |
| PROJECT ACCESS | | | | | | | | | | | | | | | | | | |
| Roadway, Eastbnd | F | >100 | 16 | F | >100 | 18 | F | >100 | 18 | F | 82.3 | 5 | F | >100 | 18 | F | >100 | 6 |
| Proj. DW, WB RT | B | 14.9 | 1 | C | 20.1 | 1 | C* | 20.3 | 1 | C* | 20.3 | 1 | C* | 24.5 | 2 | D* | 26 | 2 |
| Hwy Median, SB LT | B | 11.9 | 1 | C | 15.7 | 1 | C | 17.3 | 1 | NA | | | C | 19.9 | 2 | NA | | |
| PROJECT EXIT | | | | | | | | | | | | | | | | | | |
| Proj. DW, WB RT | | | | | | | D* | 28.6 | 3 | D* | 30.8 | 3 | F* | 92.5 | 12 | F* | >100 | 13 |
| WAKEA AVE | | | | | | | | | | | | | | | | | | |
| Wakea Ave EB RT | F | >100 | 12 | F | >100 | 18 | F | >100 | 18 | NA | | | F | >100 | 19 | NA | | |
| Wakea Ave EB LT | F | >100 | 3 | F | >100 | 4 | F | >100 | 4 | | | | F | >100 | 4 | | | |
| Hana Hwy NB LT | D | 31.7 | 3 | F | 55.4 | 5 | F | 62.7 | 5 | | | | F | 73.3 | 6 | | | |

LEGEND:
EB Eastbound
WB Westbound
SB Southbound
RT Right Turn
LT Left Turn
NB Northbound

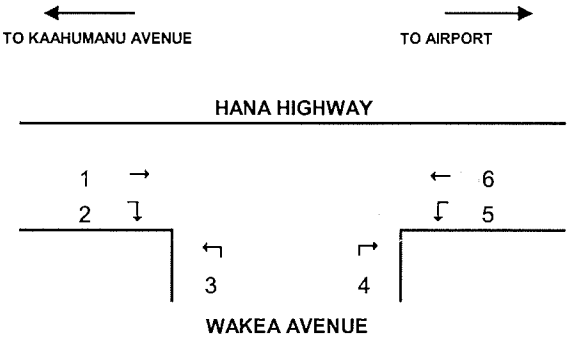
* Indicates that HCAP cannot properly analyze four lanes of traffic and that the expected level of service would be higher than shown.

# *Appendix A*

## *Traffic Turning Movement Counts*

## TRAFFIC TURNING MOVEMENT COUNT
## MAUI MEDICAL PLAZA

**LOCATION:** Hana Highway / Wakea Avenue
**DATE:** Thursday, May 21, 2009
**TIME:** 6:30a-8:30a / 3:30p-5:30p
**WEATHER:** Clear Sunny
**RECORDER:** Mike Lipscomb

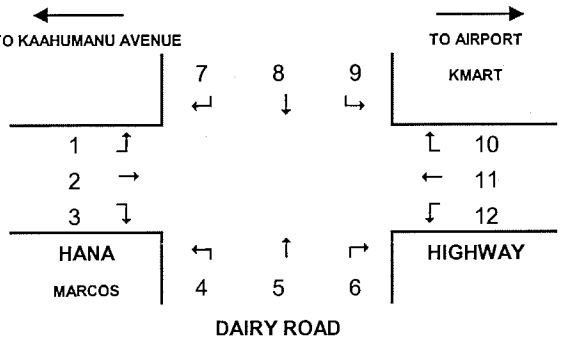



| TIME PERIOD | MOVEMENT NUMBER 1 | 2 | 3 | 4 | 5 | 6 | TOTAL |
|---|---|---|---|---|---|---|---|
| 6:30-6:45a | 125 | 11 | 2 | 23 | 55 | 229 | 445 |
| 6:45-7:00a | 98 | 11 | 0 | 14 | 30 | 149 | 302 |
| 7:00-7:15a | 81 | 13 | 0 | 10 | 17 | 103 | 224 |
| 7:15-7:30a | 135 | 14 | 2 | 13 | 65 | 251 | 480 |
| 7:30-7:45a | 140 | 18 | 0 | 18 | 87 | 325 | 588 |
| 7:45-8:00a | 149 | 14 | 0 | 12 | 84 | 331 | 590 |
| 8:00-8:15a | 145 | 16 | 0 | 6 | 87 | 327 | 581 |
| 8:15-8:30a | 133 | 15 | 2 | 9 | 77 | 321 | 557 |
| 6:30-8:30a | 1006 | 112 | 6 | 105 | 502 | 2036 | 3767 |
| 7:30-8:30a | 567 | 63 | 2 | 45 | 335 | 1304 | 2316 |
| PHF | 0.97 | | | | 0.99 | | |

| TIME PERIOD | MOVEMENT NUMBER 1 | 2 | 3 | 4 | 5 | 6 | TOTAL |
|---|---|---|---|---|---|---|---|
| 3:30-3:45p | 278 | 25 | 4 | 52 | 49 | 183 | 591 |
| 3:45-4:00p | 292 | 17 | 6 | 52 | 39 | 208 | 614 |
| 4:00-4:15p | 334 | 23 | 1 | 58 | 29 | 185 | 630 |
| 4:15-4:30p | 354 | 22 | 3 | 59 | 31 | 184 | 653 |
| 4:30-4:45p | 375 | 21 | 3 | 50 | 24 | 213 | 686 |
| 4:45-5:00p | 346 | 15 | 4 | 47 | 29 | 200 | 641 |
| 5:00-5:15p | 378 | 19 | 0 | 65 | 26 | 210 | 698 |
| 5:15-5:30p | 334 | 16 | 4 | 44 | 25 | 197 | 620 |
| 3:30-5:30p | 2691 | 158 | 25 | 427 | 252 | 1580 | 5133 |
| 4:30-5:30p | 1433 | 71 | 11 | 206 | 104 | 820 | 2645 |
| PHF | 0.95 | | | | 0.98 | | |

## TRAFFIC TURNING MOVEMENT COUNT
## MAUI MEDICAL PLAZA

**LOCATION:** Hana Highway / Dairy Road
**DATE:** Wednesday, May 20, 2009
**TIME:** 6:30a-8:30a / 3:30p-5:30p
**WEATHER:** Clear Sunny
**RECORDER:** Mike Lipscomb; Keith Oszman, Jr.




| TIME PERIOD | MOVEMENT NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6:30-6:45a | 3 | 78 | 19 | 13 | 51 | 49 | 6 | 42 | 6 | 22 | 310 | 146 | 745 |
| 6:45-7:00a | 8 | 87 | 20 | 14 | 56 | 54 | 4 | 36 | 6 | 24 | 279 | 132 | 720 |
| 7:00-7:15a | 2 | 139 | 24 | 12 | 52 | 63 | 4 | 30 | 2 | 18 | 305 | 163 | 814 |
| 7:15-7:30a | 7 | 102 | 37 | 22 | 66 | 82 | 5 | 42 | 5 | 11 | 381 | 175 | 935 |
| 7:30-7:45a | 8 | 101 | 34 | 21 | 65 | 75 | 12 | 41 | 9 | 19 | 366 | 192 | 943 |
| 7:45-8:00a | 7 | 103 | 32 | 20 | 67 | 78 | 14 | 79 | 11 | 24 | 373 | 186 | 994 |
| 8:00-8:15a | 4 | 92 | 38 | 13 | 44 | 78 | 10 | 40 | 8 | 16 | 294 | 180 | 817 |
| 8:15-8:30a | 13 | 82 | 44 | 22 | 62 | 110 | 10 | 56 | 10 | 18 | 212 | 150 | 789 |
| 6:00-8:30a | 52 | 784 | 248 | 137 | 463 | 589 | 65 | 366 | 57 | 152 | 2520 | 1324 | 6757 |
| 7:15-8:15a | 26 | 398 | 141 | 76 | 242 | 313 | 41 | 202 | 33 | 70 | 1414 | 733 | 3689 |
| PHF | 0.97 | | | 0.93 | | | 0.66 | | | 0.98 | | | |

| TIME PERIOD | MOVEMENT NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3:30-3:45p | 11 | 259 | 67 | 27 | 122 | 128 | 9 | 160 | 13 | 22 | 158 | 124 | 1100 |
| 3:45-4:00p | 21 | 237 | 33 | 36 | 107 | 156 | 5 | 147 | 11 | 14 | 175 | 127 | 1069 |
| 4:00-4:15p | 7 | 226 | 39 | 27 | 89 | 143 | 7 | 179 | 15 | 26 | 179 | 139 | 1076 |
| 4:15-4:30p | 16 | 226 | 39 | 20 | 100 | 128 | 6 | 165 | 13 | 19 | 109 | 117 | 958 |
| 4:30-4:45p | 20 | 289 | 45 | 24 | 81 | 168 | 3 | 144 | 8 | 16 | 115 | 121 | 1034 |
| 4:45-5:00p | 19 | 336 | 47 | 18 | 57 | 170 | 7 | 167 | 18 | 12 | 138 | 118 | 1107 |
| 5:00-5:15p | 14 | 292 | 32 | 21 | 82 | 149 | 4 | 131 | 21 | 25 | 120 | 91 | 982 |
| 5:15-5:30p | 25 | 224 | 33 | 24 | 75 | 155 | 11 | 132 | 15 | 18 | 115 | 91 | 918 |
| 2:00-5:30p | 133 | 2089 | 335 | 197 | 713 | 1197 | 52 | 1225 | 114 | 152 | 1109 | 928 | 8244 |
| 3:30-4:30p | 55 | 948 | 178 | 110 | 418 | 555 | 27 | 651 | 52 | 81 | 621 | 507 | 4203 |
| PHF | 0.88 | | | 0.98 | | | 0.91 | | | 0.88 | | | |
| 4:15-5:15 | 69 | 1143 | 163 | 83 | 320 | 615 | 20 | 607 | 60 | 72 | 482 | 447 | 4081 |
| 4:30-5:30 | 78 | 1141 | 157 | 87 | 295 | 642 | 25 | 574 | 62 | 71 | 488 | 421 | 4041 |

# *Appendix B*

## *Signalized Intersection Level of Service (LOS) Calculations*

Timings
6: Kaahumanu Av. & Puunene Av

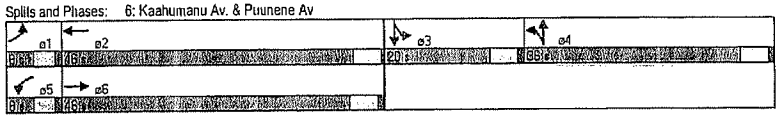
11/26/2009

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 20 | 1120 | 35 | 1505 | 455 | 20 | 10 | 15 |
| Turn Type | Prot | | Prot | | Split | | | Perm |
| Protected Phases | 1 | 6 | 5 | 2 | 4 | 4 | 3 | |
| Permitted Phases | | | | | | | | 3 |
| Detector Phase | 1 | 6 | 5 | 2 | 4 | 4 | 3 | 3 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 4.0 | 15.0 | 4.0 | 15.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 23.0 | 8.0 | 22.5 | 36.0 | 36.0 | 20.0 | 20.0 |
| Total Split (s) | 8.0 | 46.0 | 8.0 | 46.0 | 36.0 | 36.0 | 20.0 | 20.0 |
| Total Split (%) | 7.3% | 41.8% | 7.3% | 41.8% | 32.7% | 32.7% | 18.2% | 18.2% |
| Yellow Time (s) | 3.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 5.0 | 5.5 | 6.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lag | Lead | Lead |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | C-Max | None | C-Max | Max | Max | Max | Max |
| Act Effct Green (s) | 3.0 | 41.6 | 3.0 | 45.3 | 30.0 | 30.0 | 14.0 | 14.0 |
| Actuated g/C Ratio | 0.03 | 0.38 | 0.03 | 0.41 | 0.27 | 0.27 | 0.13 | 0.13 |
| v/c Ratio | 0.45 | 0.91 | 0.79 | 0.79 | 0.59 | 0.59 | 0.10 | 0.08 |
| Control Delay | 81.5 | 39.1 | 147.5 | 15.2 | 28.3 | 27.5 | 43.7 | 19.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 81.5 | 39.1 | 147.5 | 15.2 | 28.3 | 27.5 | 43.7 | 19.5 |
| LOS | F | D | F | B | C | C | D | B |
| Approach Delay | | 39.6 | | 18.2 | | 27.9 | 33.5 | |
| Approach LOS | | D | | B | | C | C | |

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 56 (51%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 29.0 — Intersection LOS: C
Intersection Capacity Utilization 62.9% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Kaahumanu Av. & Puunene Av






Timings
7: Kaahumanu Av. & Wharf Street

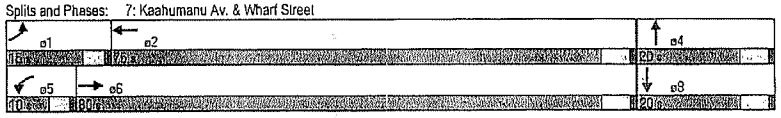
11/26/2009

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | |
| Volume (vph) | 25 | 1015 | 60 | 15 | 505 | 45 | 10 | 15 | 5 | 20 |
| Turn Type | Prot | | Perm | Prot | | Perm | | Perm | | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 4 | | 8 | |
| Permitted Phases | | | 6 | | | 4 | | 8 | | 8 |
| Detector Phase | 1 | 6 | 6 | 5 | 2 | 4 | 4 | 8 | 8 | 8 |
| Switch Phase | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | 20.0 | 4.0 | 20.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 25.0 | 25.0 | 8.0 | 25.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Total Split (s) | 15.0 | 80.0 | 80.0 | 10.0 | 75.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| Total Split (%) | 13.6% | 72.7% | 72.7% | 9.1% | 68.2% | 18.2% | 18.2% | 18.2% | 18.2% | 18.2% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | |
| Recall Mode | None | C-Max | C-Max | None | C-Max | Max | Max | Max | Max | Max |
| Act Effct Green (s) | 6.2 | 80.0 | 80.0 | 4.8 | 76.7 | 14.0 | 14.0 | | 14.0 | 14.0 |
| Actuated g/C Ratio | 0.06 | 0.73 | 0.73 | 0.04 | 0.70 | 0.13 | 0.13 | | 0.13 | 0.13 |
| v/c Ratio | 0.27 | 0.43 | 0.06 | 0.21 | 0.47 | 0.27 | 0.14 | | 0.11 | 0.10 |
| Control Delay | 51.4 | 0.6 | 0.0 | 79.2 | 1.1 | 48.2 | 24.4 | | 44.3 | 18.2 |
| Queue Delay | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 51.4 | 0.6 | 0.0 | 79.2 | 1.2 | 48.2 | 24.4 | | 44.3 | 18.2 |
| LOS | D | A | A | E | A | D | C | | D | B |
| Approach Delay | | 1.7 | | | 1.9 | | 38.6 | | 31.3 | |
| Approach LOS | | A | | | A | | D | | C | |

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 72 (65%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 3.3 — Intersection LOS: A
Intersection Capacity Utilization 51.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 7: Kaahumanu Av. & Wharf Street



Timings
8: Kaahumanu Av. & Hobron Av.

11/26/2009

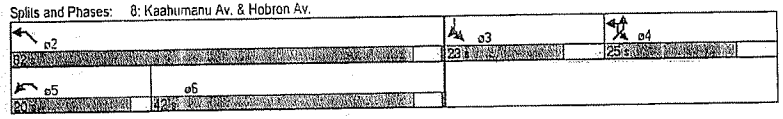
| Lane Group | EBR | SBL | SBR | SBR2 | NWLR | NWL | NWR | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 775 | 140 | 135 | 10 | 315 | 1480 | 215 | 130 | 245 |
| Turn Type | custom | | Prot | Perm | Prot | | Perm | | Prot |
| Protected Phases | | 3 | 3 | | 5 | 2 | | 4 | 4 |
| Permitted Phases | 6 | | | 3 | | | 2 | | |
| Detector Phase | 6 | 3 | 3 | 3 | 5 | 2 | 2 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 26.5 | 23.0 | 23.0 | 23.0 | 20.0 | 27.5 | 27.5 | 21.0 | 21.0 |
| Total Split (s) | 42.0 | 23.0 | 23.0 | 23.0 | 20.0 | 62.0 | 62.0 | 25.0 | 25.0 |
| Total Split (%) | 38.2% | 20.9% | 20.9% | 20.9% | 18.2% | 56.4% | 56.4% | 22.7% | 22.7% |
| Yellow Time (s) | 4.0 | 6.0 | 6.0 | 6.0 | 3.0 | 4.0 | 4.0 | 6.0 | 6.0 |
| All-Red Time (s) | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.5 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.5 | 7.0 | 7.0 | 6.0 | 4.0 | 5.5 | 5.5 | 7.0 | 7.0 |
| Lead/Lag | | Lag | Lead | Lead | Lead | | | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | C-Max | None | None | None | Max | C-Max | C-Max | Max | Max |
| Act Effct Green (s) | 36.5 | 13.3 | 13.3 | 14.3 | 16.0 | 56.5 | 56.5 | 20.7 | 20.7 |
| Actuated g/C Ratio | 0.33 | 0.12 | 0.12 | 0.13 | 0.15 | 0.51 | 0.51 | 0.19 | 0.19 |
| v/c Ratio | 0.74 | 0.71 | 0.76 | 0.05 | 0.68 | 0.53 | 0.25 | 0.59 | 0.52 |
| Control Delay | 18.9 | 64.3 | 71.6 | 20.4 | 52.6 | 20.6 | 2.6 | 39.8 | 7.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 18.9 | 64.3 | 71.6 | 20.4 | 52.6 | 20.6 | 2.6 | 39.8 | 7.4 |
| LOS | B | E | E | C | D | C | A | D | A |
| Approach Delay | | 66.1 | | | | 23.7 | | 21.2 | |
| Approach LOS | | E | | | | C | | C | |

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 2:NWL and 6:EBR, Start of Yellow
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 25.7
Intersection Capacity Utilization 62.1%
Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service B

Splits and Phases: 8: Kaahumanu Av. & Hobron Av.






Timings
58: Hana Highway & Dairy Road

11/26/2009

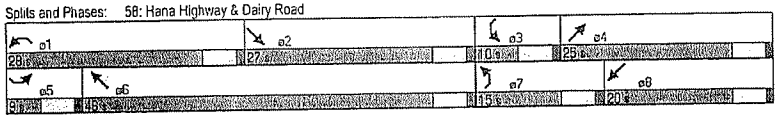
| Lane Group | SEL | SET | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Volume (vph) | 30 | 595 | 785 | 2140 | 75 | 155 | 340 | 335 | 35 | 280 | 60 |
| Turn Type | Prot | | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 5 | 2 | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | 6 | | | 4 | | | 8 |
| Detector Phase | 5 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | 4.0 | 20.0 | 20.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 9.0 | 27.0 | 9.0 | 27.0 | 27.0 | 9.0 | 20.0 | 20.0 | 9.0 | 20.0 | 20.0 |
| Total Split (s) | 9.0 | 27.0 | 28.0 | 46.0 | 46.0 | 15.0 | 25.0 | 25.0 | 10.0 | 20.0 | 20.0 |
| Total Split (%) | 10.0% | 30.0% | 31.1% | 51.1% | 51.1% | 16.7% | 27.8% | 27.8% | 11.1% | 22.2% | 22.2% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Recall Mode | None | Min | None | Min | Min | None | None | None | None | None | None |
| Act Effct Green (s) | 3.0 | 20.2 | 22.0 | 43.0 | 43.0 | 9.0 | 20.5 | 20.5 | 3.9 | 11.4 | 12.4 |
| Actuated g/C Ratio | 0.03 | 0.23 | 0.25 | 0.50 | 0.50 | 0.10 | 0.24 | 0.24 | 0.05 | 0.13 | 0.14 |
| v/c Ratio | 0.53 | 0.69 | 0.97 | 0.92 | 0.10 | 0.91 | 0.44 | 0.56 | 0.47 | 0.65 | 0.23 |
| Control Delay | 75.2 | 31.1 | 59.1 | 29.5 | 4.3 | 89.4 | 31.4 | 7.4 | 62.3 | 43.1 | 11.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 75.2 | 31.1 | 59.1 | 29.5 | 4.3 | 89.4 | 31.4 | 7.4 | 62.3 | 43.1 | 11.2 |
| LOS | E | C | E | C | A | F | C | A | E | D | B |
| Approach Delay | | 32.8 | | 36.6 | | | 32.5 | | | 39.9 | |
| Approach LOS | | C | | D | | | C | | | D | |

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 86.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 35.6
Intersection Capacity Utilization 81.0%
Analysis Period (min) 15

Intersection LOS: D
ICU Level of Service D

Splits and Phases: 58: Hana Highway & Dairy Road

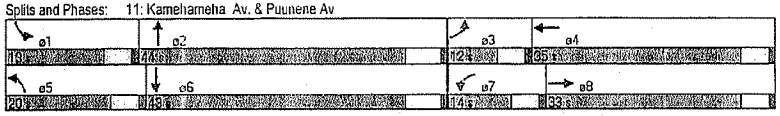


| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 55 | 425 | 85 | 360 | 135 | 155 | 465 | 100 | 475 |
| Turn Type | Prot | | Prot | | Perm | Prot | | Prot | |
| Protected Phases | 3 | 8 | 7 | 4 | | 5 | 2 | 1 | 6 |
| Permitted Phases | | | | | 4 | | | | |
| Detector Phase | 3 | 8 | 7 | 4 | 4 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 8.0 | 4.0 | 8.0 | 8.0 | 4.0 | 10.0 | 4.0 | 10.0 |
| Minimum Split (s) | 9.0 | 30.0 | 9.0 | 30.0 | 30.0 | 9.0 | 41.0 | 9.0 | 41.0 |
| Total Split (s) | 12.0 | 33.0 | 14.0 | 35.0 | 35.0 | 20.0 | 44.0 | 19.0 | 43.0 |
| Total Split (%) | 10.9% | 30.0% | 12.7% | 31.8% | 31.8% | 18.2% | 40.0% | 17.3% | 39.1% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | 4.0 | 5.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 7.0 | 6.0 | 7.0 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | C-Max | None | C-Max |
| Act Effct Green (s) | 5.6 | 24.1 | 7.4 | 27.9 | 28.9 | 12.5 | 43.8 | 9.7 | 41.0 |
| Actuated g/C Ratio | 0.05 | 0.22 | 0.07 | 0.25 | 0.26 | 0.11 | 0.40 | 0.09 | 0.37 |
| v/c Ratio | 0.67 | 0.86 | 0.77 | 0.83 | 0.28 | 0.83 | 0.44 | 0.69 | 0.48 |
| Control Delay | 85.3 | 48.7 | 91.2 | 42.0 | 3.9 | 80.2 | 25.7 | 84.0 | 9.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 85.3 | 48.7 | 91.2 | 42.0 | 3.9 | 80.2 | 25.7 | 84.0 | 9.0 |
| LOS | F | D | F | D | A | F | C | F | A |
| Approach Delay | | 51.7 | | 40.3 | | | 37.5 | | 20.1 |
| Approach LOS | | D | | D | | | D | | C |

**Intersection Summary**

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 84 (76%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 37.3 Intersection LOS: D
Intersection Capacity Utilization 66.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: Kamehameha Av. & Puunene Av



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↑↑↑ | | | ↑↑↑ | | | ↑ | | | ↑ | |
| Volume (vph) | 20 | 1120 | 480 | 35 | 1505 | 25 | 455 | 20 | 25 | 10 | 10 | 15 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.91 | 0.91 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.955 | | | 0.998 | | | 0.985 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | 0.961 | | | 0.976 | |
| Satd. Flow (prot) | 1719 | 4718 | 0 | 1719 | 4930 | 0 | 1633 | 1627 | 0 | 0 | 1766 | 1538 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | 0.961 | | | 0.976 | |
| Satd. Flow (perm) | 1719 | 4718 | 0 | 1719 | 4930 | 0 | 1633 | 1627 | 0 | 0 | 1766 | 1538 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 92 | | | 2 | | | 4 | | | | 16 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 491 | | | 576 | | | 1003 | | | 377 | |
| Travel Time (s) | | 13.4 | | | 15.7 | | | 27.4 | | | 10.3 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 21 | 1179 | 505 | 37 | 1584 | 26 | 479 | 21 | 26 | 11 | 11 | 16 |
| Shared Lane Traffic (%) | | | | | | | 45% | | | | | |
| Lane Group Flow (vph) | 21 | 1684 | 0 | 37 | 1610 | 0 | 263 | 263 | 0 | 0 | 22 | 16 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | | Prot | | | Split | | | Split | | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 4 | 4 | | 3 | 3 | |
| Permitted Phases | | | | | | | | | | | | 3 |
| Detector Phase | 1 | 6 | | 5 | 2 | | 4 | 4 | | 3 | 3 | 3 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 15.0 | | 4.0 | 15.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 23.0 | | 8.0 | 22.5 | | 36.0 | 36.0 | | 20.0 | 20.0 | 20.0 |
| Total Split (s) | 11.0 | 72.0 | 0.0 | 11.0 | 72.0 | 0.0 | 47.0 | 47.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| Total Split (%) | 7.3% | 48.0% | 0.0% | 7.3% | 48.0% | 0.0% | 31.3% | 31.3% | 0.0% | 13.3% | 13.3% | 13.3% |
| Maximum Green (s) | 7.0 | 67.0 | | 7.0 | 67.5 | | 42.0 | 42.0 | | 15.0 | 15.0 | 15.0 |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | | 1.0 | 0.5 | | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 4.0 | 5.0 | 5.5 | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lag | Lag | | Lead | Lead | Lead |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 5.0 | | 2.0 | 5.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | C-Max | | None | C-Max | | Max | Max | | Max | Max | Max |
| Walk Time (s) | | 7.0 | | | 7.0 | | 7.0 | 7.0 | | | | |
| Flash Dont Walk (s) | | 10.0 | | | 10.0 | | 24.0 | 24.0 | | | | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | 0 | 0 | | | | |
| Act Effct Green (s) | 5.0 | 68.3 | | 5.4 | 71.0 | | 41.0 | 41.0 | | | 14.0 | 14.0 |
| Actuated g/C Ratio | 0.03 | 0.46 | | 0.04 | 0.47 | | 0.27 | 0.27 | | | 0.09 | 0.09 |



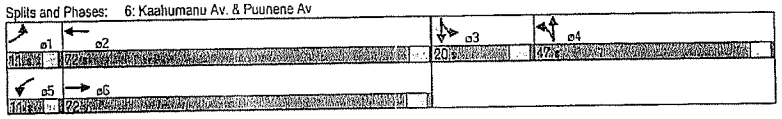


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.37 | 0.77 | | 0.60 | 0.69 | | 0.59 | 0.59 | | | 0.13 | 0.10 |
| Control Delay | 88.0 | 35.5 | | 137.9 | 14.8 | | 41.3 | 40.4 | | | 64.6 | 25.9 |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.1 | | 0.0 | 0.0 | | | 0.0 | 0.0 |
| Total Delay | 88.0 | 35.5 | | 137.9 | 14.9 | | 41.3 | 40.4 | | | 64.6 | 25.9 |
| LOS | F | D | | F | B | | D | D | | | E | C |
| Approach Delay | | 36.1 | | | 17.6 | | | 40.8 | | | 48.3 | |
| Approach LOS | | D | | | B | | | D | | | D | |
| Queue Length 50th (ft) | 21 | 489 | | 35 | 611 | | 241 | 236 | | | 20 | 0 |
| Queue Length 95th (ft) | 51 | 553 | | #86 | 568 | | 354 | 350 | | | 50 | 25 |
| Internal Link Dist (ft) | | 411 | | | 496 | | | 923 | | | 297 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 69 | 2199 | | 69 | 2336 | | 446 | 448 | | | 165 | 158 |
| Starvation Cap Reductn | 0 | 0 | | 0 | 97 | | 0 | 0 | | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Reduced v/c Ratio | 0.30 | 0.77 | | 0.54 | 0.72 | | 0.59 | 0.59 | | | 0.13 | 0.10 |

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 148 (99%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 29.1 Intersection LOS: C
Intersection Capacity Utilization 62.9% ICU Level of Service B
Analysis Period (min) 15
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Kaahumanu Av. & Puunene Av



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 25 | 1015 | 60 | 15 | 1505 | 25 | 45 | 10 | 20 | 15 | 5 | 20 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.998 | | | 0.902 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.963 | |
| Satd. Flow (prot) | 1719 | 3438 | 1538 | 1719 | 4930 | 0 | 1719 | 1632 | 0 | 0 | 1743 | 1538 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.744 | | | | 0.811 | |
| Satd. Flow (perm) | 1719 | 3438 | 1538 | 1719 | 4930 | 0 | 1346 | 1632 | 0 | 0 | 1468 | 1538 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 63 | | 3 | | | 21 | | | | 21 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 576 | | | 745 | | | 284 | | | 611 | |
| Travel Time (s) | | 15.7 | | | 20.3 | | | 7.7 | | | 16.7 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 26 | 1068 | 63 | 16 | 1584 | 26 | 47 | 11 | 21 | 16 | 5 | 21 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 26 | 1068 | 63 | 16 | 1610 | 0 | 47 | 32 | 0 | 0 | 21 | 21 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | Perm | Prot | | | Perm | | | Perm | | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | | | 6 | | | | 4 | | | 8 | | 8 |
| Detector Phase | 1 | 6 | 6 | 5 | 2 | | 4 | 4 | | 8 | 8 | 8 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | 20.0 | 4.0 | 20.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 25.0 | 25.0 | 8.0 | 25.0 | | 10.0 | 10.0 | | 10.0 | 10.0 | 10.0 |
| Total Split (s) | 17.0 | 109.0 | 109.0 | 16.0 | 108.0 | 0.0 | 25.0 | 25.0 | 0.0 | 25.0 | 25.0 | 25.0 |
| Total Split (%) | 11.3% | 72.7% | 72.7% | 10.7% | 72.0% | 0.0% | 16.7% | 16.7% | 0.0% | 16.7% | 16.7% | 16.7% |
| Maximum Green (s) | 13.0 | 104.0 | 104.0 | 12.0 | 103.0 | | 20.0 | 20.0 | | 20.0 | 20.0 | 20.0 |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | | |
| Vehicle Extension (s) | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | | Max | Max | | Max | Max | Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 10.0 | 10.0 | | 10.0 | | 23.0 | 23.0 | | 24.0 | 24.0 | 24.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | 0 |
| Act Effct Green (s) | 6.8 | 114.1 | 114.1 | 6.0 | 111.2 | | 19.0 | 19.0 | | | 19.0 | 19.0 |
| Actuated g/C Ratio | 0.05 | 0.76 | 0.76 | 0.04 | 0.74 | | 0.13 | 0.13 | | | 0.13 | 0.13 |



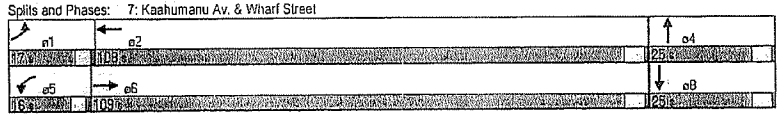


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.33 | 0.41 | 0.05 | 0.23 | 0.44 | | 0.28 | 0.14 | | | 0.11 | 0.10 |
| Control Delay | 77.3 | 0.7 | 0.1 | 79.5 | 16.5 | | 64.1 | 31.3 | | | 59.9 | 22.0 |
| Queue Delay | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 |
| Total Delay | 77.3 | 0.7 | 0.1 | 79.5 | 16.6 | | 64.1 | 31.3 | | | 59.9 | 22.0 |
| LOS | E | A | A | E | B | | E | C | | | E | C |
| Approach Delay | | 2.4 | | | 17.2 | | | 50.8 | | | 40.9 | |
| Approach LOS | | A | | | B | | | D | | | D | |
| Queue Length 50th (ft) | 26 | 6 | 0 | 14 | 480 | | 42 | 10 | | | 19 | 0 |
| Queue Length 95th (ft) | m36 | 15 | m0 | m17 | 605 | | 86 | 44 | | | 47 | 28 |
| Internal Link Dist (ft) | | 496 | | | 665 | | | 204 | | | 531 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 138 | 2614 | 1184 | 126 | 3656 | | 170 | 225 | | | 186 | 213 |
| Starvation Cap Reductn | 0 | 416 | 0 | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 250 | | 0 | 0 | | | 0 | 1 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Reduced v/c Ratio | 0.19 | 0.49 | 0.05 | 0.13 | 0.47 | | 0.28 | 0.14 | | | 0.11 | 0.10 |

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 14 (9%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 51.3% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Kaahumanu Av. & Wharf Street



| Lane Group | EBL | EBR | EBR2 | SBL | SBR | SBR2 | NWL2 | NWL | NWR | NEL2 | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 775 | 45 | 140 | 135 | 10 | 315 | 1480 | 215 | 50 | 130 | 245 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.97 | 1.00 | 1.00 | 1.00 | 0.88 |
| Frt | | 0.850 | | | 0.850 | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | | | | 0.950 | | | 0.950 | 0.950 | | | 0.950 | |
| Satd. Flow (prot) | 0 | 2707 | 0 | 1719 | 1538 | 1538 | 3335 | 3335 | 1538 | 0 | 1719 | 2707 |
| Flt Permitted | | | | 0.950 | | | 0.950 | 0.950 | | | 0.950 | |
| Satd. Flow (perm) | 0 | 2707 | 0 | 1719 | 1538 | 1538 | 3335 | 3335 | 1538 | 0 | 1719 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | | 11 | | | 170 | | | 258 |
| Link Speed (mph) | 25 | | | 25 | | | | 25 | | | 25 | |
| Link Distance (ft) | 782 | | | 406 | | | | 406 | | | 1802 | |
| Travel Time (s) | 21.3 | | | 11.1 | | | | 11.1 | | | 49.1 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 0 | 816 | 47 | 147 | 142 | 11 | 332 | 1558 | 226 | 53 | 137 | 258 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 863 | 0 | 147 | 142 | 11 | 332 | 1558 | 226 | 0 | 190 | 258 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Right | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | 0 | | | 12 | | | | 48 | | | 12 | |
| Link Offset(ft) | 0 | | | 0 | | | | 0 | | | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | 9 | 15 | 9 | 9 | 15 | 15 | 9 | 15 | 15 | 9 |
| Turn Type | | custom | | | Prot | Perm | Prot | | Perm | Split | | Prot |
| Protected Phases | | | | 3 | 3 | | 5 | 2 | | 4 | 4 | 4 |
| Permitted Phases | | 6 | | | | 3 | | | 2 | | | |
| Detector Phase | | 6 | | 3 | 3 | 3 | 5 | 2 | 2 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | | 26.5 | | 23.0 | 23.0 | 23.0 | 20.0 | 27.5 | 27.5 | 21.0 | 21.0 | 21.0 |
| Total Split (s) | 0.0 | 66.0 | 0.0 | 28.0 | 28.0 | 28.0 | 24.0 | 90.0 | 90.0 | 32.0 | 32.0 | 32.0 |
| Total Split (%) | 0.0% | 44.0% | 0.0% | 18.7% | 18.7% | 18.7% | 16.0% | 60.0% | 60.0% | 21.3% | 21.3% | 21.3% |
| Maximum Green (s) | | 61.5 | | 22.0 | 22.0 | 22.0 | 21.0 | 85.5 | 85.5 | 26.0 | 26.0 | 26.0 |
| Yellow Time (s) | | 4.0 | | 6.0 | 6.0 | 6.0 | 3.0 | 4.0 | 4.0 | 6.0 | 6.0 | 6.0 |
| All-Red Time (s) | | 0.5 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 4.0 | 5.5 | 4.0 | 7.0 | 7.0 | 6.0 | 4.0 | 5.5 | 5.5 | 7.0 | 7.0 | 7.0 |
| Lead/Lag | | Lag | | Lead | Lead | Lead | Lead | | | Lag | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 5.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | | C-Max | | None | None | None | Max | C-Max | C-Max | Max | Max | Max |
| Walk Time (s) | | 7.0 | | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | | |
| Flash Dont Walk (s) | | 15.0 | | 10.0 | 10.0 | 10.0 | | 16.0 | 16.0 | | | |
| Pedestrian Calls (#/hr) | | 10 | | 10 | 10 | 10 | | 10 | 10 | | | |
| Act Effct Green (s) | | 60.5 | | 17.2 | 17.2 | 18.2 | 20.0 | 84.5 | 84.5 | | 28.8 | 28.8 |
| Actuated g/C Ratio | | 0.40 | | 0.11 | 0.11 | 0.12 | 0.13 | 0.56 | 0.56 | | 0.19 | 0.19 |



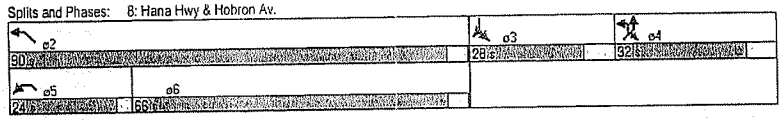


| Lane Group | EBL | EBR | EBR2 | SBL | SBR | SBR2 | NWL2 | NWL | NWR | NEL2 | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | | 0.79 | | 0.75 | 0.80 | 0.06 | 0.75 | 0.83 | 0.24 | | 0.58 | 0.35 |
| Control Delay | | 22.9 | | 86.0 | 95.2 | 26.0 | 81.4 | 22.3 | 6.3 | | 52.3 | 8.0 |
| Queue Delay | | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | | 22.9 | | 86.0 | 95.2 | 26.0 | 81.4 | 22.3 | 6.3 | | 52.3 | 8.0 |
| LOS | | C | | F | F | C | F | C | A | | D | A |
| Approach Delay | | | | 88.2 | | | | 29.8 | | | 26.8 | |
| Approach LOS | | | | F | | | | C | | | C | |
| Queue Length 50th (ft) | | 456 | | 141 | 137 | 0 | 157 | 193 | 3 | | 81 | 5 |
| Queue Length 95th (ft) | | 556 | | 217 | 212 | 20 | m225 | 543 | m94 | | 216 | 35 |
| Internal Link Dist (ft) | 702 | | | 326 | | | | 326 | | | 1722 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | 1094 | | 241 | 215 | 235 | 445 | 1879 | 941 | | 330 | 726 |
| Starvation Cap Reductn | | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | | 0.79 | | 0.61 | 0.66 | 0.05 | 0.75 | 0.83 | 0.24 | | 0.58 | 0.35 |

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 66 (44%), Referenced to phase 2:NWL and 6:EBR, Start of Yellow
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 32.6 Intersection LOS: C
Intersection Capacity Utilization 76.2% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Hana Hwy & Hobron Av.



| Lane Group | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 30 | 595 | 175 | 785 | 2140 | 75 | 155 | 340 | 335 | 35 | 280 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | 0.966 | | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1719 | 4772 | 0 | 3335 | 3438 | 1538 | 1719 | 3438 | 1538 | 1719 | 3438 | 1538 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1719 | 4772 | 0 | 3335 | 3438 | 1538 | 1719 | 3438 | 1538 | 1719 | 3438 | 1538 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 53 | | | | 48 | | | 353 | | | 59 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1200 | | | 298 | | | 441 | | | 410 | |
| Travel Time (s) | | 32.7 | | | 8.1 | | | 12.0 | | | 11.2 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 32 | 626 | 184 | 826 | 2253 | 79 | 163 | 358 | 353 | 37 | 295 | 63 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 32 | 810 | 0 | 826 | 2253 | 79 | 163 | 358 | 353 | 37 | 295 | 63 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | 6 | | | 4 | | | 8 |
| Detector Phase | 5 | 2 | | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | | 4.0 | 20.0 | 20.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 9.0 | 27.0 | | 9.0 | 27.0 | 27.0 | 9.0 | 20.0 | 20.0 | 9.0 | 20.0 | 20.0 |
| Total Split (s) | 9.0 | 56.0 | 0.0 | 54.0 | 101.0 | 101.0 | 20.0 | 28.0 | 28.0 | 12.0 | 20.0 | 20.0 |
| Total Split (%) | 6.0% | 37.3% | 0.0% | 36.0% | 67.3% | 67.3% | 13.3% | 18.7% | 18.7% | 8.0% | 13.3% | 13.3% |
| Maximum Green (s) | 4.0 | 51.0 | | 49.0 | 96.0 | 96.0 | 15.0 | 23.0 | 23.0 | 7.0 | 15.0 | 15.0 |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 3.0 | 2.0 | 3.0 | 3.0 | 2.0 | 3.0 | 3.0 |
| Recall Mode | None | C-Min | | None | C-Min | C-Min | None | None | None | None | None | None |
| Walk Time (s) | | 7.0 | | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 15.0 | | | 15.0 | 15.0 | | 15.0 | 15.0 | | 15.0 | 15.0 |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 3.0 | 56.8 | | 41.2 | 95.0 | 95.0 | 14.0 | 24.5 | 24.5 | 5.4 | 14.0 | 15.0 |
| Actuated g/C Ratio | 0.02 | 0.38 | | 0.27 | 0.63 | 0.63 | 0.09 | 0.16 | 0.16 | 0.04 | 0.09 | 0.10 |





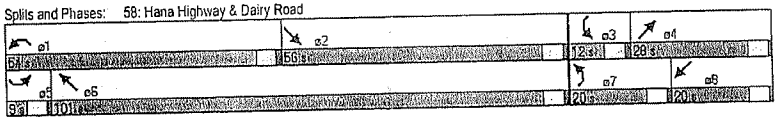
| Lane Group | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.94 | 0.44 | | 0.90 | 1.03 | 0.08 | 1.02 | 0.64 | 0.65 | 0.80 | 0.92 | 0.30 |
| Control Delay | 208.4 | 20.7 | | 65.9 | 56.5 | 5.0 | 141.2 | 65.3 | 11.4 | 106.8 | 100.0 | 20.1 |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 208.4 | 20.7 | | 65.9 | 56.5 | 5.0 | 141.2 | 65.3 | 11.4 | 106.8 | 100.0 | 20.1 |
| LOS | F | C | | E | E | A | F | E | B | F | F | C |
| Approach Delay | | 27.9 | | | 57.7 | | | 57.7 | | | 87.9 | |
| Approach LOS | | C | | | E | | | E | | | F | |
| Queue Length 50th (ft) | 29 | 232 | | 402 | ~1243 | 11 | ~166 | 177 | 0 | 36 | 153 | 4 |
| Queue Length 95th (ft) | m#88 | 217 | | 457 | #1370 | 32 | #322 | 236 | 101 | #86 | #245 | 51 |
| Internal Link Dist (ft) | | 1120 | | | 218 | | | 361 | | | 330 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 34 | 1841 | | 1067 | 2177 | 992 | 160 | 562 | 547 | 69 | 321 | 207 |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.94 | 0.44 | | 0.77 | 1.03 | 0.08 | 1.02 | 0.64 | 0.65 | 0.54 | 0.92 | 0.30 |

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 148 (99%), Referenced to phase 2:SET and 6:NWT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 55.2 Intersection LOS: E
Intersection Capacity Utilization 98.8% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 58: Hana Highway & Dairy Road



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 55 | 425 | 205 | 85 | 360 | 135 | 155 | 465 | 100 | 100 | 475 | 100 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | 0.951 | | | | 0.850 | | 0.973 | | | 0.974 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1719 | 3270 | 0 | 1719 | 1810 | 1538 | 1719 | 3345 | 0 | 1719 | 3349 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1719 | 3270 | 0 | 1719 | 1810 | 1538 | 1719 | 3345 | 0 | 1719 | 3349 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 55 | | | | 142 | | 18 | | | 16 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1026 | | | 1802 | | | 721 | | | 1003 | |
| Travel Time (s) | | 28.0 | | | 49.1 | | | 19.7 | | | 27.4 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 58 | 447 | 216 | 89 | 379 | 142 | 163 | 489 | 105 | 105 | 500 | 105 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 58 | 663 | 0 | 89 | 379 | 142 | 163 | 594 | 0 | 105 | 605 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | | Prot | | Perm | Prot | | | Prot | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | 4 | | | | | | |
| Detector Phase | 3 | 8 | | 7 | 4 | 4 | 5 | 2 | | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 8.0 | | 4.0 | 8.0 | 8.0 | 4.0 | 10.0 | | 4.0 | 10.0 | |
| Minimum Split (s) | 9.0 | 30.0 | | 9.0 | 30.0 | 30.0 | 9.0 | 41.0 | | 9.0 | 41.0 | |
| Total Split (s) | 16.0 | 49.0 | 0.0 | 21.0 | 54.0 | 54.0 | 32.0 | 57.0 | 0.0 | 23.0 | 48.0 | 0.0 |
| Total Split (%) | 10.7% | 32.7% | 0.0% | 14.0% | 36.0% | 36.0% | 21.3% | 38.0% | 0.0% | 15.3% | 32.0% | 0.0% |
| Maximum Green (s) | 11.0 | 44.0 | | 16.0 | 49.0 | 49.0 | 27.0 | 51.0 | | 18.0 | 42.0 | |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | | 4.0 | 5.0 | |
| All-Red Time (s) | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 | |
| Lost Time Adjust (s) | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 5.0 | 6.0 | 7.0 | 4.0 | 6.0 | 7.0 | 4.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 3.0 | 2.0 | 4.5 | | 2.0 | 4.5 | |
| Recall Mode | None | None | | None | None | None | None | C-Max | | None | C-Max | |
| Walk Time (s) | | 4.0 | | | | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 20.0 | | | | | | 28.0 | | | 28.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | | | | 0 | | | 0 | |
| Act Effct Green (s) | 7.9 | 33.7 | | 10.9 | 38.8 | 39.8 | 17.5 | 67.9 | | 12.5 | 62.9 | |
| Actuated g/C Ratio | 0.05 | 0.22 | | 0.07 | 0.26 | 0.27 | 0.12 | 0.45 | | 0.08 | 0.42 | |



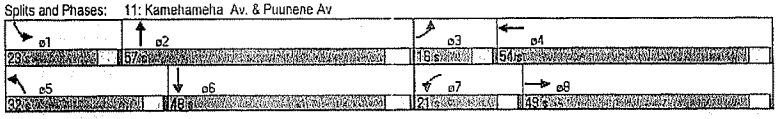


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.64 | 0.85 | | 0.71 | 0.81 | 0.28 | 0.81 | 0.39 | | 0.73 | 0.43 | |
| Control Delay | 99.3 | 61.9 | | 68.2 | 54.1 | 10.1 | 92.5 | 29.7 | | 113.3 | 13.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 99.3 | 61.9 | | 68.2 | 54.1 | 10.1 | 92.5 | 29.7 | | 113.3 | 13.1 | |
| LOS | F | E | | E | D | B | F | C | | F | B | |
| Approach Delay | | 65.0 | | | 45.9 | | | 43.2 | | | 27.9 | |
| Approach LOS | | E | | | D | | | D | | | C | |
| Queue Length 50th (ft) | 57 | 306 | | 49 | 382 | 64 | 158 | 194 | | 102 | 86 | |
| Queue Length 95th (ft) | 106 | 357 | | m79 | m485 | m101 | 230 | 300 | | m135 | 272 | |
| Internal Link Dist (ft) | | 946 | | | 1722 | | | 641 | | | 923 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 115 | 977 | | 172 | 579 | 598 | 298 | 1524 | | 197 | 1413 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.50 | 0.68 | | 0.52 | 0.65 | 0.24 | 0.55 | 0.39 | | 0.53 | 0.43 | |

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 25 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 45.5 Intersection LOS: D
Intersection Capacity Utilization 69.8% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Kamehameha Av. & Puunene Av



| Lane Group | SEU | SET | SER | NWL | NWT | NEL | NER |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Volume (vph) | 95 | 795 | 80 | 470 | 1965 | 3 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Frt | | 0.986 | | | | 0.871 | |
| Flt Protected | 0.950 | | | 0.950 | | 0.998 | |
| Satd. Flow (prot) | 1719 | 3390 | 0 | 1719 | 3438 | 1573 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | 0.998 | |
| Satd. Flow (perm) | 1719 | 3390 | 0 | 1719 | 3438 | 1573 | 0 |
| Right Turn on Red | | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 8 | | | | 63 | |
| Link Speed (mph) | | 25 | | | 25 | 25 | |
| Link Distance (ft) | | 708 | | | 503 | 1187 | |
| Travel Time (s) | | 19.3 | | | 13.7 | 32.4 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 100 | 837 | 84 | 495 | 2068 | 3 | 63 |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 100 | 921 | 0 | 495 | 2068 | 66 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No |
| Lane Alignment | R NA | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | 12 | |
| Link Offset(ft) | | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 9 | 15 | | 15 | 9 |
| Turn Type | Prot | | | Prot | | | |
| Protected Phases | 5 | | | 1 | | 4 | |
| Permitted Phases | | 2 | | | 6 | | |
| Detector Phase | 5 | 2 | | 1 | 6 | 4 | |
| Switch Phase | | | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Minimum Split (s) | 8.0 | 25.0 | | 8.0 | 20.0 | 25.0 | |
| Total Split (s) | 10.0 | 62.0 | 0.0 | 63.0 | 107.0 | 25.0 | 0.0 |
| Total Split (%) | 12.0% | 41.3% | 0.0% | 42.0% | 71.3% | 16.7% | 0.0% |
| Maximum Green (s) | 14.0 | 55.0 | | 59.0 | 104.0 | 18.0 | |
| Yellow Time (s) | 3.0 | 5.0 | | 3.0 | 3.0 | 5.0 | |
| All-Red Time (s) | 1.0 | 2.0 | | 1.0 | 0.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.0 | 7.0 | 4.0 | 4.0 | 3.0 | 7.0 | 4.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | | |
| Lead-Lag Optimize? | | | | | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | C-Min | | None | C-Min | Min | |
| Walk Time (s) | | 7.0 | | | | 7.0 | |
| Flash Dont Walk (s) | | 11.0 | | | | 11.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | | 0 | |
| Act Effct Green (s) | 14.1 | 75.8 | | 49.2 | 114.9 | 7.0 | |
| Actuated g/C Ratio | 0.09 | 0.51 | | 0.33 | 0.77 | 0.05 | |



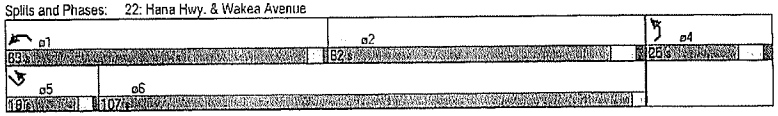


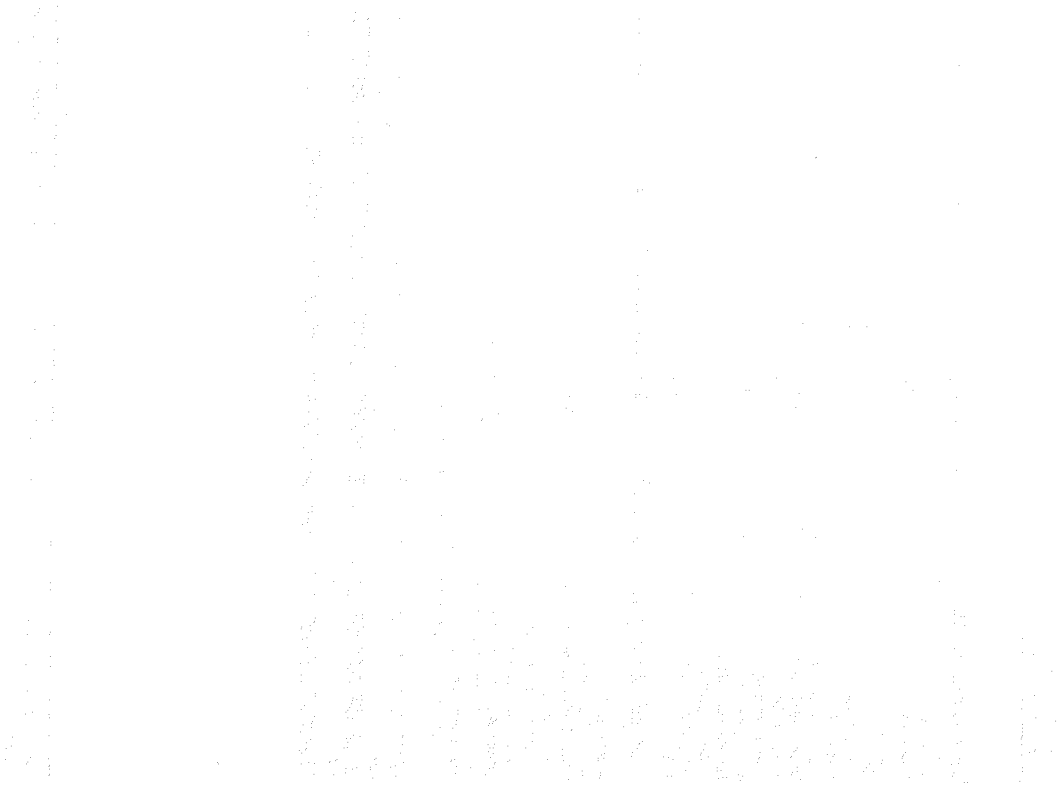
| Lane Group | SEU | SET | SER | NWL | NWT | NEL | NER |
|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.62 | 0.54 | | 0.88 | 0.79 | 0.49 | |
| Control Delay | 68.6 | 18.7 | | 53.4 | 16.0 | 29.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | |
| Total Delay | 68.6 | 18.7 | | 53.4 | 16.0 | 29.0 | |
| LOS | E | B | | D | B | C | |
| Approach Delay | | 23.6 | | | 23.3 | 29.0 | |
| Approach LOS | | C | | | C | C | |
| Queue Length 50th (ft) | 99 | 213 | | 412 | 470 | 3 | |
| Queue Length 95th (ft) | m141 | 241 | | m323 | m1082 | 53 | |
| Internal Link Dist (ft) | | 628 | | | 423 | 1107 | |
| Turn Bay Length (ft) | | | | | | | |
| Base Capacity (vph) | 178 | 1717 | | 678 | 2634 | 244 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.56 | 0.54 | | 0.73 | 0.79 | 0.27 | |

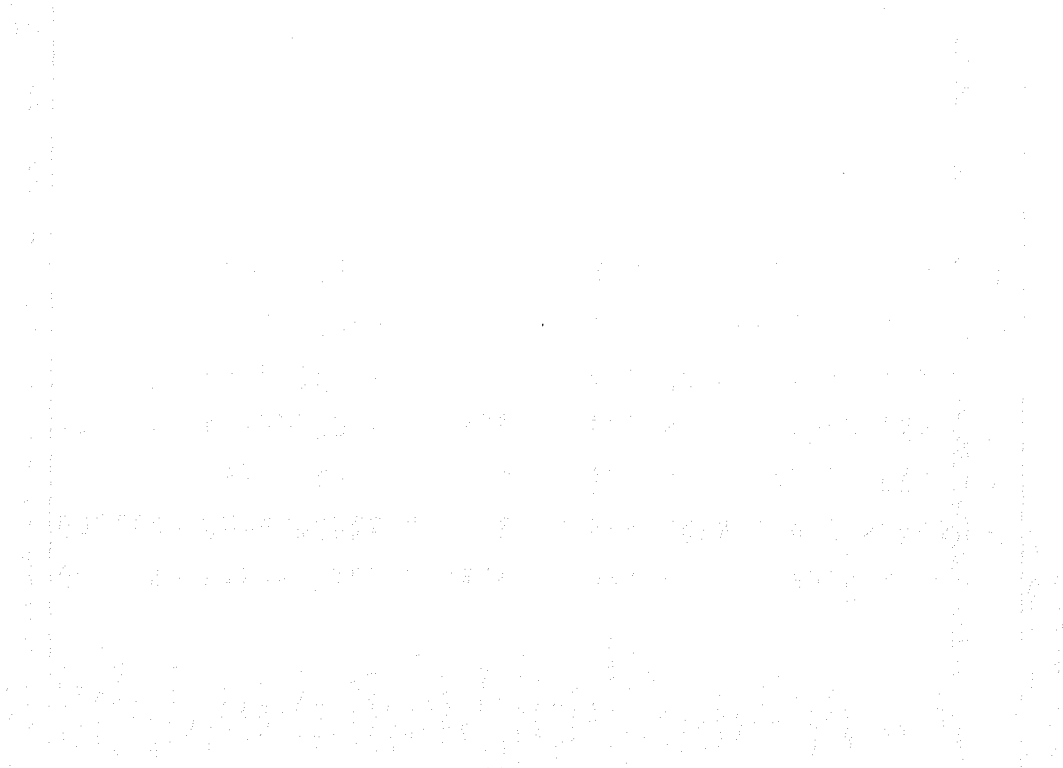
Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 38 (25%), Referenced to phase 2:SET and 6:NWT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 23.5 Intersection LOS: C
Intersection Capacity Utilization 76.0% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Hana Hwy. & Wakea Avenue





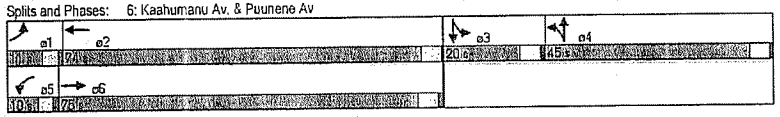


Timings
6: Kaahumanu Av. & Puunene Av 11/26/2009

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 25 | 1700 | 50 | 1270 | 745 | 30 | 30 | 30 |
| Turn Type | Prot | | Prot | | Split | | | Perm |
| Protected Phases | 1 | 6 | 5 | 2 | 4 | 4 | 3 | |
| Permitted Phases | | | | | | | | 3 |
| Detector Phase | 1 | 6 | 5 | 2 | 4 | 4 | 3 | 3 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 4.0 | 15.0 | 4.0 | 15.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 23.0 | 8.0 | 22.5 | 36.0 | 36.0 | 20.0 | 20.0 |
| Total Split (s) | 11.0 | 75.0 | 10.0 | 74.0 | 45.0 | 45.0 | 20.0 | 20.0 |
| Total Split (%) | 7.3% | 50.0% | 6.7% | 49.3% | 30.0% | 30.0% | 13.3% | 13.3% |
| Yellow Time (s) | 3.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 5.0 | 5.5 | 6.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lag | Lead | Lead |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | Max | None | C-Max | Max | Max | Max | Max |
| Act Effct Green (s) | 5.2 | 69.0 | 5.0 | 73.0 | 39.0 | 39.0 | 14.0 | 14.0 |
| Actuated g/C Ratio | 0.03 | 0.46 | 0.03 | 0.49 | 0.26 | 0.26 | 0.09 | 0.09 |
| v/c Ratio | 0.44 | 1.03 | 0.93 | 0.56 | 1.00 | 0.98 | 0.32 | 0.18 |
| Control Delay | 92.9 | 66.9 | 187.5 | 6.8 | 78.7 | 75.4 | 69.2 | 21.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 92.9 | 66.9 | 187.5 | 6.9 | 78.7 | 75.4 | 69.2 | 21.9 |
| LOS | F | E | F | A | E | E | E | C |
| Approach Delay | | 67.1 | | 13.7 | | 77.1 | 51.4 | |
| Approach LOS | | E | | B | | E | D | |

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 132 (88%), Referenced to phase 2:WBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 52.5 Intersection LOS: D
Intersection Capacity Utilization 82.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 6: Kaahumanu Av. & Puunene Av



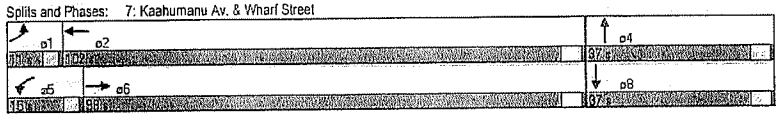



Timings
7: Kaahumanu Av. & Wharf Street 11/26/2009

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | |
| Volume (vph) | 20 | 1480 | 115 | 50 | 1255 | 115 | 5 | 15 | 1 | 25 |
| Turn Type | Prot | | Perm | Prot | | Perm | | Perm | | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 4 | | 8 | |
| Permitted Phases | | | 6 | | | 4 | | 8 | | 8 |
| Detector Phase | 1 | 6 | 6 | 5 | 2 | 4 | 4 | 8 | 8 | 8 |
| Switch Phase | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | 20.0 | 4.0 | 20.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 25.0 | 25.0 | 8.0 | 25.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| Total Split (s) | 11.0 | 98.0 | 98.0 | 15.0 | 102.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 |
| Total Split (%) | 7.3% | 65.3% | 65.3% | 10.0% | 68.0% | 24.7% | 24.7% | 24.7% | 24.7% | 24.7% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | |
| Recall Mode | None | C-Max | C-Max | None | C-Max | Max | Max | Max | Max | Max |
| Act Effct Green (s) | 5.5 | 95.7 | 95.7 | 8.3 | 100.4 | 31.0 | 31.0 | | 31.0 | 31.0 |
| Actuated g/C Ratio | 0.04 | 0.64 | 0.64 | 0.06 | 0.67 | 0.21 | 0.21 | | 0.21 | 0.21 |
| v/c Ratio | 0.33 | 0.71 | 0.12 | 0.56 | 0.40 | 0.43 | 0.19 | | 0.06 | 0.08 |
| Control Delay | 85.5 | 2.0 | 0.0 | 73.1 | 19.8 | 57.5 | 13.3 | | 48.6 | 16.3 |
| Queue Delay | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 85.5 | 2.4 | 0.0 | 73.1 | 19.8 | 57.5 | 13.3 | | 48.6 | 16.3 |
| LOS | F | A | A | E | B | E | B | | D | B |
| Approach Delay | | 3.3 | | | 21.8 | | 40.9 | | 29.1 | |
| Approach LOS | | A | | | C | | D | | C | |

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 13.5 Intersection LOS: B
Intersection Capacity Utilization 64.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 7: Kaahumanu Av. & Wharf Street



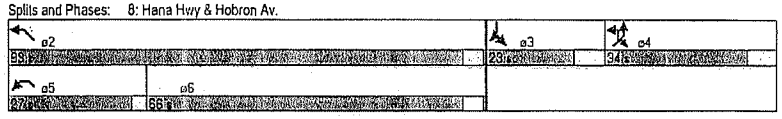
Timings
8: Hana Hwy & Hobron Av. 11/26/2009

| Lane Group | EBR | SBL | SBR | SBR2 | NWL2 | NWL | NWR | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 1545 | 210 | 180 | 10 | 590 | 1095 | 240 | 130 | 605 |
| Turn Type | custom | | Prot | Perm | Prot | | Perm | | Prot |
| Protected Phases | | 3 | 3 | | 5 | 2 | | 4 | 4 |
| Permitted Phases | 6 | | | 3 | | | 2 | | |
| Detector Phase | 6 | 3 | 3 | 3 | 5 | 2 | 2 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 26.5 | 23.0 | 23.0 | 23.0 | 20.0 | 27.5 | 27.5 | 21.0 | 21.0 |
| Total Split (s) | 66.0 | 23.0 | 23.0 | 23.0 | 27.0 | 93.0 | 93.0 | 34.0 | 34.0 |
| Total Split (%) | 44.0% | 15.3% | 15.3% | 15.3% | 18.0% | 62.0% | 62.0% | 22.7% | 22.7% |
| Yellow Time (s) | 4.0 | 6.0 | 6.0 | 6.0 | 3.0 | 4.0 | 4.0 | 6.0 | 6.0 |
| All-Red Time (s) | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.5 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.5 | 7.0 | 7.0 | 6.0 | 4.0 | 5.5 | 5.5 | 7.0 | 7.0 |
| Lead/Lag | Lag | Lead | Lead | Lead | Lead | | | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | C-Max | None | None | None | Max | C-Max | C-Max | Max | Max |
| Act Effct Green (s) | 60.5 | 16.0 | 16.0 | 17.0 | 23.0 | 87.5 | 87.5 | 27.0 | 27.0 |
| Actuated g/C Ratio | 0.40 | 0.11 | 0.11 | 0.11 | 0.15 | 0.58 | 0.58 | 0.18 | 0.18 |
| v/c Ratio | 1.20 | 1.21 | 1.15 | 0.06 | 1.22 | 0.41 | 0.25 | 0.73 | 1.28 |
| Control Delay | 132.3 | 187.4 | 173.7 | 28.1 | 165.3 | 17.6 | 2.2 | 52.8 | 155.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 132.3 | 187.4 | 173.7 | 28.1 | 165.3 | 17.6 | 2.2 | 52.8 | 155.2 |
| LOS | F | F | F | C | F | B | A | D | F |
| Approach Delay | | 177.1 | | | | 61.0 | | 128.4 | |
| Approach LOS | | F | | | | E | | F | |

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 72 (48%), Referenced to phase 2:NWL and 6:EBR, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.28
Intersection Signal Delay: 106.5 Intersection LOS: F
Intersection Capacity Utilization 85.7% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 8: Hana Hwy & Hobron Av.





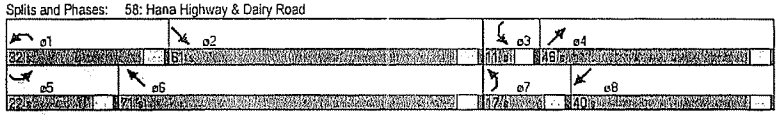

Timings
58: Hana Highway & Dairy Road 11/26/2009

| Lane Group | SEL | SET | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Volume (vph) | 90 | 1675 | 610 | 1020 | 95 | 140 | 455 | 655 | 65 | 825 | 25 |
| Turn Type | Prot | | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 5 | 2 | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | 6 | | | 4 | | | 8 |
| Detector Phase | 5 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | 4.0 | 20.0 | 20.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 9.0 | 27.0 | 9.0 | 27.0 | 27.0 | 9.0 | 35.0 | 35.0 | 9.0 | 35.0 | 35.0 |
| Total Split (s) | 22.0 | 61.0 | 32.0 | 71.0 | 71.0 | 17.0 | 46.0 | 46.0 | 11.0 | 40.0 | 40.0 |
| Total Split (%) | 14.7% | 40.7% | 21.3% | 47.3% | 47.3% | 11.3% | 30.7% | 30.7% | 7.3% | 26.7% | 26.7% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Recall Mode | None | Min | None | Min | Min | None | None | None | None | None | None |
| Act Effct Green (s) | 11.5 | 55.0 | 26.0 | 69.5 | 69.5 | 11.0 | 40.0 | 40.0 | 5.0 | 34.0 | 35.0 |
| Actuated g/C Ratio | 0.08 | 0.37 | 0.17 | 0.46 | 0.46 | 0.07 | 0.27 | 0.27 | 0.03 | 0.23 | 0.23 |
| v/c Ratio | 0.73 | 1.11 | 1.11 | 0.47 | 0.13 | 1.17 | 0.52 | 1.10 | 1.19 | 1.11 | 0.07 |
| Control Delay | 96.2 | 100.7 | 126.9 | 28.8 | 4.7 | 189.3 | 49.3 | 96.9 | 238.0 | 120.3 | 21.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 96.2 | 100.7 | 126.9 | 28.8 | 4.7 | 189.3 | 49.3 | 96.9 | 238.0 | 120.3 | 21.2 |
| LOS | F | F | F | C | A | F | D | F | F | F | C |
| Approach Delay | | 100.5 | | 62.2 | | | 89.9 | | | 126.0 | |
| Approach LOS | | F | | E | | | F | | | F | |

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 90.9 Intersection LOS: F
Intersection Capacity Utilization 105.0% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 58: Hana Highway & Dairy Road

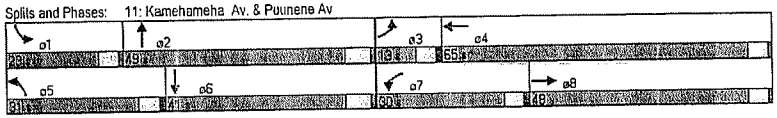


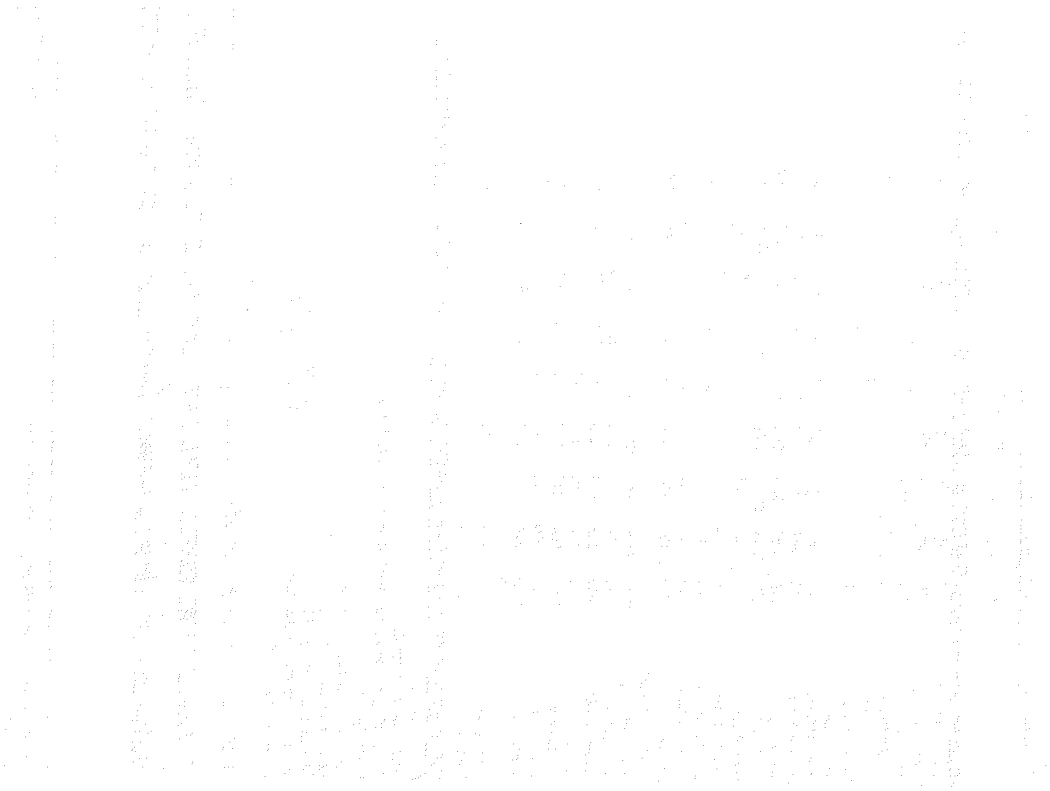
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 50 | 580 | 210 | 570 | 335 | 220 | 575 | 145 | 435 |
| Turn Type | Prot | | Prot | | Perm | Prot | | Prot | |
| Protected Phases | 3 | 8 | 7 | 4 | | 5 | 2 | 1 | 6 |
| Permitted Phases | | | | | 4 | | | | |
| Detector Phase | 3 | 8 | 7 | 4 | 4 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 8.0 | 4.0 | 8.0 | 8.0 | 4.0 | 10.0 | 4.0 | 10.0 |
| Minimum Split (s) | 9.0 | 30.0 | 9.0 | 30.0 | 30.0 | 9.0 | 41.0 | 9.0 | 41.0 |
| Total Split (s) | 13.0 | 48.0 | 30.0 | 65.0 | 65.0 | 31.0 | 49.0 | 23.0 | 41.0 |
| Total Split (%) | 8.7% | 32.0% | 20.0% | 43.3% | 43.3% | 20.7% | 32.7% | 15.3% | 27.3% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | 4.0 | 5.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 7.0 | 6.0 | 7.0 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | C-Max | None | C-Max |
| Act Effct Green (s) | 6.5 | 41.0 | 21.4 | 58.0 | 59.0 | 22.3 | 47.4 | 15.3 | 40.4 |
| Actuated g/C Ratio | 0.04 | 0.27 | 0.14 | 0.39 | 0.39 | 0.15 | 0.32 | 0.10 | 0.27 |
| v/c Ratio | 0.72 | 0.94 | 0.90 | 0.86 | 0.46 | 0.91 | 0.67 | 0.87 | 0.55 |
| Control Delay | 115.4 | 68.4 | 100.7 | 34.4 | 4.1 | 98.9 | 48.6 | 98.9 | 23.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 115.4 | 68.4 | 100.7 | 34.4 | 4.1 | 98.9 | 48.6 | 98.9 | 23.9 |
| LOS | F | E | F | C | A | F | D | F | C |
| Approach Delay | | 71.1 | | 37.7 | | | 61.0 | | 41.4 |
| Approach LOS | | E | | D | | | E | | D |

**Intersection Summary**

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 8 (5%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 52.7 Intersection LOS: D
Intersection Capacity Utilization 83.8% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 11: Kamehameha Av. & Puunene Av





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 25 | 1700 | 490 | 50 | 1270 | 15 | 745 | 30 | 25 | 20 | 30 | 30 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.91 | 0.91 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.966 | | | 0.998 | | | 0.991 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | 0.959 | | | 0.981 | |
| Satd. Flow (prot) | 1719 | 4772 | 0 | 1719 | 4930 | 0 | 1633 | 1634 | 0 | 0 | 1775 | 1538 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | 0.959 | | | 0.981 | |
| Satd. Flow (perm) | 1719 | 4772 | 0 | 1719 | 4930 | 0 | 1633 | 1634 | 0 | 0 | 1775 | 1538 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 62 | | | 1 | | | 2 | | | | 32 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 491 | | | 576 | | | 1003 | | | 377 | |
| Travel Time (s) | | 13.4 | | | 15.7 | | | 27.4 | | | 10.3 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 26 | 1789 | 516 | 53 | 1337 | 16 | 784 | 32 | 26 | 21 | 32 | 32 |
| Shared Lane Traffic (%) | | | | | | | 46% | | | | | |
| Lane Group Flow (vph) | 26 | 2305 | 0 | 53 | 1353 | 0 | 423 | 419 | 0 | 0 | 53 | 32 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | | Prot | | | Split | | | Split | | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 4 | 4 | | 3 | 3 | |
| Permitted Phases | | | | | | | | | | | | 3 |
| Detector Phase | 1 | 6 | | 5 | 2 | | 4 | 4 | | 3 | 3 | 3 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 15.0 | | 4.0 | 15.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 23.0 | | 8.0 | 22.5 | | 36.0 | 36.0 | | 20.0 | 20.0 | 20.0 |
| Total Split (s) | 11.0 | 82.0 | 0.0 | 10.0 | 81.0 | 0.0 | 48.0 | 48.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| Total Split (%) | 6.9% | 51.3% | 0.0% | 6.3% | 50.6% | 0.0% | 30.0% | 30.0% | 0.0% | 12.5% | 12.5% | 12.5% |
| Maximum Green (s) | 7.0 | 77.0 | | 6.0 | 76.5 | | 43.0 | 43.0 | | 15.0 | 15.0 | 15.0 |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | | 1.0 | 0.5 | | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 4.0 | 5.0 | 5.5 | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lag | Lag | | Lead | Lead | Lead |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 5.0 | | 2.0 | 5.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | Max | | None | C-Max | | Max | Max | | Max | Max | Max |
| Walk Time (s) | | 7.0 | | | 7.0 | | 7.0 | 7.0 | | | | |
| Flash Dont Walk (s) | | 10.0 | | | 10.0 | | 24.0 | 24.0 | | | | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | 0 | 0 | | | | |
| Act Effct Green (s) | 5.2 | 76.0 | | 5.0 | 79.9 | | 42.0 | 42.0 | | | 14.0 | 14.0 |
| Actuated g/C Ratio | 0.03 | 0.48 | | 0.03 | 0.50 | | 0.26 | 0.26 | | | 0.09 | 0.09 |



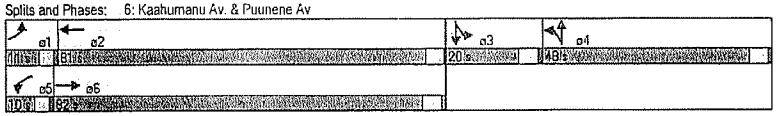


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.47 | 1.00 | | 0.98 | 0.55 | | 0.99 | 0.97 | | | 0.34 | 0.20 |
| Control Delay | 102.0 | 59.7 | | 210.6 | 7.5 | | 80.9 | 77.7 | | | 75.3 | 22.7 |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.1 | | 0.0 | 0.0 | | | 0.0 | 0.0 |
| Total Delay | 102.0 | 59.7 | | 210.6 | 7.6 | | 80.9 | 77.7 | | | 75.3 | 22.7 |
| LOS | F | E | | F | A | | F | E | | | E | C |
| Approach Delay | | 60.2 | | | 15.2 | | | 79.3 | | | 55.5 | |
| Approach LOS | | E | | | B | | | E | | | E | |
| Queue Length 50th (ft) | 27 | ~864 | | 59 | 80 | | 461 | 455 | | | 53 | 0 |
| Queue Length 95th (ft) | 63 | #990 | | #161 | 90 | | #708 | #694 | | | 102 | 36 |
| Internal Link Dist (ft) | | 411 | | | 496 | | | 923 | | | 297 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 64 | 2299 | | 54 | 2464 | | 429 | 430 | | | 155 | 164 |
| Starvation Cap Reductn | 0 | 0 | | 0 | 259 | | 0 | 0 | | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Reduced v/c Ratio | 0.41 | 1.00 | | 0.98 | 0.61 | | 0.99 | 0.97 | | | 0.34 | 0.20 |

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 134 (84%), Referenced to phase 2:WBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 50.0 Intersection LOS: D
Intersection Capacity Utilization 82.6% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Kaahumanu Av. & Puunene Av



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 20 | 1480 | 115 | 50 | 1255 | 5 | 115 | 5 | 65 | 15 | 1 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.999 | | | 0.860 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.955 | |
| Satd. Flow (prot) | 1719 | 3438 | 1538 | 1719 | 4935 | 0 | 1719 | 1556 | 0 | 0 | 1728 | 1538 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.746 | | | | 0.789 | |
| Satd. Flow (perm) | 1719 | 3438 | 1538 | 1719 | 4935 | 0 | 1350 | 1556 | 0 | 0 | 1428 | 1538 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 97 | | 1 | | | 68 | | | | 26 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 576 | | | 745 | | | 284 | | | 611 | |
| Travel Time (s) | | 15.7 | | | 20.3 | | | 7.7 | | | 16.7 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 21 | 1558 | 121 | 53 | 1321 | 5 | 121 | 5 | 68 | 16 | 1 | 26 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 21 | 1558 | 121 | 53 | 1326 | 0 | 121 | 73 | 0 | 0 | 17 | 26 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | Perm | Prot | | | Perm | | | Perm | | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | | | 6 | | | | 4 | | | 8 | | 8 |
| Detector Phase | 1 | 6 | 6 | 5 | 2 | | 4 | 4 | | 8 | 8 | 8 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | 20.0 | 4.0 | 20.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 25.0 | 25.0 | 8.0 | 25.0 | | 36.0 | 36.0 | | 36.0 | 36.0 | 36.0 |
| Total Split (s) | 11.0 | 106.0 | 106.0 | 16.0 | 111.0 | 0.0 | 38.0 | 38.0 | 0.0 | 38.0 | 38.0 | 38.0 |
| Total Split (%) | 6.9% | 66.3% | 66.3% | 10.0% | 69.4% | 0.0% | 23.8% | 23.8% | 0.0% | 23.8% | 23.8% | 23.8% |
| Maximum Green (s) | 7.0 | 101.0 | 101.0 | 12.0 | 106.0 | | 33.0 | 33.0 | | 33.0 | 33.0 | 33.0 |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 4.0 | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | | Max | Max | | Max | Max | Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 10.0 | 10.0 | | 10.0 | | 23.0 | 23.0 | | 24.0 | 24.0 | 24.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | 0 |
| Act Effct Green (s) | 5.6 | 104.2 | 104.2 | 8.8 | 109.4 | | 32.0 | 32.0 | | | 32.0 | 32.0 |
| Actuated g/C Ratio | 0.04 | 0.65 | 0.65 | 0.06 | 0.68 | | 0.20 | 0.20 | | | 0.20 | 0.20 |



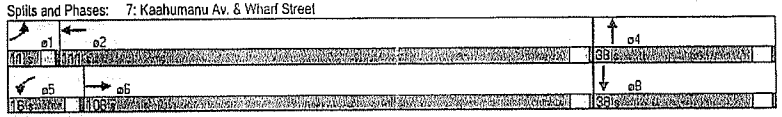


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.35 | 0.70 | 0.12 | 0.56 | 0.39 | | 0.45 | 0.20 | | | 0.06 | 0.08 |
| Control Delay | 90.8 | 2.0 | 0.1 | 88.9 | 16.0 | | 62.4 | 13.9 | | | 52.7 | 17.4 |
| Queue Delay | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 |
| Total Delay | 90.8 | 2.3 | 0.1 | 88.9 | 16.0 | | 62.4 | 13.9 | | | 52.7 | 17.4 |
| LOS | F | A | A | F | B | | E | B | | | D | B |
| Approach Delay | | 3.3 | | | 18.8 | | | 44.2 | | | 31.4 | |
| Approach LOS | | A | | | B | | | D | | | C | |
| Queue Length 50th (ft) | 23 | 28 | 0 | 56 | 263 | | 113 | 4 | | | 15 | 0 |
| Queue Length 95th (ft) | m23 | m29 | m0 | m104 | m337 | | 183 | 51 | | | 38 | 29 |
| Internal Link Dist (ft) | | 496 | | | 665 | | | 204 | | | 531 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 64 | 2240 | 1036 | 118 | 3375 | | 270 | 366 | | | 286 | 328 |
| Starvation Cap Reductn | 0 | 197 | 0 | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | | 0 | 0 |
| Reduced v/c Ratio | 0.33 | 0.76 | 0.12 | 0.45 | 0.39 | | 0.45 | 0.20 | | | 0.06 | 0.08 |

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 154 (96%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 12.5 Intersection LOS: B
Intersection Capacity Utilization 64.6% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Kaahumanu Av. & Wharf Street



| Lane Group | EBL | EBR | EBR2 | SBL | SBR | SBR2 | NWL2 | NWL | NWR | NEL2 | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1545 | 75 | 210 | 180 | 10 | 590 | 1095 | 240 | 85 | 130 | 605 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.97 | 1.00 | 1.00 | 1.00 | 0.88 |
| Frt | | 0.850 | | | 0.850 | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | | | | 0.950 | | | 0.950 | 0.950 | | | 0.950 | |
| Satd. Flow (prot) | 0 | 2707 | 0 | 1719 | 1538 | 1538 | 3335 | 3335 | 1538 | 0 | 1719 | 2707 |
| Flt Permitted | | | | 0.950 | | | 0.950 | 0.950 | | | 0.950 | |
| Satd. Flow (perm) | 0 | 2707 | 0 | 1719 | 1538 | 1538 | 3335 | 3335 | 1538 | 0 | 1719 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | | 11 | | | 253 | | | 410 |
| Link Speed (mph) | 25 | | | 25 | | | | 25 | | | 25 | |
| Link Distance (ft) | 782 | | | 406 | | | | 406 | | | 1802 | |
| Travel Time (s) | 21.3 | | | 11.1 | | | | 11.1 | | | 49.1 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 0 | 1626 | 79 | 221 | 189 | 11 | 621 | 1153 | 253 | 89 | 137 | 637 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1705 | 0 | 221 | 189 | 11 | 621 | 1153 | 253 | 0 | 226 | 637 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Right | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | 0 | | | 12 | | | | 48 | | | 12 | |
| Link Offset(ft) | 0 | | | 0 | | | | 0 | | | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | 9 | 15 | 9 | 9 | 15 | 15 | 9 | 15 | 15 | 9 |
| Turn Type | | custom | | | Prot | Perm | Prot | | Perm | Split | | Prot |
| Protected Phases | | | | 3 | 3 | | 5 | 2 | | 4 | 4 | 4 |
| Permitted Phases | | 6 | | | | 3 | | | 2 | | | |
| Detector Phase | | 6 | | 3 | 3 | 3 | 5 | 2 | 2 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | | 26.5 | | 23.0 | 23.0 | 23.0 | 20.0 | 27.5 | 27.5 | 21.0 | 21.0 | 21.0 |
| Total Split (s) | 0.0 | 84.0 | 0.0 | 24.0 | 24.0 | 24.0 | 27.0 | 111.0 | 111.0 | 25.0 | 25.0 | 25.0 |
| Total Split (%) | 0.0% | 52.5% | 0.0% | 15.0% | 15.0% | 15.0% | 16.9% | 69.4% | 69.4% | 15.6% | 15.6% | 15.6% |
| Maximum Green (s) | | 79.5 | | 18.0 | 18.0 | 18.0 | 24.0 | 106.5 | 106.5 | 19.0 | 19.0 | 19.0 |
| Yellow Time (s) | | 4.0 | | 6.0 | 6.0 | 6.0 | 3.0 | 4.0 | 4.0 | 6.0 | 6.0 | 6.0 |
| All-Red Time (s) | | 0.5 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 4.0 | 5.5 | 4.0 | 7.0 | 7.0 | 6.0 | 4.0 | 5.5 | 5.5 | 7.0 | 7.0 | 7.0 |
| Lead/Lag | | Lag | | Lead | Lead | Lead | Lead | | | Lag | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 5.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | | C-Max | | None | None | None | Max | C-Max | C-Max | Max | Max | Max |
| Walk Time (s) | | 7.0 | | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | | |
| Flash Dont Walk (s) | | 15.0 | | 10.0 | 10.0 | 10.0 | | 16.0 | 16.0 | | | |
| Pedestrian Calls (#/hr) | | 10 | | 10 | 10 | 10 | | 10 | 10 | | | |
| Act Effct Green (s) | | 78.5 | | 17.0 | 17.0 | 18.0 | 23.0 | 105.5 | 105.5 | | 18.0 | 18.0 |
| Actuated g/C Ratio | | 0.49 | | 0.11 | 0.11 | 0.11 | 0.14 | 0.66 | 0.66 | | 0.11 | 0.11 |





| Lane Group | EBL | EBR | EBR2 | SBL | SBR | SBR2 | NWL2 | NWL | NWR | NEL2 | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | | 1.28 | 1.21 | 1.16 | 0.06 | 1.30 | 0.52 | 0.23 | | | 1.17 | 0.95 |
| Control Delay | | 167.4 | 190.4 | 179.1 | 28.5 | 201.5 | 16.2 | 4.3 | | | 151.8 | 35.1 |
| Queue Delay | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 |
| Total Delay | | 167.4 | 190.4 | 179.1 | 28.5 | 201.5 | 16.2 | 4.3 | | | 151.8 | 35.1 |
| LOS | | F | F | F | C | F | B | A | | | F | D |
| Approach Delay | | | 181.1 | | | | 71.5 | | | | 65.7 | |
| Approach LOS | | | F | | | | E | | | | E | |
| Queue Length 50th (ft) | | ~1308 | ~281 | ~233 | 0 | ~434 | 239 | 14 | | | ~272 | 92 |
| Queue Length 95th (ft) | | #1461 | #459 | #399 | 21 | #563 | 345 | 78 | | | m#358 | m#235 |
| Internal Link Dist (ft) | 702 | | 326 | | | | 326 | | | | 1722 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | 1330 | 183 | 163 | 183 | 479 | 2199 | 1100 | | | 193 | 668 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 |
| Spillback Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 |
| Reduced v/c Ratio | | 1.28 | 1.21 | 1.16 | 0.06 | 1.30 | 0.52 | 0.23 | | | 1.17 | 0.95 |

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 72 (45%), Referenced to phase 2:NWL and 6:EBR, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.30
Intersection Signal Delay: 112.3 Intersection LOS: F
Intersection Capacity Utilization 88.3% ICU Level of Service E
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Hana Hwy & Hobron Av.

| Lane Group | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 90 | 1675 | 210 | 610 | 1020 | 95 | 140 | 455 | 655 | 65 | 825 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | 0.983 | | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1719 | 4856 | 0 | 3335 | 3438 | 1538 | 1719 | 3438 | 1538 | 1719 | 3438 | 1538 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1719 | 4856 | 0 | 3335 | 3438 | 1538 | 1719 | 3438 | 1538 | 1719 | 3438 | 1538 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 15 | | | | 79 | | | 299 | | | 18 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1200 | | | 298 | | | 441 | | | 410 | |
| Travel Time (s) | | 32.7 | | | 8.1 | | | 12.0 | | | 11.2 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 95 | 1763 | 221 | 642 | 1074 | 100 | 147 | 479 | 689 | 68 | 868 | 26 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 95 | 1984 | 0 | 642 | 1074 | 100 | 147 | 479 | 689 | 68 | 868 | 26 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | 6 | | | 4 | | | 8 |
| Detector Phase | 5 | 2 | | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 20.0 | | 4.0 | 20.0 | 20.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 9.0 | 27.0 | | 9.0 | 27.0 | 27.0 | 9.0 | 35.0 | 35.0 | 9.0 | 35.0 | 35.0 |
| Total Split (s) | 21.0 | 64.0 | 0.0 | 34.0 | 77.0 | 77.0 | 19.0 | 50.0 | 50.0 | 12.0 | 43.0 | 43.0 |
| Total Split (%) | 13.1% | 40.0% | 0.0% | 21.3% | 48.1% | 48.1% | 11.9% | 31.3% | 31.3% | 7.5% | 26.9% | 26.9% |
| Maximum Green (s) | 16.0 | 59.0 | | 29.0 | 72.0 | 72.0 | 14.0 | 45.0 | 45.0 | 7.0 | 38.0 | 38.0 |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 3.0 | 2.0 | 3.0 | 3.0 | 2.0 | 3.0 | 3.0 |
| Recall Mode | None | C-Min | | None | C-Min | C-Min | None | None | None | None | None | None |
| Walk Time (s) | | 7.0 | | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 15.0 | | | 15.0 | 15.0 | | 15.0 | 15.0 | | 15.0 | 15.0 |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 11.7 | 58.0 | | 28.0 | 74.3 | 74.3 | 13.0 | 44.0 | 44.0 | 6.0 | 37.0 | 38.0 |
| Actuated g/C Ratio | 0.07 | 0.36 | | 0.18 | 0.46 | 0.46 | 0.08 | 0.28 | 0.28 | 0.04 | 0.23 | 0.24 |



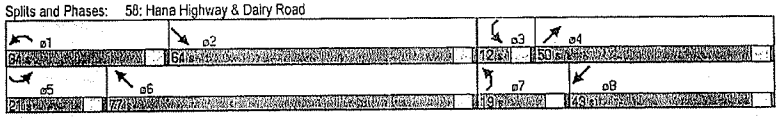


| Lane Group | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.76 | 1.12 | | 1.10 | 0.67 | 0.13 | 1.05 | 0.51 | 1.08 | 1.06 | 1.09 | 0.07 |
| Control Delay | 88.9 | 101.5 | | 126.4 | 36.4 | 8.0 | 157.4 | 51.1 | 88.2 | 199.2 | 115.7 | 24.2 |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 88.9 | 101.5 | | 126.4 | 36.4 | 8.0 | 157.4 | 51.1 | 88.2 | 199.2 | 115.7 | 24.2 |
| LOS | F | F | | F | D | A | F | D | F | F | F | C |
| Approach Delay | | 100.9 | | | 66.7 | | | 82.4 | | | 119.1 | |
| Approach LOS | | F | | | E | | | F | | | F | |
| Queue Length 50th (ft) | 97 | ~878 | | ~391 | 457 | 12 | ~167 | 223 | ~561 | ~78 | ~536 | 7 |
| Queue Length 95th (ft) | m103 | #972 | | #518 | 557 | 49 | #321 | 283 | #815 | #188 | #673 | 34 |
| Internal Link Dist (ft) | | 1120 | | | 218 | | | 361 | | | 330 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 161 | 1770 | | 584 | 1597 | 757 | 140 | 945 | 640 | 64 | 795 | 379 |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.59 | 1.12 | | 1.10 | 0.67 | 0.13 | 1.05 | 0.51 | 1.08 | 1.06 | 1.09 | 0.07 |

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 8 (5%), Referenced to phase 2:SET and 6:NWT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 89.7 Intersection LOS: F
Intersection Capacity Utilization 105.0% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 58: Hana Highway & Dairy Road



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 50 | 580 | 250 | 210 | 570 | 335 | 220 | 575 | 105 | 145 | 435 | 45 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | 0.955 | | | | 0.850 | | 0.977 | | | 0.986 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1719 | 3283 | 0 | 1719 | 1810 | 1538 | 1719 | 3359 | 0 | 1719 | 3390 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1719 | 3283 | 0 | 1719 | 1810 | 1538 | 1719 | 3359 | 0 | 1719 | 3390 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 42 | | | | 248 | | 13 | | | 6 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1026 | | | 1802 | | | 721 | | | 1003 | |
| Travel Time (s) | | 28.0 | | | 49.1 | | | 19.7 | | | 27.4 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 53 | 611 | 263 | 221 | 600 | 353 | 232 | 605 | 111 | 153 | 458 | 47 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 53 | 874 | 0 | 221 | 600 | 353 | 232 | 716 | 0 | 153 | 505 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Turn Type | Prot | | | Prot | | Perm | Prot | | | Prot | | |
| Protected Phases | 3 | 8 | | 7 | 4 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | 4 | | | | | | |
| Detector Phase | 3 | 8 | | 7 | 4 | 4 | 5 | 2 | | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 8.0 | | 4.0 | 8.0 | 8.0 | 4.0 | 10.0 | | 4.0 | 10.0 | |
| Minimum Split (s) | 9.0 | 30.0 | | 9.0 | 30.0 | 30.0 | 9.0 | 41.0 | | 9.0 | 41.0 | |
| Total Split (s) | 13.0 | 52.0 | 0.0 | 32.0 | 71.0 | 71.0 | 33.0 | 52.0 | 0.0 | 24.0 | 43.0 | 0.0 |
| Total Split (%) | 8.1% | 32.5% | 0.0% | 20.0% | 44.4% | 44.4% | 20.6% | 32.5% | 0.0% | 15.0% | 26.9% | 0.0% |
| Maximum Green (s) | 8.0 | 47.0 | | 27.0 | 66.0 | 66.0 | 28.0 | 46.0 | | 19.0 | 37.0 | |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | | 4.0 | 5.0 | |
| All-Red Time (s) | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 | |
| Lost Time Adjust (s) | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Total Lost Time (s) | 6.0 | 6.0 | 4.0 | 6.0 | 6.0 | 5.0 | 6.0 | 7.0 | 4.0 | 6.0 | 7.0 | 4.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 3.0 | | 2.0 | 3.0 | 3.0 | 2.0 | 4.5 | | 2.0 | 4.5 | |
| Recall Mode | None | None | | None | None | None | None | C-Max | | None | C-Max | |
| Walk Time (s) | | 4.0 | | | | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 20.0 | | | | | | 28.0 | | | 28.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | | | | 0 | | | 0 | |
| Act Effct Green (s) | 6.6 | 44.3 | | 22.8 | 62.7 | 63.7 | 23.8 | 51.7 | | 16.3 | 44.2 | |
| Actuated g/C Ratio | 0.04 | 0.28 | | 0.14 | 0.39 | 0.40 | 0.15 | 0.32 | | 0.10 | 0.28 | |



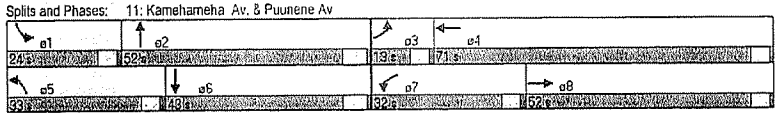


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.76 | 0.93 | | 0.90 | 0.85 | 0.46 | 0.91 | 0.66 | | 0.87 | 0.54 | |
| Control Delay | 127.4 | 70.1 | | 69.5 | 39.0 | 6.7 | 103.0 | 50.7 | | 104.2 | 25.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 127.4 | 70.1 | | 69.5 | 39.0 | 6.7 | 103.0 | 50.7 | | 104.2 | 25.9 | |
| LOS | F | E | | E | D | A | F | D | | F | C | |
| Approach Delay | | 73.4 | | | 35.0 | | | 63.5 | | | 44.1 | |
| Approach LOS | | E | | | D | | | E | | | D | |
| Queue Length 50th (ft) | 56 | 442 | | 149 | 635 | 38 | 239 | 355 | | 147 | 206 | |
| Queue Length 95th (ft) | #133 | #562 | | m130 | m554 | m30 | #371 | 434 | | m160 | m223 | |
| Internal Link Dist (ft) | | 946 | | | 1722 | | | 641 | | | 923 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 75 | 978 | | 279 | 735 | 780 | 290 | 1093 | | 194 | 940 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.71 | 0.89 | | 0.79 | 0.82 | 0.45 | 0.80 | 0.66 | | 0.79 | 0.54 | |

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 53.5 Intersection LOS: D
Intersection Capacity Utilization 83.8% ICU Level of Service E
Analysis Period (min) 15
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Kamehameha Av. & Puunene Av



| Lane Group | SEU | SET | SER | NWL | NWT | NEL | NER |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Volume (vph) | 170 | 2050 | 90 | 145 | 1510 | 15 | 260 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Frt | | 0.994 | | | | 0.872 | |
| Flt Protected | 0.950 | | | 0.950 | | 0.997 | |
| Satd. Flow (prot) | 1719 | 3417 | 0 | 1719 | 3438 | 1573 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | 0.997 | |
| Satd. Flow (perm) | 1719 | 3417 | 0 | 1719 | 3438 | 1573 | 0 |
| Right Turn on Red | | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 154 | |
| Link Speed (mph) | | 25 | | | 25 | 25 | |
| Link Distance (ft) | | 708 | | | 503 | 1187 | |
| Travel Time (s) | | 19.3 | | | 13.7 | 32.4 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 179 | 2158 | 95 | 153 | 1589 | 16 | 274 |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 179 | 2253 | 0 | 153 | 1589 | 290 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No |
| Lane Alignment | R NA | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | 12 | |
| Link Offset(ft) | | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 9 | 15 | | 15 | 9 |
| Turn Type | Prot | | | custom | | | |
| Protected Phases | 1 | 6 | | 5 | 2 | 4 | |
| Permitted Phases | | | | 5 | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 4 | |
| Switch Phase | | | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Minimum Split (s) | 8.0 | 23.0 | | 8.0 | 20.0 | 23.0 | |
| Total Split (s) | 30.0 | 117.0 | 0.0 | 19.0 | 106.0 | 24.0 | 0.0 |
| Total Split (%) | 18.8% | 73.1% | 0.0% | 11.9% | 66.3% | 15.0% | 0.0% |
| Maximum Green (s) | 27.0 | 112.0 | | 16.0 | 101.0 | 19.0 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 4.0 | |
| All-Red Time (s) | 0.0 | 1.0 | | 0.0 | 1.0 | 1.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 3.0 | 5.0 | 4.0 | 3.0 | 5.0 | 5.0 | 4.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | | |
| Lead-Lag Optimize? | | | | | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | Min | | None | C-Min | Min | |
| Walk Time (s) | | 7.0 | | | | 7.0 | |
| Flash Dont Walk (s) | | 11.0 | | | | 11.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | | 0 | |
| Act Effct Green (s) | 21.4 | 113.6 | | 15.8 | 108.0 | 17.6 | |
| Actuated g/C Ratio | 0.13 | 0.71 | | 0.10 | 0.68 | 0.11 | |



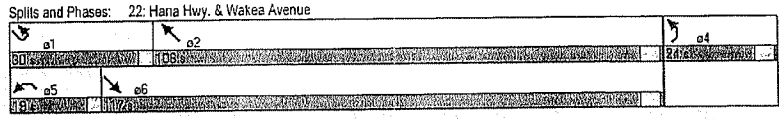


| Lane Group | SEU | SET | SER | NWL | NWT | NEL | NER |
|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.78 | 0.93 | | 0.90 | 0.68 | 0.94 | |
| Control Delay | 65.7 | 12.0 | | 134.2 | 17.4 | 68.9 | |
| Queue Delay | 0.0 | 3.4 | | 0.0 | 0.0 | 0.0 | |
| Total Delay | 65.7 | 15.4 | | 134.2 | 17.4 | 68.9 | |
| LOS | E | B | | F | B | E | |
| Approach Delay | | 19.1 | | | 27.7 | 68.9 | |
| Approach LOS | | B | | | C | E | |
| Queue Length 50th (ft) | 186 | 348 | | 153 | 733 | 149 | |
| Queue Length 95th (ft) | m162 | m298 | | m#282 | m825 | #327 | |
| Internal Link Dist (ft) | | 628 | | | 423 | 1107 | |
| Turn Bay Length (ft) | | | | | | | |
| Base Capacity (vph) | 290 | 2429 | | 172 | 2320 | 323 | |
| Starvation Cap Reductn | 0 | 119 | | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.62 | 0.98 | | 0.89 | 0.68 | 0.90 | |

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:NWT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 96.1% ICU Level of Service F
Analysis Period (min) 15
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Hana Hwy. & Wakea Avenue



| Lane Group | SEU | SET | SER | NWL | NWT | NEL | NER |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Volume (vph) | 170 | 2050 | 90 | 145 | 1510 | 15 | 260 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Frt | | 0.994 | | | | 0.872 | |
| Flt Protected | 0.950 | | | 0.950 | | 0.997 | |
| Satd. Flow (prot) | 1719 | 3417 | 0 | 1719 | 3438 | 1573 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | 0.997 | |
| Satd. Flow (perm) | 1719 | 3417 | 0 | 1719 | 3438 | 1573 | 0 |
| Right Turn on Red | | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 155 | |
| Link Speed (mph) | | 25 | | | 25 | 25 | |
| Link Distance (ft) | | 708 | | | 503 | 1187 | |
| Travel Time (s) | | 19.3 | | | 13.7 | 32.4 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 179 | 2158 | 95 | 153 | 1589 | 16 | 274 |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 179 | 2253 | 0 | 153 | 1589 | 290 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No |
| Lane Alignment | R NA | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | 12 | |
| Link Offset(ft) | | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 9 | 15 | | 15 | 9 |
| Turn Type | Prot | | | custom | | | |
| Protected Phases | 1 | 6 | | 5 | 2 | 4 | |
| Permitted Phases | | | | 5 | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 4 | |
| Switch Phase | | | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | |
| Minimum Split (s) | 8.0 | 23.0 | | 8.0 | 20.0 | 23.0 | |
| Total Split (s) | 28.0 | 109.0 | 0.0 | 18.0 | 99.0 | 23.0 | 0.0 |
| Total Split (%) | 18.7% | 72.7% | 0.0% | 12.0% | 66.0% | 15.3% | 0.0% |
| Maximum Green (s) | 25.0 | 104.0 | | 15.0 | 94.0 | 18.0 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 4.0 | |
| All-Red Time (s) | 0.0 | 1.0 | | 0.0 | 1.0 | 1.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 3.0 | 5.0 | 4.0 | 3.0 | 5.0 | 5.0 | 4.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | | |
| Lead-Lag Optimize? | | | | | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | Min | | None | C-Min | Min | |
| Walk Time (s) | | 7.0 | | | | 7.0 | |
| Flash Dont Walk (s) | | 11.0 | | | | 11.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | | 0 | |
| Act Effct Green (s) | 20.2 | 105.5 | | 14.9 | 100.2 | 16.6 | |
| Actuated g/C Ratio | 0.13 | 0.70 | | 0.10 | 0.67 | 0.11 | |



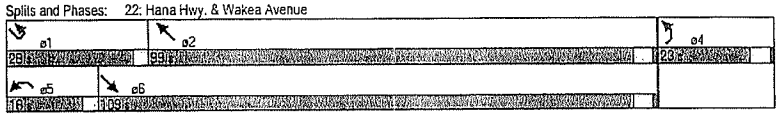


| Lane Group | SEU | SET | SER | NWL | NWT | NEL | NER |
|---|---|---|---|---|---|---|---|
| v/c Ratio | 0.77 | 0.94 | | 0.89 | 0.69 | 0.93 | |
| Control Delay | 59.3 | 16.5 | | 131.0 | 14.1 | 66.0 | |
| Queue Delay | 0.0 | 3.3 | | 0.0 | 0.0 | 0.0 | |
| Total Delay | 59.3 | 19.8 | | 131.0 | 14.1 | 66.0 | |
| LOS | E | B | | F | B | E | |
| Approach Delay | | 22.7 | | | 24.3 | 66.0 | |
| Approach LOS | | C | | | C | E | |
| Queue Length 50th (ft) | 173 | 413 | | 154 | 659 | 137 | |
| Queue Length 95th (ft) | m122 | m240 | | m#275 | m771 | #309 | |
| Internal Link Dist (ft) | | 628 | | | 423 | 1107 | |
| Turn Bay Length (ft) | | | | | | | |
| Base Capacity (vph) | 287 | 2406 | | 173 | 2297 | 325 | |
| Starvation Cap Reductn | 0 | 102 | | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.62 | 0.98 | | 0.88 | 0.69 | 0.89 | |

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 144 (96%), Referenced to phase 2:NWT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 26.2 Intersection LOS: C
Intersection Capacity Utilization 96.1% ICU Level of Service F
Analysis Period (min) 15
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Hana Hwy. & Wakea Avenue

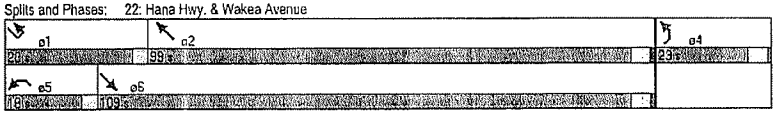


| Lane Group | SEU | SET | NWL | NWT | NEL |
|---|---|---|---|---|---|
| Lane Configurations | | | | | |
| Volume (vph) | 170 | 2050 | 145 | 1510 | 15 |
| Turn Type | Prot | | custom | | |
| Protected Phases | 1 | 6 | 5 | 2 | 4 |
| Permitted Phases | | | 5 | | |
| Detector Phase | 1 | 6 | 5 | 2 | 4 |
| Switch Phase | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 8.0 | 23.0 | 8.0 | 20.0 | 23.0 |
| Total Split (s) | 28.0 | 109.0 | 18.0 | 99.0 | 23.0 |
| Total Split (%) | 18.7% | 72.7% | 12.0% | 66.0% | 15.3% |
| Yellow Time (s) | 3.0 | 4.0 | 3.0 | 4.0 | 4.0 |
| All-Red Time (s) | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 3.0 | 5.0 | 3.0 | 5.0 | 5.0 |
| Lead/Lag | Lead | Lag | Lead | Lag | |
| Lead-Lag Optimize? | | | | | |
| Recall Mode | None | Min | None | C-Min | Min |
| Act Effct Green (s) | 20.2 | 105.5 | 14.9 | 100.2 | 16.6 |
| Actuated g/C Ratio | 0.13 | 0.70 | 0.10 | 0.67 | 0.11 |
| v/c Ratio | 0.77 | 0.94 | 0.89 | 0.69 | 0.93 |
| Control Delay | 59.3 | 16.5 | 131.0 | 14.1 | 66.0 |
| Queue Delay | 0.0 | 3.3 | 0.0 | 0.0 | 0.0 |
| Total Delay | 59.3 | 19.8 | 131.0 | 14.1 | 66.0 |
| LOS | E | B | F | B | E |
| Approach Delay | | 22.7 | | 24.3 | 66.0 |
| Approach LOS | | C | | C | E |

**Intersection Summary**

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 144 (96%), Referenced to phase 2:NWT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 26.2 Intersection LOS: C
Intersection Capacity Utilization 96.1% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 22: Hana Hwy. & Wakea Avenue



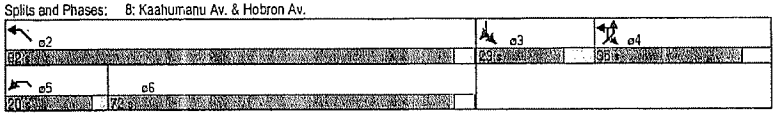
Timings
8: Kaahumanu Av. & Hobron Av. 11/26/2009

| Lane Group | EBR | SBL | SBR | SBR2 | NWL2 | NWL | NWR | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 1300 | 145 | 85 | 10 | 255 | 805 | 105 | 95 | 510 |
| Turn Type | custom | | Prot | Perm | Prot | | Perm | | Prot |
| Protected Phases | | 3 | 3 | | 5 | 2 | | 4 | 4 |
| Permitted Phases | 6 | | | 3 | | | 2 | | |
| Detector Phase | 6 | 3 | 3 | 3 | 5 | 2 | 2 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 26.5 | 23.0 | 23.0 | 23.0 | 20.0 | 27.5 | 27.5 | 21.0 | 21.0 |
| Total Split (s) | 72.0 | 23.0 | 23.0 | 23.0 | 20.0 | 92.0 | 92.0 | 35.0 | 35.0 |
| Total Split (%) | 48.0% | 15.3% | 15.3% | 15.3% | 13.3% | 61.3% | 61.3% | 23.3% | 23.3% |
| Yellow Time (s) | 4.0 | 6.0 | 6.0 | 6.0 | 3.0 | 4.0 | 4.0 | 6.0 | 6.0 |
| All-Red Time (s) | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.5 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 5.5 | 7.0 | 7.0 | 6.0 | 4.0 | 5.5 | 5.5 | 7.0 | 7.0 |
| Lead/Lag | Lag | Lead | Lead | Lead | Lead | | | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | C-Max | None | None | None | Max | C-Max | C-Max | Max | Max |
| Act Effct Green (s) | 66.5 | 15.3 | 15.3 | 16.3 | 16.0 | 86.5 | 86.5 | 28.7 | 28.7 |
| Actuated g/C Ratio | 0.44 | 0.10 | 0.10 | 0.11 | 0.11 | 0.58 | 0.58 | 0.19 | 0.19 |
| v/c Ratio | 1.18 | 0.87 | 0.57 | 0.06 | 0.75 | 0.44 | 0.12 | 0.56 | 1.14 |
| Control Delay | 125.5 | 107.5 | 78.8 | 28.2 | 79.0 | 18.9 | 2.6 | 95.2 | 139.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 125.5 | 107.5 | 78.8 | 28.2 | 79.0 | 18.9 | 2.6 | 95.2 | 139.8 |
| LOS | F | F | E | C | E | B | A | F | F |
| Approach Delay | | 93.9 | | | | 30.6 | | 128.4 | |
| Approach LOS | | F | | | | C | | F | |

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 30 (20%), Referenced to phase 2:NWL and 6:EBR, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.18
Intersection Signal Delay: 91.7 Intersection LOS: F
Intersection Capacity Utilization 89.2% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 8: Kaahumanu Av. & Hobron Av.






Timings
8: Hana Hwy & Hobron Av. 11/26/2009

| Lane Group | EBR | SBL | SBR | SBR2 | NWL2 | NWL | NWR | NEL2 | NEL | NER |
|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | |
| Volume (vph) | 1545 | 210 | 180 | 10 | 590 | 1095 | 240 | 85 | 130 | 605 |
| Turn Type | custom | | custom | custom | Prot | | custom | Prot | | custom |
| Protected Phases | | 3 | | | 5 | | | 7 | | |
| Permitted Phases | 6 | | 8 | 8 | | 2 | 2 | | 4 | 4 |
| Detector Phase | 6 | 3 | 8 | 8 | 5 | 2 | 2 | 7 | 4 | 4 |
| Switch Phase | | | | | | | | | | |
| Minimum Initial (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Minimum Split (s) | 21.0 | 23.0 | 23.0 | 23.0 | 20.0 | 27.5 | 27.5 | 21.0 | 21.0 | 21.0 |
| Total Split (s) | 78.0 | 24.0 | 34.0 | 34.0 | 27.0 | 105.0 | 105.0 | 21.0 | 31.0 | 31.0 |
| Total Split (%) | 48.8% | 15.0% | 21.3% | 21.3% | 16.9% | 65.6% | 65.6% | 13.1% | 19.4% | 19.4% |
| Yellow Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 4.0 | 4.0 | 6.0 | 6.0 | 6.0 |
| All-Red Time (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Lost Time (s) | 7.0 | 7.0 | 7.0 | 6.0 | 4.0 | 5.5 | 5.5 | 7.0 | 7.0 | 7.0 |
| Lead/Lag | Lag | Lead | Lag | Lag | Lead | | | Lead | Lag | Lag |
| Lead-Lag Optimize? | | | | | | | | | | |
| Recall Mode | C-Max | None | None | None | Max | C-Max | C-Max | Max | Max | Max |
| Act Effct Green (s) | 71.0 | 17.0 | 27.0 | 28.0 | 23.0 | 99.5 | 99.5 | 14.0 | 24.0 | 24.0 |
| Actuated g/C Ratio | 0.44 | 0.11 | 0.17 | 0.18 | 0.14 | 0.62 | 0.62 | 0.09 | 0.15 | 0.15 |
| v/c Ratio | 1.42 | 1.21 | 0.73 | 0.04 | 1.30 | 0.56 | 0.24 | 0.59 | 0.50 | 1.44 |
| Control Delay | 214.0 | 190.4 | 79.9 | 24.3 | 204.8 | 18.2 | 4.4 | 112.9 | 51.0 | 226.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 214.0 | 190.4 | 79.9 | 24.3 | 204.8 | 18.2 | 4.4 | 112.9 | 51.0 | 226.3 |
| LOS | F | F | E | C | F | B | A | F | D | F |
| Approach Delay | | 136.5 | | | | 73.6 | | | 186.7 | |
| Approach LOS | | F | | | | E | | | F | |

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 72 (45%), Referenced to phase 2:NWL and 6:EBR, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.44
Intersection Signal Delay: 146.1 Intersection LOS: F
Intersection Capacity Utilization 105.8% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 8: Hana Hwy & Hobron Av.

# *Appendix C*

## *Unsignalized Intersection Level of Service (LOS) Calculations*

## CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

### Analysis Summary

**General Information**

| | | | |
|---|---|---|---|
| Analyst | WY | Jurisdiction/Date | 11/26/200 |
| Agency or Company | AECOM | Major Street | KAAHUMANU AVE |
| Analysis Period/Year | TOT LO AM 2013 | Minor Street | U TURN |
| Comment | 2013 AM PK UTURN W/ LOW TRIP GEN | | |

**Site Information**

**Input Data**

| Lane Configuration | EB | WB | NB | SB |
|---|---|---|---|---|
| Lane 1 (curb) | T | | | L |
| Lane 2 | T | | | |
| 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) | | 995 | | | | | | | | 15 | | |
| PHF | | .9 | | | | | | | | .9 | | |
| Proportion of heavy vehicles, HV | | 3 | | | | | | | | 3 | | |
| Flow rate | | 1106 | | | | | | | | 17 | | |
| Flare storage (# of vehs) | | | | | | | | | | | | |
| 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 | | | | | | | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| SB | 1 | L | 17 | 461 | .037 | <1 | 13.1 | B | 13.1 |
| | 2 | | | | | | | | B |
| | 3 | | | | | | | | |
| | | ① | | | | | | | |
| | | ④ | | | | | | | |





## CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

### Analysis Summary

**General Information**

| | | | |
|---|---|---|---|
| Analyst | WY | Jurisdiction/Date | 11/26/200 |
| Agency or Company | AECOM | Major Street | KAAHUMANU AVE |
| Analysis Period/Year | TOT HI AM 2013 | Minor Street | U TURN |
| Comment | 2013 AM PK UTURN W/ HIGH TRIP GEN | | |

**Site Information**

**Input Data**

| Lane Configuration | EB | WB | NB | SB |
|---|---|---|---|---|
| Lane 1 (curb) | T | | | L |
| Lane 2 | T | | | |
| 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) | | 1050 | | | | | | | | 30 | | |
| PHF | | .9 | | | | | | | | .9 | | |
| Proportion of heavy vehicles, HV | | 3 | | | | | | | | 3 | | |
| Flow rate | | 1167 | | | | | | | | 33 | | |
| Flare storage (# of vehs) | | | | | | | | | | | | |
| 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 | | | | | | | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| SB | 1 | L | 33 | 441 | .075 | <1 | 13.8 | B | 13.8 |
| | 2 | | | | | | | | B |
| | 3 | | | | | | | | |
| | | ① | | | | | | | |
| | | ④ | | | | | | | |

## CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

### Analysis Summary

**General Information** | **Site Information**

| | | | |
|---|---|---|---|
| Analyst | WY | Jurisdiction/Date | 11/26/200 |
| Agency or Company | AECOM | Major Street | KAAHUMANU AVE |
| Analysis Period/Year | TOT HI PM 2013 | Minor Street | U TURN |
| Comment | 2013 PM PK UTURN W/ HIGH TRIP GEN | | |

**Input Data**

| Lane Configuration | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane 1 (curb) | | T | | | | | | | | | L | |
| Lane 2 | | T | | | | | | | | | | |
| 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) | | 1560 | | | | | | | | 60 | | |
| PHF | | .9 | | | | | | | | .9 | | |
| Proportion of heavy vehicles, HV | | 3 | | | | | | | | 3 | | |
| Flow rate | | 1733 | | | | | | | | 67 | | |
| Flare storage (# of vehs) | | | | | | | | | | | | |
| 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 | | | | | | | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| SB | 1 | L | 67 | 290 | .231 | 1 | 21.1 | C | 21.1 |
| | 2 | | | | | | | | C |
| | 3 | | | | | | | | |
| | | ① | | | | | | | |
| | | ④ | | | | | | | |

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1 of 1

## CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

### Analysis Summary

**General Information** | **Site Information**

| | | | |
|---|---|---|---|
| Analyst | WY | Jurisdiction/Date | 11/21/200 |
| Agency or Company | AECOM | Major Street | KAAHUMANU AVE |
| Analysis Period/Year | TOT HI PM 2013 | Minor Street | U TURN |
| Comment | 2013 PM PK UTURN W/ HIGH TRIP GEN | | |

**Input Data**

| Lane Configuration | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane 1 (curb) | | T | | | | | | | | | L | |
| Lane 2 | | T | | | | | | | | | | |
| 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) | | 1560 | | | | | | | | 140 | | |
| PHF | | .9 | | | | | | | | .9 | | |
| Proportion of heavy vehicles, HV | | 3 | | | | | | | | 3 | | |
| Flow rate | | 1733 | | | | | | | | 156 | | |
| Flare storage (# of vehs) | | | | | | | | | | | | |
| 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 | | | | | | | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| SB | 1 | L | 156 | 290 | .537 | 3 | 30.9 | D | 30.9 |
| | 2 | | | | | | | | D |
| | 3 | | | | | | | | |
| | | ① | | | | | | | |
| | | ④ | | | | | | | |

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1 of 1

# APPENDIX G-1.

# Letter from State Department of Transportation Granting Conditional Approval for Vehicle Access Rights

LINDA LINGLE
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SERVICE, ROOM 688

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 602

MOTOR VEHICLE SAFETY OFFICE, ROOM 511

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

**STATE OF HAWAII**
**DEPARTMENT OF TRANSPORTATION**
**HIGHWAYS DIVISION AT KAPOLEI**
601 KAMOKILA BOULEVARD, ROOM 691
KAPOLEI, HAWAII 96707

IN REPLY REFER TO:

HWY-RM
3.87594

RECEIVED
MAR 22 2010
By

March 18, 2010

Mr. Lloyd P.C.W. Lee, Sr., P.E.
Senior Project Manager
AECOM Pacific, Inc.
100 Pauahi Street, Suite 207
Hilo, Hawaii 96720

Dear Mr. Lee:

SUBJECT: HALEAKALA ROAD AND PAIA SPUR
HAWAII PROJECT NO. DA-NC 8(1)
KAHULUI TOWN TO KAUNOA SCHOOL
TMK: (2) 3-7-11: 028
REQUEST FOR VEHICLE ACCESS RIGHTS:
MAUI MEDICAL PLAZA AT KANAHA

We have conceptually approved your request and shall continue to process your request subject to the following conditions:

1. Kanaha Professional Plaza, LLC (KPP) shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments.

2. All improvements (driveways/sidewalks, etc.) must comply with current Americans with Disabilities Act (ADA) requirements. The driveway layout must conform to Department of Transportation standards for residential driveways.

3. KPP must execute a "Grant of Limited Vehicle Access Rights" document whereby you are granted access for your proposed use and all other rights of vehicle access are restricted along the remainder of the property's Hana Highway frontage.

4. KPP must submit an updated title search for their property, TMK: (2) 3-7-11: 028 to show status of title.

5. KPP shall be responsible for all costs associated with the stipulated highway improvements for the access location.

6. Please provide proof of H.R.S. Chapter 343-5 compliance (E.A. or E.I.S. documentation) when submitting your application for Permit to Perform Work upon State Highways.

7. The requested access shall be granted for the proposed use. Any future increase in density of the lot by an owner, via CPR or the subdivision of the existing/proposed lots, shall require the owner to obtain the use of additional access rights to Hana Highway.

8. KPP must submit two (2) copies of metes and bounds description of the subject area along with a parcel map, which will be used as Exhibits to the document.

9. KPP must submit four (4) sets of construction plans to our Maui Permit Engineer, at our Maui District Office, 650 Palapala Drive, Kahului, Hawaii 96732, for review and approval.

10. KPP shall defend, hold harmless and indemnify the State, from and against all claims or demands for bodily injury, property damage and/or death.

11. KPP shall be responsible for all documentation and recording fees incurred for the requested access.

12. The Highways Division reserves the right to add or impose additional conditions as necessary to mitigate adverse impacts to the State.

If KPP is agreeable to the foregoing conditions, please sign the acceptance portion of this letter and return it to our office. If we do not receive the signed acceptance portion within thirty (30) days from the date of this letter, we will assume you are no longer interested in pursuing the matter.

If you have any questions, please call me at 692-7338.

Very truly yours,

Jaime K. Yamashiro

JAIME K. YAMASHIRO
Right-of-Way Agent
Property Management Section

**ACCEPTANCE:**

Kanaha Professional Plaza, LLC accepts all terms and conditions as set forth in the Department of Transportation letter (ref. HWY-RM 3.87594) dated March 18, 2010.

Date: 3.25.2010

Print Name: Robert T. McDaniel III

Its: Member

# APPENDIX H.

# Preliminary Engineering and Drainage Report

# PRELIMINARY ENGINEERING AND DRAINAGE REPORT

# FOR

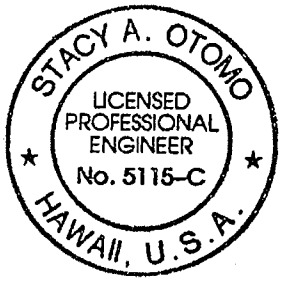
# MAUI MEDICAL PLAZA AT KANAHA

**Kahului, Maui, Hawaii**

**T.M.K.: (2) 3-7-011: 028**

**Prepared for:**

**Harrison G. Fagg & Associates**
**222 North 32nd Street, Suite 800**
**Billings, Montana 59101**




**Prepared by:**

OTOMO
ENGINEERING, INC.

CONSULTING CIVIL ENGINEERS
305 SOUTH HIGH STREET, SUITE 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032
FAX: (808) 242-5779

**April 2010**

# TABLE OF CONTENTS

# PRELIMINARY ENGINEERING AND DRAINAGE REPORT
# FOR
# MAUI MEDICAL PLAZA AT KANAHA
# T.M.K.: (2) 3-7-011: 028

## 1.0 INTRODUCTION

The purpose of this report is to provide information on the existing infrastructure which will be servicing the proposed project. It will also evaluate the adequacy of the existing infrastructure and anticipated improvements which may be required for the proposed project.

The subject property is identified as T.M.K.: (2) 3-7-011: 028, which contains approximately 2.499 acres. It is also Lot 8 of the Kanaha Industrial Subdivision II. The project site is bordered by developed and undeveloped industrial lands (Lots 5, 6 and 7 of the Kahana Industrial Subdivision II) to the north, a drainage canal and culverts to the east and south, and Hana Highway to the west. The Kanaha Pond Wildlife Sanctuary is situated beyond the existing network of drainage canals.

The development plan is to construct a state-of-the-art six-story medical office building to service the local doctors and community. Associated improvements include utility connections, parking structure, modular planting system on the exterior lanais, and landscaping.

## 2.0 EXISTING INFRASTRUCTURE

### 2.1 ROADWAYS

There are three highways under the jurisdiction of the State Department of Transportation (SDOT) that provide access to the project site. Kamehameha Avenue is a County-owned roadway in the immediate vicinity of the project site.

Hana Highway is a State-owned, four-lane highway, providing access between Paia and Central Maui. Most of the intersections along the highway have separate turning lanes. The posted speed limit is 45 miles per hour (mph) to the east of the project site and reduces to 30 mph fronting the project site. Hana Highway turns into Kaahumanu Avenue at the Hobron Triangle.

There are two intersections on Hana Highway in the vicinity of the project site which are controlled by traffic signals. They are at the intersection with Dairy Road and at the intersection of Hobron Avenue and Kamehameha Avenue.

Kaahumanu Avenue is a State-owned, six-lane highway that provides access between Kahului and Wailuku. In the vicinity of the project site, it intersects with the Wharf Street/Maui Mall driveway and Puunene Avenue. Both intersections are signalized.

Puunene Avenue is a State-owned highway that connects Kaahumanu Avenue with Kuihelani Highway and Mokulele Highway. It is a four-lane roadway between Kaahumanu Avenue and Wakea Avenue. The remainder of the roadway is a two-lane roadway. The intersection with Kamehameha Avenue is signalized.

Kamehameha Avenue is a County-owned roadway which provides east-west access from Hana Highway to Puunene Avenue. It is a four-lane roadway between Hana Highway and Lono Avenue. The remainder of the roadway is a two-lane roadway. Kamehameha Avenue serves the adjoining commercial areas from Hana Highway to Puunene Avenue.

## 2.2 DRAINAGE

The elevation on the site ranges from elevation 6 feet above mean sea level along the western (Hana Highway) boundary to 4.4 feet above mean sea level at the northern end of the site. Approximately 0.94 acres of the parcel is determined to be a severely disturbed jurisdictional wetland. Based on agency site reviews and determination, the wetland has been determined to have little or no functional value. Generally, the wetland boundary lies within the 4-foot elevation contour line located approximately in the middle of the parcel.

According to Panel No. 1500030392E of the Flood Insurance Rate Map, revised September 25, 2009, the project site is situated in Flood Zone X. Flood Zone X is designated as areas determined to be outside the 0.2% annual chance flood plain.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, the soil within the project site is classified as Jaucas sand, saline, 0 to 12 percent slopes (JcC). This soil occurs near the ocean in areas where the water table is near the surface and salts have accumulated. It is somewhat poorly drained in depressions but excessively drained on knolls. The water table is normally within a depth of 30 inches.

Presently, onsite runoff sheet flows toward the middle of the project site and ponds in the low-lying area. It is estimated that approximately 10,700 cubic feet of runoff currently ponds in the low area on the site before it overflows into the adjacent drainage canal, which is situated between the project site and Kanaha Pond. The drainage canal conveys runoff to an outlet at the ocean. No runoff from the project site is expected to enter into Kanaha Pond. It is estimated that the existing 50-year, 1-hour onsite runoff is 2.84 cfs. The corresponding volume generated by the runoff is 2,728 cubic feet.

Offsite runoff from the two westbound lanes and shoulder area of Hana Highway immediately fronting the project site sheet flows onto the project site. It is estimated that the existing 50-year, 1-hour offsite runoff is 2.37 cfs and the corresponding volume is 996 cubic feet.

## 2.3 SEWER

There are no existing sewer facilities on or immediately adjacent to the project site. The nearest sewer system is the recently installed sewerline traversing across Kamehameha Avenue, between Alamaha Street and Hana Highway. The sewerline crossing is located approximately 630 feet to the northwest of the project site. An 8-inch sewerline was recently installed as part of the Consent Decree Sewer Rehabilitation Project, 24-Hour Fitness Line.

Wastewater collected in the Kahului area is conveyed to the Kahului Wastewater Pump Station, which is located to the northwest and on the opposite side of Hana Highway of the project site. Wastewater collected from the pump station is transported to the Kahului Wastewater Reclamation Facility in Naska.

## 2.4 WATER

Domestic water and fire flow will be provided by the County's water system. There are existing 8-inch and 16-inch waterlines which traverse along the southbound lanes of Hana Highway.

Domestic water and fire flow for the Kahului area are serviced from the 3.0 million gallon Mokuhau tank and wells in Happy Valley, which is at elevation of 358 feet. The source for this water system is from the Central Maui source.

### 2.5 ELECTRIC, TELEPHONE AND CABLE TV

There are existing overhead utility lines traversing on both sides of Hana Highway fronting the project site. Electrical service is available from the existing overhead lines immediately fronting the project site. There are existing underground telephone and cable TV services to the northwest of the entry driveway.

## 3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

### 3.1 ROADWAYS

The proposed medical plaza building will be facing Hana Highway. A six-story parking structure will be located behind the building, which will provide approximately 360 parking stalls.

Access to the proposed medical building will be from two driveways. The northwest driveway will be constructed over the existing access that currently serves the commercial complex to the northwest of the project site. A new driveway will be constructed along the southerly boundary and will serve as a right turn only exit driveway. The traffic movement within the project site will create a clockwise traffic pattern within the site.

The conclusions and recommendations in the *Traffic Impact Analysis Report for Maui Medical Plaza at Kanaha*, prepared by AECOM recommended the following mitigation measures for the project:

"Several improvements would be made to Hana Highway to accommodate the above traffic movements. The northwest bound approach of Hana Highway would be widened from two to four lanes to provide a third through lane and an acceleration/deceleration lane. The third through lane would be designed to accommodate the future widening of Hana Highway and would provide an additional lane for traffic exiting the project site to merge onto Hana Highway. The acceleration/deceleration lane would be a continuous lane beginning at the new exit driveway and terminating at the northwest access roadway. A shuttle bus stop would also be located in the acceleration/deceleration lane to encourage transit access to the project. This design would minimize the reconstruction activity fronting the project site when Hana Highway is widened. A left turn lane in the median of Hana Highway would accommodate the left turn movements from southeast bound Hana Highway into the project site. U-turns would not be permitted at this median opening. A landscaped median with a

four foot high hedge would be installed to form a physical barrier to prevent pedestrians from jaywalking across Hana Highway.

Other off-site improvements include converting the single right turn lane on the Kamehameha Avenue approach to double right turn lanes to accommodate the very high number of turns currently being made. Also, a left turn storage lane would be added to the existing U-turn median opening on Hana Highway on the Wailuku side of the Hobron Avenue/Kamehameha Highway intersection."

## 3.2 DRAINAGE

After the development of the proposed project, it is estimated that the onsite 50-year, 1-hour storm runoff will be approximately 6.69 cfs, which will generate a volume of 5,615 cubic feet, a net increase of 3.85 cfs and 2,887 cubic feet of storage volume. The offsite runoff from Hana Highway will not change from existing conditions and 2.37 cfs will continue to sheet flow into the project site. The offsite volume is estimated to be 996 cubic feet.

In accordance with the County's drainage standards, the project's drainage system will be required to accommodate the increase in runoff generated from the project of 3.85 cfs and 2,887 cubic feet of storage. The onsite detention basins will create a total storage volume of 16,850 cubic feet. The existing site condition currently provides approximately 10,700 cubic feet of onsite storage. Therefore, the proposed onsite detention basins will create an additional 6,150 cubic feet of storage, which is greater than the 2,887 cubic feet required. The detention basins will have sufficient volume to accommodate the total post-development flow from the project site for the 50-year, 1-hour storm event. During extreme rain events, any runoff that exceeds the storage capacity of the onsite detention basins will continue to overflow into the adjacent drainage canal as it is presently doing. No post-development runoff from the project site is expected to enter into Kanaha Pond.

The onsite drainage plan is to intercept runoff by grated catch basins and area drains and convey it to the detention basins. Gutter and/or downspouts from the building will be connected to the site drainage system to convey runoff into the detention basins.

As part of the best management practices plan (BMP), the onsite detention basins will be graded and grassed prior to commencement of construction of the project. In addition, silt and dust fences will be strategically located along

the perimeter of the project site to control the movement of dust and silt from the project site to the adjacent properties. Said measures will be reviewed and approved by the State Department of Health to secure the NPDES permit and the County Department of Public Works to secure the grading permit.

It is estimated that the onsite post-development runoff for a 2-year, 24-hour storm is 2.08 cfs with a corresponding volume of 13,171 cubic feet. Should this rainfall event occur during the construction period, the onsite detention basins have sufficient capacity to accommodate the runoff volume generated by this storm event.

The proposed drainage plan is to provide onsite detention basins with sufficient storage capacity accommodate the runoff generated from the post-development conditions. The drainage design criteria is to maintain the existing runoff pattern of the onsite of offsite runoff.

There will be no additional runoff sheet flowing from the project site to adjacent properties as a result of the development of the project. The proposed drainage system will be designed in accordance with Chapter 4, "Rules for the Design of Storm Drainage Facilities in the County of Maui."

The subject parcel is a severely disturbed site of minimal wetland value in its current state. Offsite wetland mitigation will be done at the Waihee Coastal Dunes and Wetland Refuge. Mitigation work will involve the removal of invasive species and the reestablishment of native plants on approximately five acres within the wetland portions of the Refuge. The wetland mitigation work is being done offsite due to the FAA restrictions on activity in the initially proposed mitigation site adjacent to Lot 8.

## 3.3 SEWER

The proposed 131,500 square feet professional plaza is expected to accommodate up to 200 medical professionals and staff. Based on this expectation, it is estimated that the proposed facility will generate 4,000 gallons of wastewater daily (See Appendix C). An offsite sewerline will be constructed from the northwest end of the project, along Hana Highway, along Kamehameha Avenue, and connecting to the recently installed 8-inch sewerline on Kamehameha Avenue. No sewer lift station is anticipated.

The Kahului Wastewater Reclamation Facility has a plant capacity of 7.9 million gallons per day (mgd). As of March 2010, the Wastewater Reclamation Division reported that the Kahului Wastewater Reclamation Facility has an

allotted capacity of 6.95 mgd and the average daily flow is approximately 4.9 mgd. Therefore, the facility currently has the capacity to accommodate wastewater flow from the project.

## 3.4 WATER

In accordance with the Department of Water Supply's Domestic Consumption Guidelines for a business development, the average daily demand for the proposed project is approximately 15,000 gallons per day (See Appendix B). Fire flow demand for commercial development is 2,000 gallons per minute for a 2-hour duration. The water system will be designed to meet the domestic and fire flow demands of the project.

The project will connect to the existing 16-inch waterline on Hana Highway to provide for domestic and fire protection services. The required water meter size will be determined at the time the building permit is applied for. At the present time, the Department of Water Supply (DWS) cannot guarantee water for the project. The project may be subject to the Water Availability Ordinance which was recently passed by the Maui County Council. A water meter can be applied for and secured after the required improvements are installed, inspected and accepted by the DWS.

## 3.5 ELECTRIC, TELEPHONE AND CABLE TV

The proposed electrical, telephone and cable TV distribution systems for the subject project will be installed underground from the existing facilities along Hana Highway. The existing overhead utility lines along Hana Highway will remain overhead. All outdoor lighting will be in compliance with the applicable County lighting standards.

# APPENDIX A
# HYDROLOGIC CALCULATIONS

## Hydrologic Calculations

Purpose: Determine the increase in surface runoff from the development of the proposed project based on a 50-year storm.

A. Determine the Runoff Coefficient (C):

PAVEMENT AREAS:

| | |
|---|---|
| Infiltration (Negligible) | = 0.20 |
| Relief (Flat) | = 0.00 |
| Vegetal Cover (None) | = 0.07 |
| Development Type (Pavement) | = 0.55 |
| | C= 0.82 |

ROOF AREAS:

| | |
|---|---|
| Infiltration (Negligible) | = 0.20 |
| Relief (Hilly) | = 0.06 |
| Vegetal Cover (None) | = 0.07 |
| Development Type (Roof) | = 0.55 |
| | C= 0.88 |

LANDSCAPED AREAS:

| | |
|---|---|
| Infiltration (Medium) | = 0.07 |
| Relief (Flat) | = 0.00 |
| Vegetal Cover (High) | = 0.00 |
| Development Type (Landscape) | = 0.15 |
| | C= 0.22 |

EXISTING CONDITION (SITE):

Pavement Areas = 0.13 Acres
Landscaped Areas = 2.37 Acres

WEIGHTED C = 0.25

EXISTING CONDITION (HANA HIGHWAY):

Pavement Areas = 0.45 Acres
Landscaped Areas = 0.14 Acres

WEIGHTED C = 0.68

DEVELOPED CONDITION:

Roof Areas = 0.92 Acres
Paved Areas = 0.42 Acres
Landscaped Areas = 1.16 Acres

WEIGHTED C = 0.56

B. Determine the 50-year 1-hour rainfall:

$i_{50}$ = 2.5 inches

Adjust for time of concentration to compute Rainfall Intensity (I):

Existing Condition (Site):

$T_c$ = 16 minutes

I = 4.55 inches/hour

Existing Condition (Hana Highway):

$T_c$ = 5 minutes

I = 5.91 inches/hour

Developed Condition:

$T_c$ = 12 minutes

I = 5.04 inches/hour

C. Drainage Area (A) = 2.50 Acres (Site)

Drainage Area (A) = 0.59 Acres (Hana Highway)

D. Compute the 50-year storm runoff volume (Q):

Q = CIA

Existing Condition (Site):

Q = (0.25)(4.55)(2.50)

= 2.84 cfs

Existing Condition (Hana Highway):

$$Q = (0.68)(5.91)(0.59)$$

$$= 2.37 \text{ cfs}$$

Developed Conditions:

$$Q = (0.56)(4.78)(2.50)$$

$$= 6.69 \text{ cfs}$$

The increase in runoff due to the proposed development is 6.69 - 2.84 = 3.85 cfs. The required onsite storage volume required to accommodate the increase in runoff generated from the proposed project is 5,615 cubic feet - 2,728 cubic feet = 2,887 cubic feet.

# Hydrograph Plot

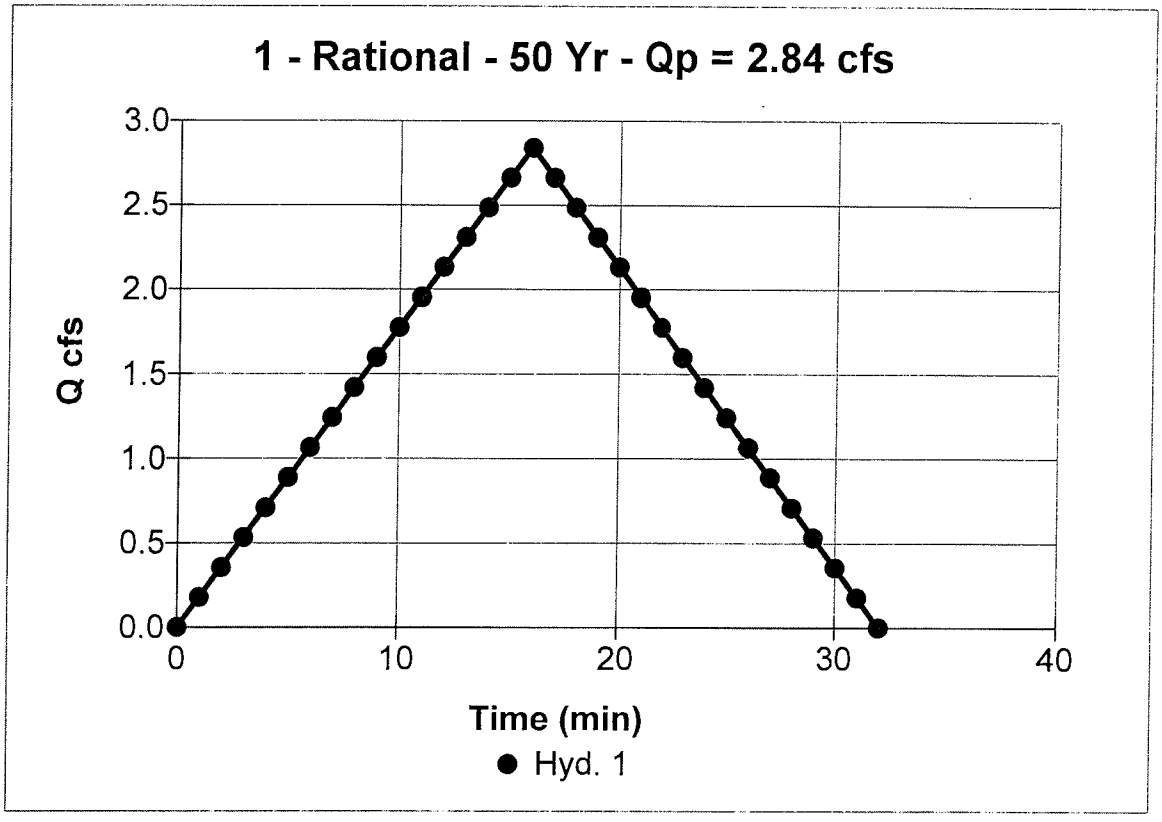
English

## Hyd. No. 1

EXISTING CONDITION (SITE)

| | | | |
|---|---|---|---|
| Hydrograph type | = Rational | Peak discharge | = 2.84 cfs |
| Storm frequency | = 50 yrs | Time interval | = 1 min |
| Drainage area | = 2.5 ac | Runoff coeff. | = 0.25 |
| Intensity | = 4.55 in | Time of conc. (Tc) | = 16 min |
| I-D-F Curve | = 2-5.IDF | Reced. limb factor | = 1 |

Total Volume = 2,728 cuft



# Hydrograph Plot

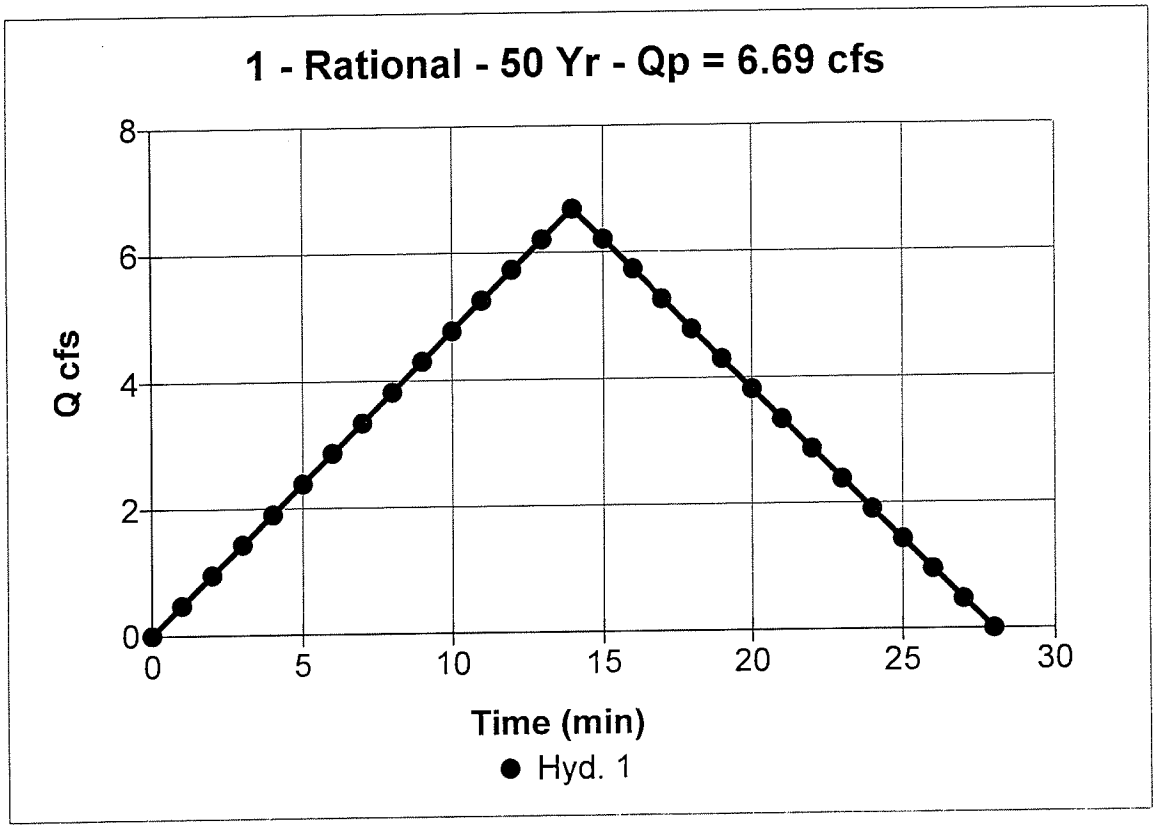
English

## Hyd. No. 1

DEVELOPED CONDITION

| | | | |
|---|---|---|---|
| Hydrograph type | = Rational | Peak discharge | = 6.69 cfs |
| Storm frequency | = 50 yrs | Time interval | = 1 min |
| Drainage area | = 2.5 ac | Runoff coeff. | = 0.56 |
| Intensity | = 4.78 in | Time of conc. (Tc) | = 14 min |
| I-D-F Curve | = 2-5.IDF | Reced. limb factor | = 1 |

Total Volume = 5,615 cuft



# Hydrograph Plot

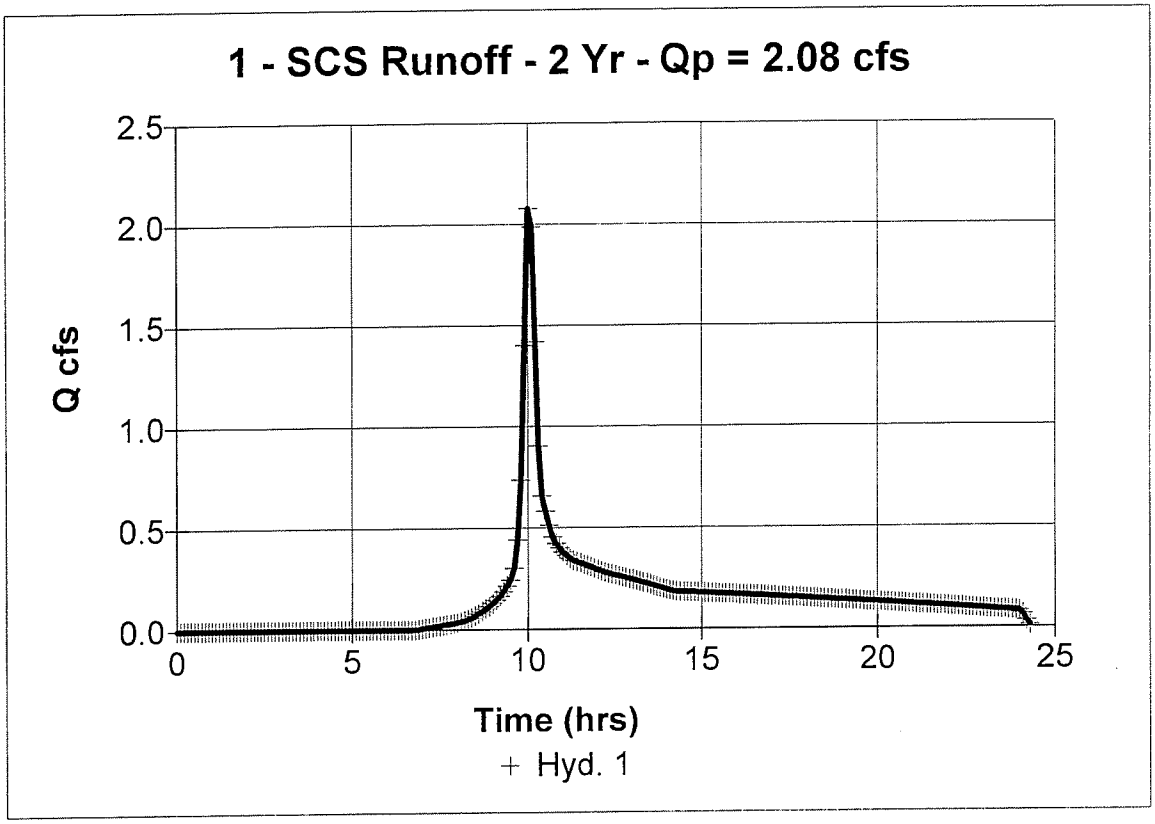
English

## Hyd. No. 1

Maui Medical Plaza-Developed

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.08 cfs |
| Storm frequency | = 2 yrs | Time interval | = 6 min |
| Drainage area | = 2.50 ac | Curve number | = 81 |
| Basin Slope | = 1.0 % | Hydraulic length | = 350 ft |
| Tc method | = USER | Time of conc. (Tc) | = 13.3 min |
| Total precip. | = 3.30 in | Distribution | = Type I |
| Storm duration | = 24 hrs | Shape factor | = 484 |

Total Volume = 13,171 cuft



# Hydrograph Plot

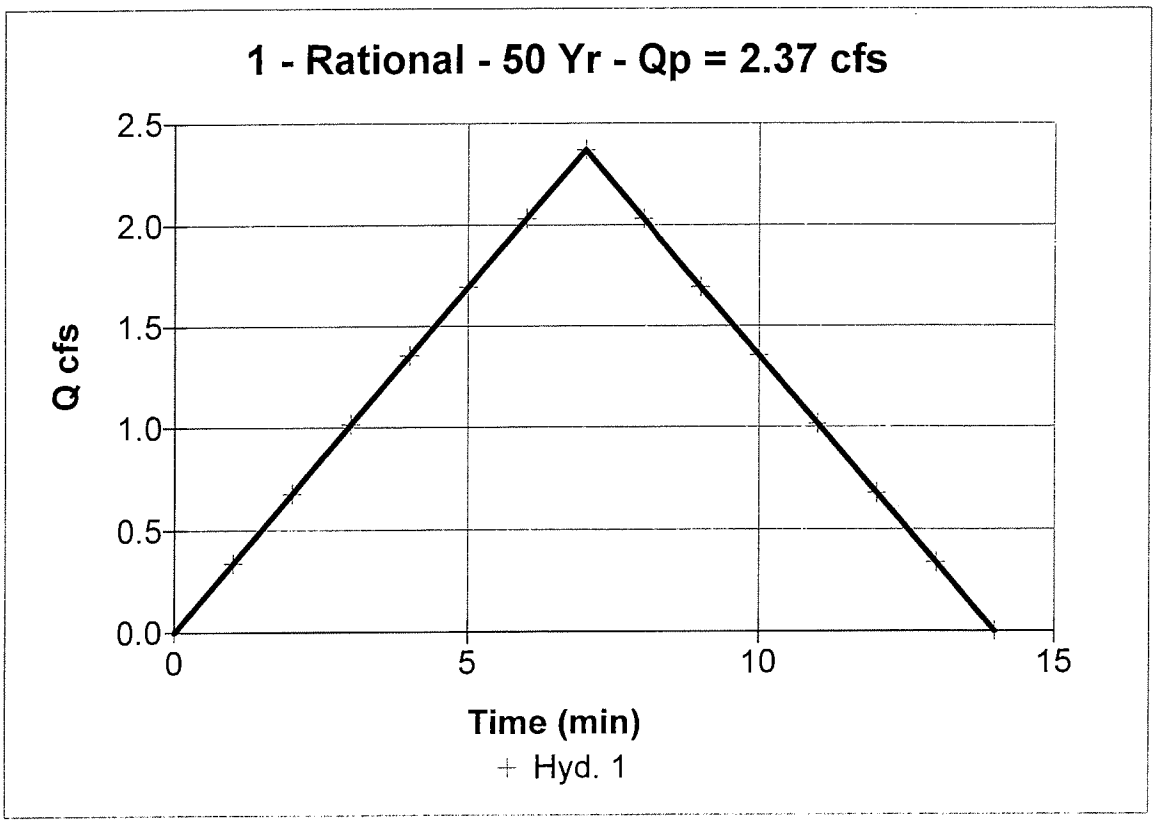
English

## Hyd. No. 1

EXISTING CONDITION (HANA HIGHWAY)

| | | | |
|---|---|---|---|
| Hydrograph type | = Rational | Peak discharge | = 2.37 cfs |
| Storm frequency | = 50 yrs | Time interval | = 1 min |
| Drainage area | = 0.6 ac | Runoff coeff. | = 0.68 |
| Intensity | = 5.91 in | Time of conc. (Tc) | = 7 min |
| I-D-F Curve | = 2-5.IDF | Reced. limb factor | = 1 |

Total Volume = 996 cuft



# APPENDIX B
# WATER DEMAND CALCULATIONS

# WATER DEMAND CALCULATIONS

Per 2002 Water System Standards:

Average Daily Demand (ADD) = 6,000 gallons per acre for commercial use

ADD = (6,000 gal/acre) (2.50 acres) = 15,000 gpd

# APPENDIX C
# WASTEWATER CALCULATIONS

# WASTEWATER CALCULATIONS

Per the 2000 Wastewater Flow Standards:

Wastewater Contribution for Office use is 20 gallons/employee/day

When fully occupied, the Maui Medical Plaza at Kanaha is expected to accommodate up to 200 medical professionals and staff.

Wastewater Contribution = (200 employees) x (20 gallons/employee/day)
= 4,000 gpd

# EXHIBITS

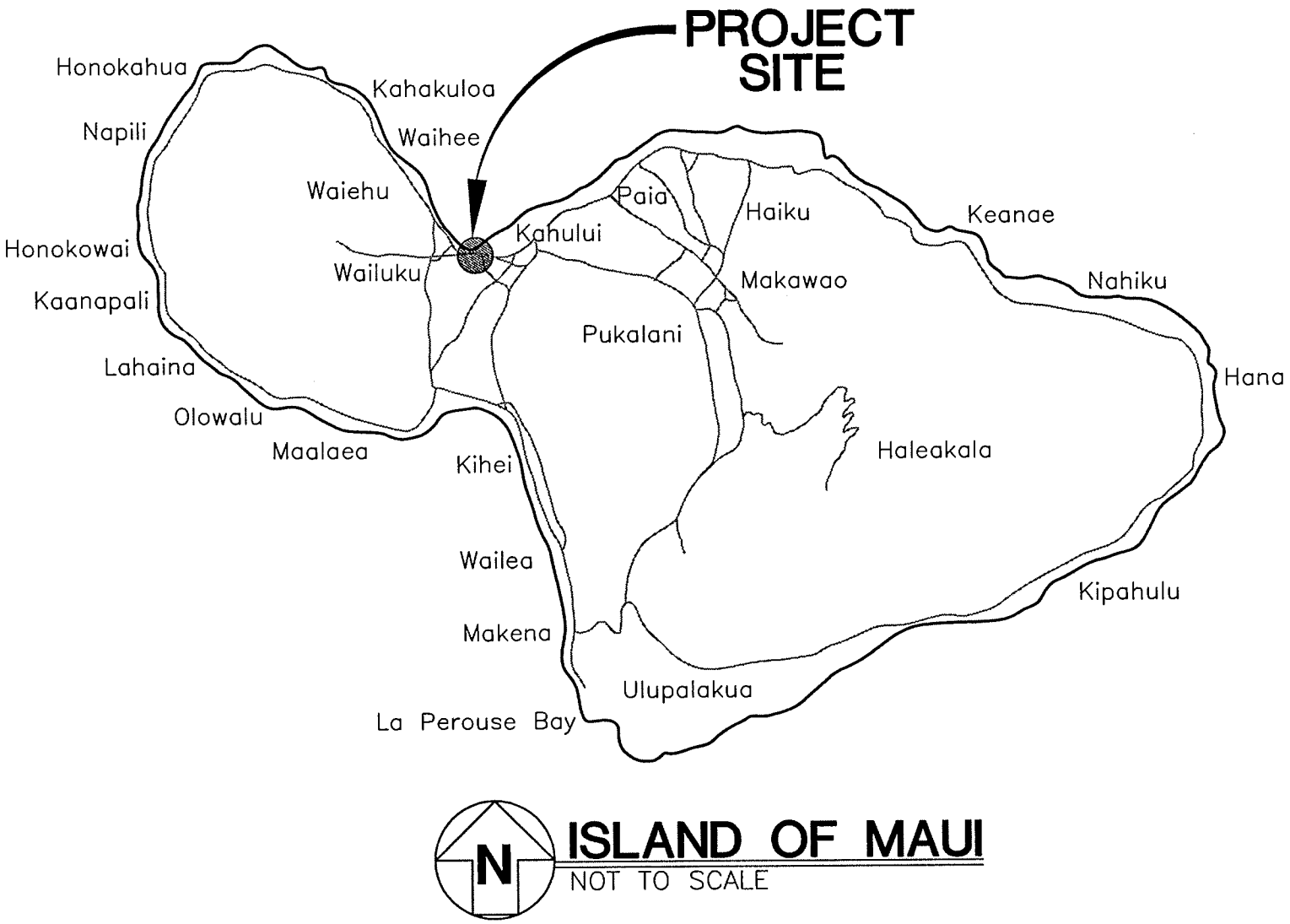
1 Location Map

2 Vicinity Map

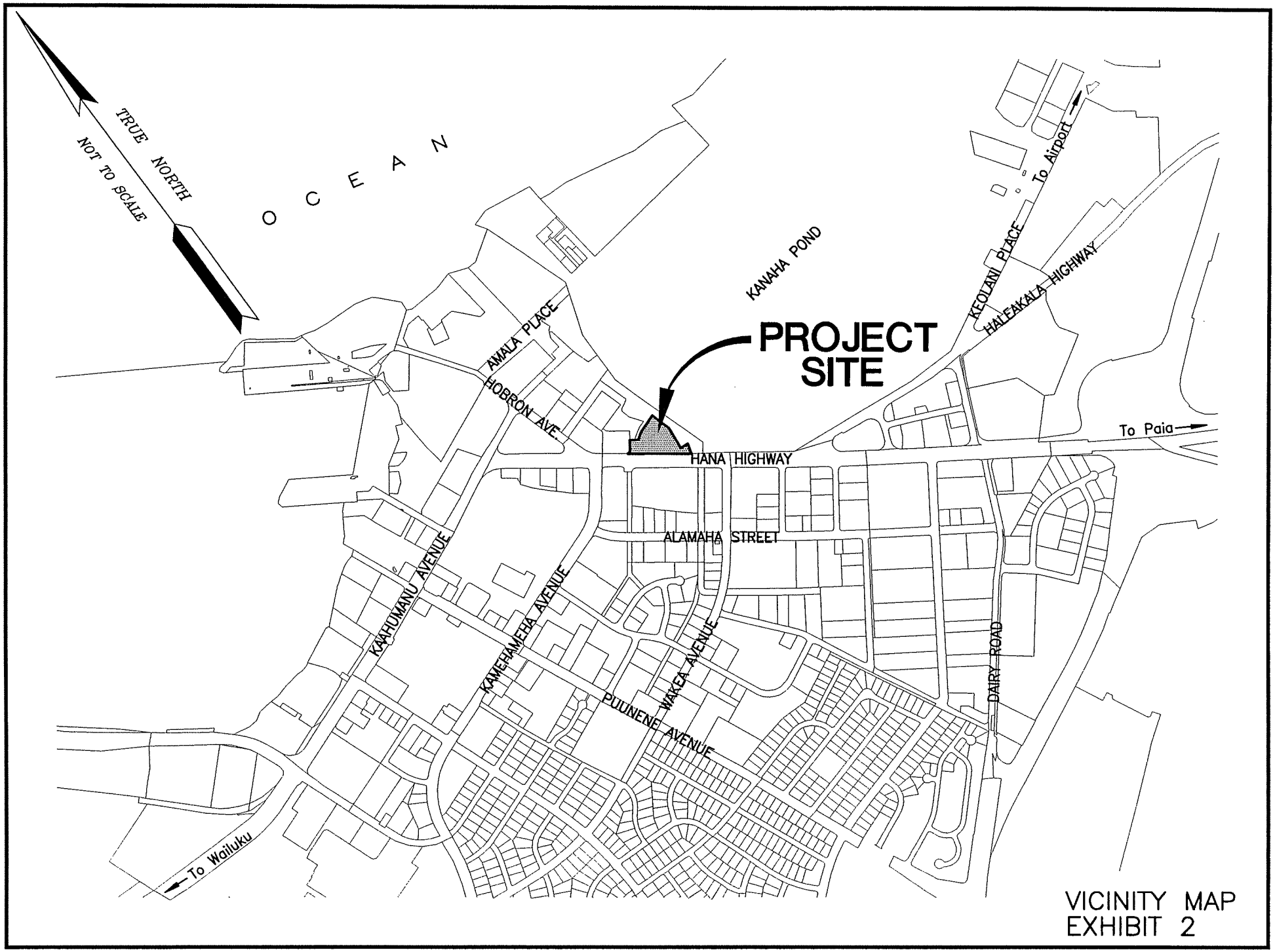
3 Soil Survey Map

4 Flood Insurance Rate Map

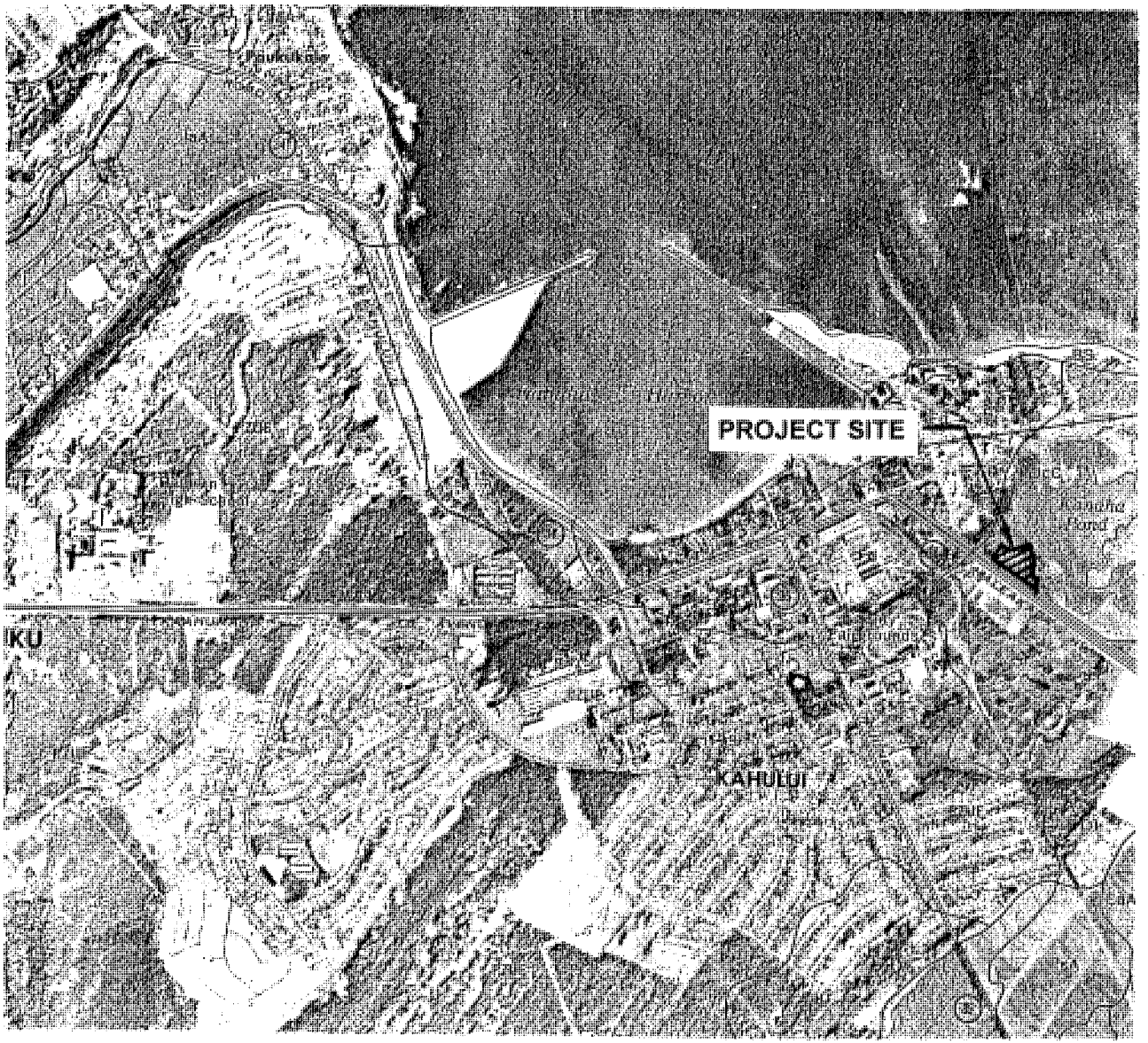
5 Enlarged Flood Map



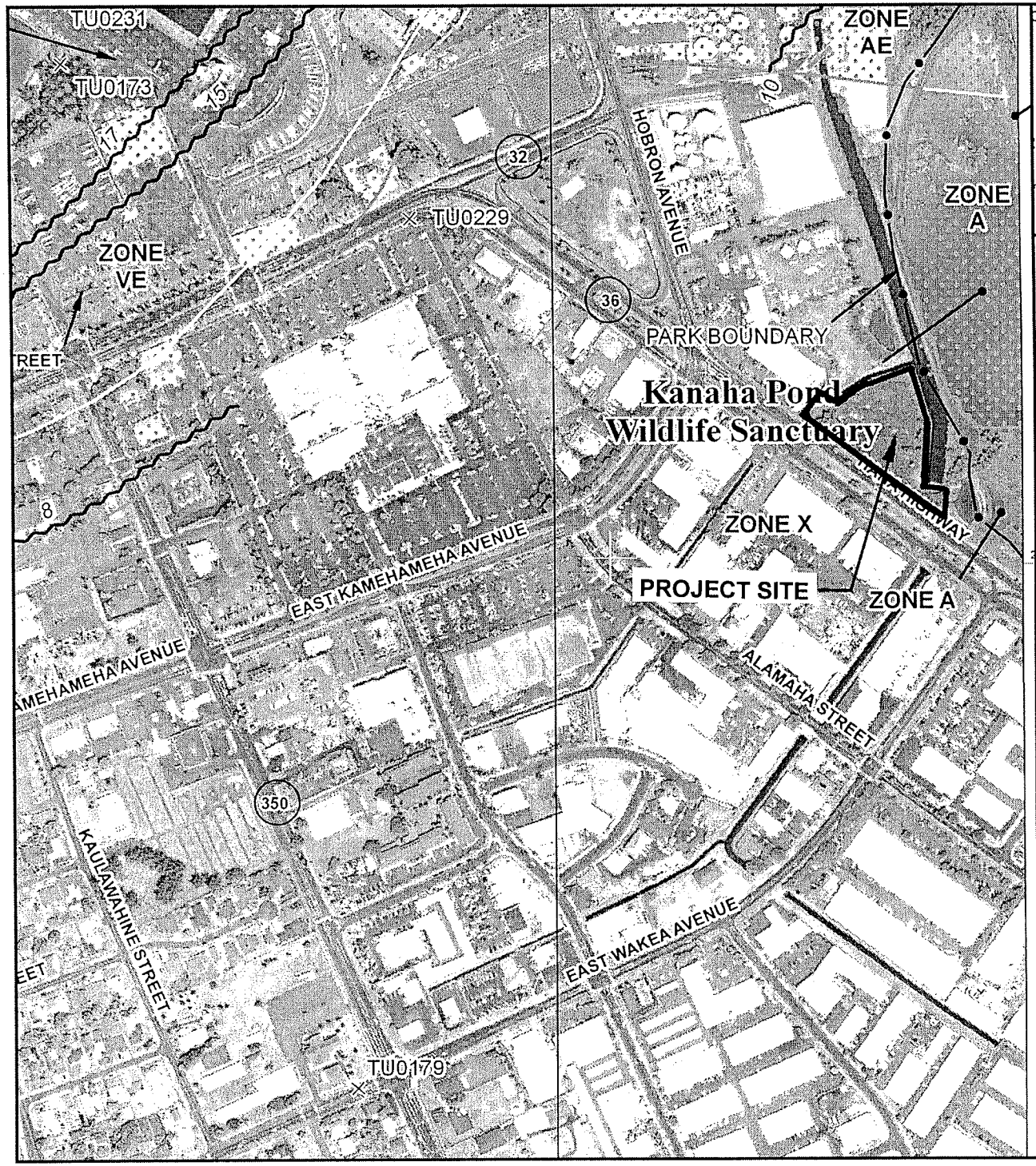

LOCATION MAP
EXHIBIT 1




VICINITY MAP
EXHIBIT 2




SOIL SURVEY MAP
EXHIBIT 3




od Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0392E

# FIRM

FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

PANEL 392 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| MAUI COUNTY | 150003 | 0392 | E |

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

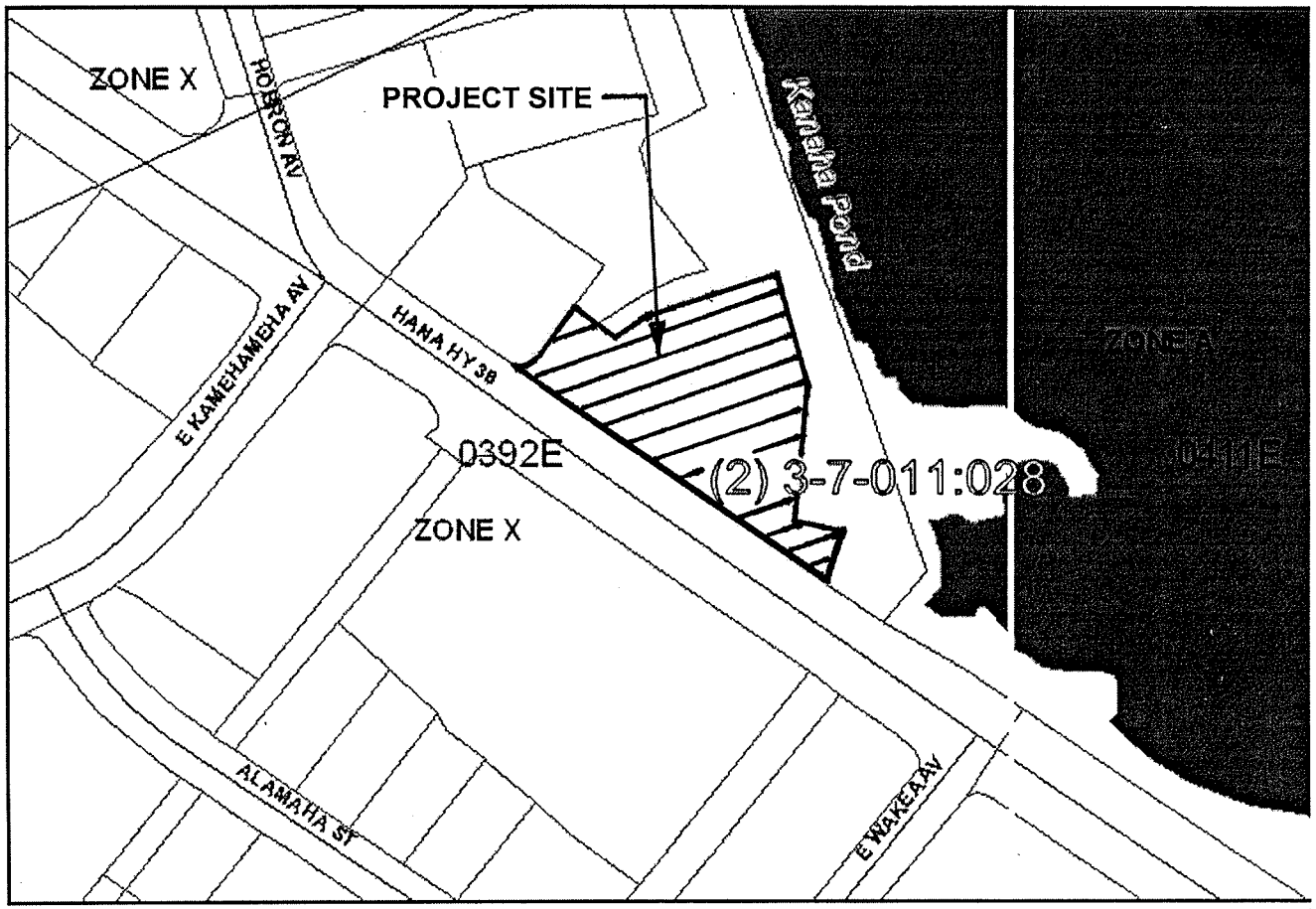
MAP NUMBER
1500030392E

MAP REVISED
SEPTEMBER 25, 2009

Federal Emergency Management Agency

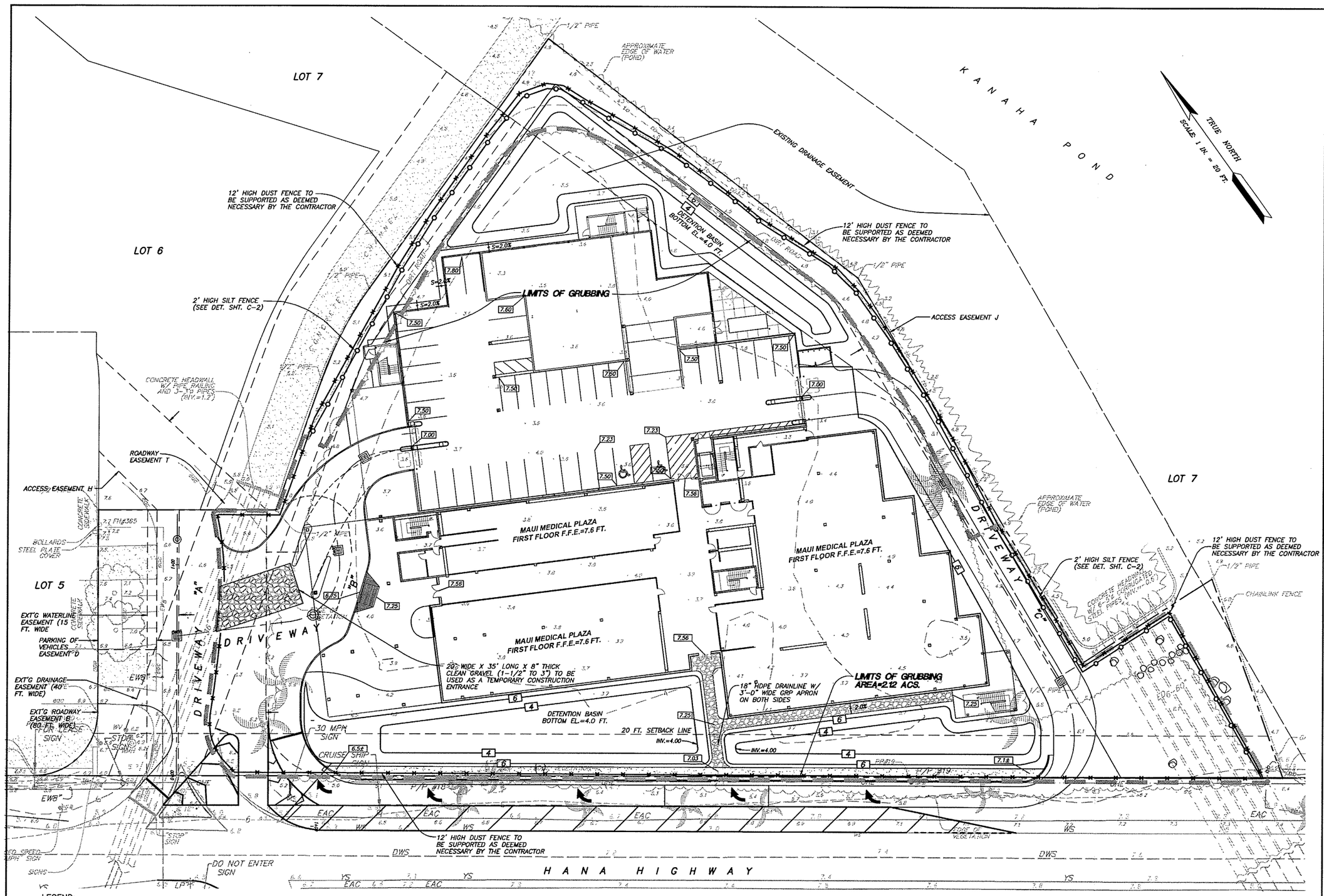
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FLOOD INSURANCE RATE MAP
EXHIBIT 4




County: **MAUI** TMK: **(2) 3-7-011:028** Address: **151 HANA HWY** LOMC: **NONE**

ENLARGED FLOOD MAP
EXHIBIT 5




LEGEND:

- EXISTING GRADE SPOT ELEVATION
- EXISTING CONTOUR LINE
- FINISH GRADE CONTOUR LINE
- DIRECTION OF EXISTING ONSITE RUNOFF
- 12' HIGH DUST FENCE
- 2' HIGH SILT FENCE
- TEMPORARY CONSTRUCTION ACCESS

**GRADING & BMP PLAN**
SCALE: 1 IN. = 20 FT.

## APPROXIMATE EARTHWORK QUANTITIES

THE EARTHWORK QUANTITIES SHOWN HEREIN ARE FOR SECURING THE GRADING PERMIT ONLY. THE CONTRACTOR SHALL VERIFY THE QUANTITIES AND COMPLETE THE GRADING AS SHOWN ON THE PLAN.

CLEARING AND GRUBBING = 2.12 ACRES±
EMBANKMENT = 6,456 C.Y.
EXCAVATION = 144 C.Y.


OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032
FAX: (808) 242-5779


STACY A. OTOMO
LICENSED PROFESSIONAL ENGINEER
No. 5115-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. "OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

Stacy A. Otomo 10-5-09
SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

# MAUI MEDICAL PLAZA

TMK: (2) 3-7-11: 28
KAHULUI, MAUI, HAWAII

GRADING & BMP PLAN

| REVISION | DATE | NOTE |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | |
|---|---|
| DESIGNED BY: | S.A.O. |
| DRAWN BY: | L.C.O. |
| PROJECT NO.: | 2006-52 |
| DRAWING NAME: | GRAD-00 |
| DATE: | 10-5-09 (PERMIT SUBMITTAL) |

SHEET NO.
C-2.1
OF SHEETS

# APPENDIX I.

# Letters of Support

CHARMAINE TAVARES
MAYOR

200 South High Street
Wailuku, Hawaii 96793-2155
Telephone (808) 270-7855
Fax (808) 270-7870
e-mail: mayors.office@mauicounty.gov

**OFFICE OF THE MAYOR**
County of Maui

November 12, 2009

Mr. Benjamin Brown
Doctor James Hansen
Mr. Robert McDaniel
Kanaha Professional Plaza LLC
350 Hukilike Street, Suite D
Kahului, Hawaii 96732

Dear Mr. Brown, Dr. Hansen & Mr. McDaniel:

SUBJECT: PROPOSED MAUI MEDICAL PLAZA AT KANAHA PROJECT
AT TMK (2) 3-7-011:028, KAHULUI, MAUI

As our community continues to grow on Maui, the need for proper medical services increases. The proposed Maui Medical Plaza at Kanaha will give physicians and other health specialists on the island an accessible and central location in which they can provide care for their patients. It intends to replace the loss of medical space that will be experienced with the expected closure of the Maui Clinic Medical Center on Puunene Avenue.

I support and appreciate your efforts to provide the community with a medical office facility that can administer timely healthcare services and contribute to the economic well-being of Maui County. The proposed facility will afford physicians, clinical laboratory personnel, physical therapists, radiologists and others the opportunity to work together to assist in the overall physical and mental wellness of each individual patient.

I look forward to seeing this project come to fruition and become a real and viable venue for enhanced medical practices in Central Maui.

Aloha,

CHARMAINE TAVARES
Mayor, County of Maui

CT:gi

MAUI
MEDICAL
PLAZA
At Kanaha

The Maui Medical Plaza at Kanaha is a new health care facility and medical office building proposed for development at 151 Hana Highway in Kahului. As a long-time neighbor of this project location, I support this new health care facility for central Maui. It will be a positive contribution to the neighborhood and benefit all of our central Maui community.

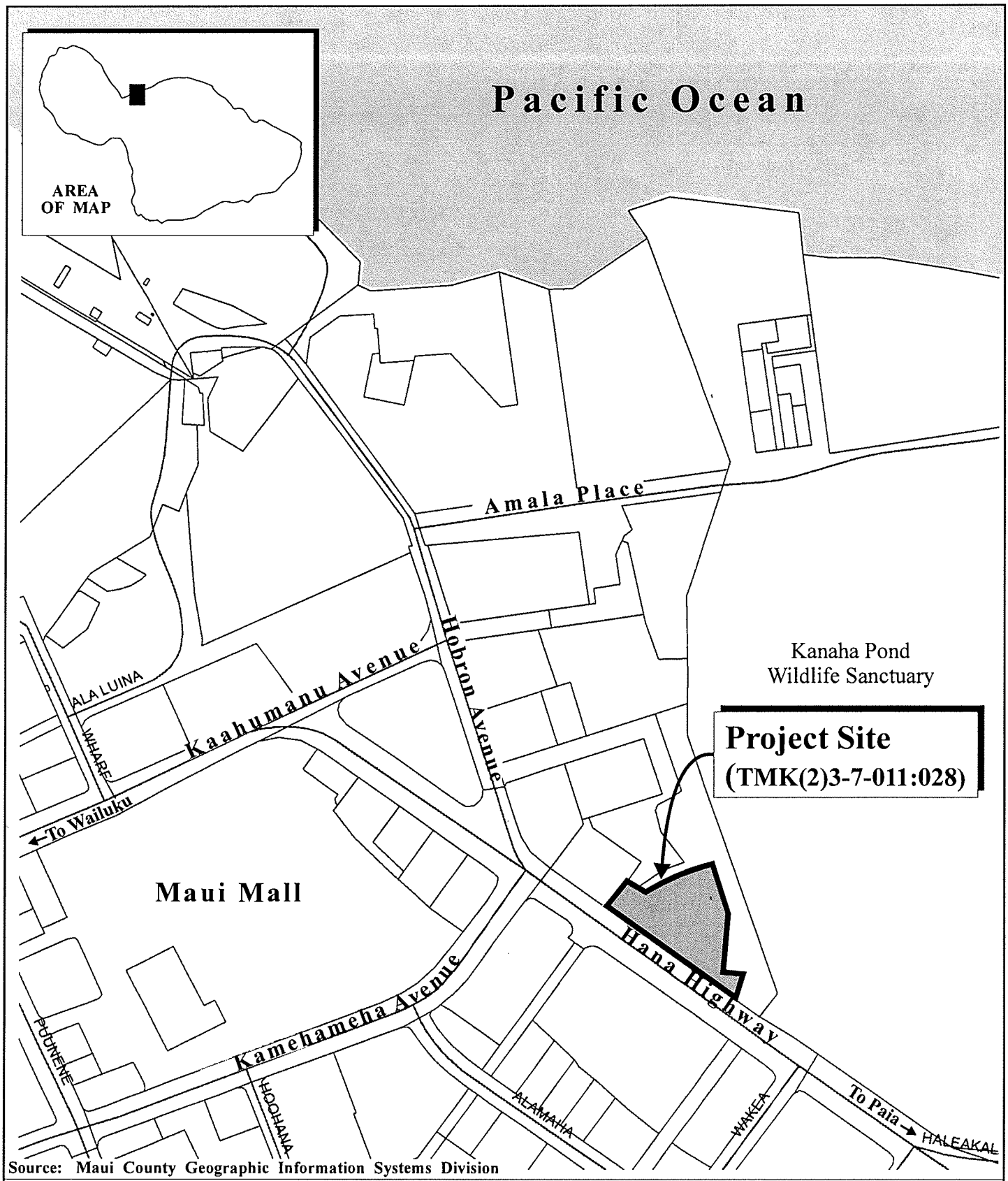
Additional Comments: Welcome to our neighborhood & I wish you all the luck in your ventures.

Signature: [signature] Date 8/17/09

Printed Name: Roy M. Kitagawa Date 8/17/09

Kitagawa Motors Inc.
DBA: Island Honda &
Island Auto Center

350 Hukilike Street, Suite D • Kahului, Maui, HI 96732 • 808.283.8811 (cell) • 866.812.8585 (toll free) • 808.876.0861 (fax) • MauiMedicalPlaza.com




Source: Maui County Geographic Information Systems Division

# Proposed Maui Medical Plaza Project

NOT TO SCALE

## Property Location Map

MUNEKIYO & HIRAGA, INC.

Prepared for: Kanaha Professional Plaza, LLC