Draft Environmental Assessment

PROPOSED LAHAINA WASTEWATER PUMP STATION NO. 1 MODIFICATIONS

(TMK 4-4-002:029 and 033)

Prepared for:

County of Maui, Department of Environmental Management

January 2008

MUNEKIYO HIRAGA, INC.

CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

Executive Summary

Project Name:	Proposed Lahaina Wastewater Pump Station No. 1 Modifications
Type of Document:	Draft Environmental Assessment
Legal Authority:	Chapter 343, Hawai`i Revised Statutes
Agency Determination:	Anticipated Finding of No Significant Impact (FONSI)
Applicable Environmental Assessment Review "Trigger":	Use of County Lands and Funds
Location:	TMK: (2) 4-4-002:029 and 033 Lahaina Maui Island
Applicant:	County of Maui, Department of Environmental Management 200 South High Street Wailuku, Hawai`i 96793
Approving Agency:	County of Maui, Department of Environmental Management 200 South High Street Wailuku, Hawai`i 96793 Contact: Cheryl Okuma, Director Phone: (808) 270-8230
Consultant:	Munekiyo & Hiraga, Inc. 305 High Street, Suite 104 Wailuku, Hawai`i 96793 Contact: Kyle Ginoza Phone: (808) 244-2015
Project Summary:	The applicant, the County of Maui, Department of Environmental Management, Wastewater Reclamation Division, proposes to upgrade the existing Lahaina Wastewater Pump Station (WWPS) No. 1, which currently does not have sufficient capacity to handle peak wet-weather flows. The pump station improvements will include a new submersible pumping station, electrical/emergency generator building, fuel tank, and odor control system.

The pump station is currently serviced by a 1,600 feet long, 20-inch diameter force main. A new 30-inch force main will be installed between Lahaina WWPS No. 1 and the Lahaina Wastewater Reclamation Facility (WWRF). The existing pumping station and 20-inch force main will continue to be used until the existing pumps reach the end of their service life. The existing force main will serve as a backup line in the future.

The implementation of the proposed improvements sought by the applicant will commence upon receipt of regulatory permits and approvals. It is estimated that site construction will be initiated in mid-2008 and will be completed by mid-2010.

I. PROJECT OVERVIEW

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A. PROJECT LOCATION, EXISTING USE, AND OWNERSHIP

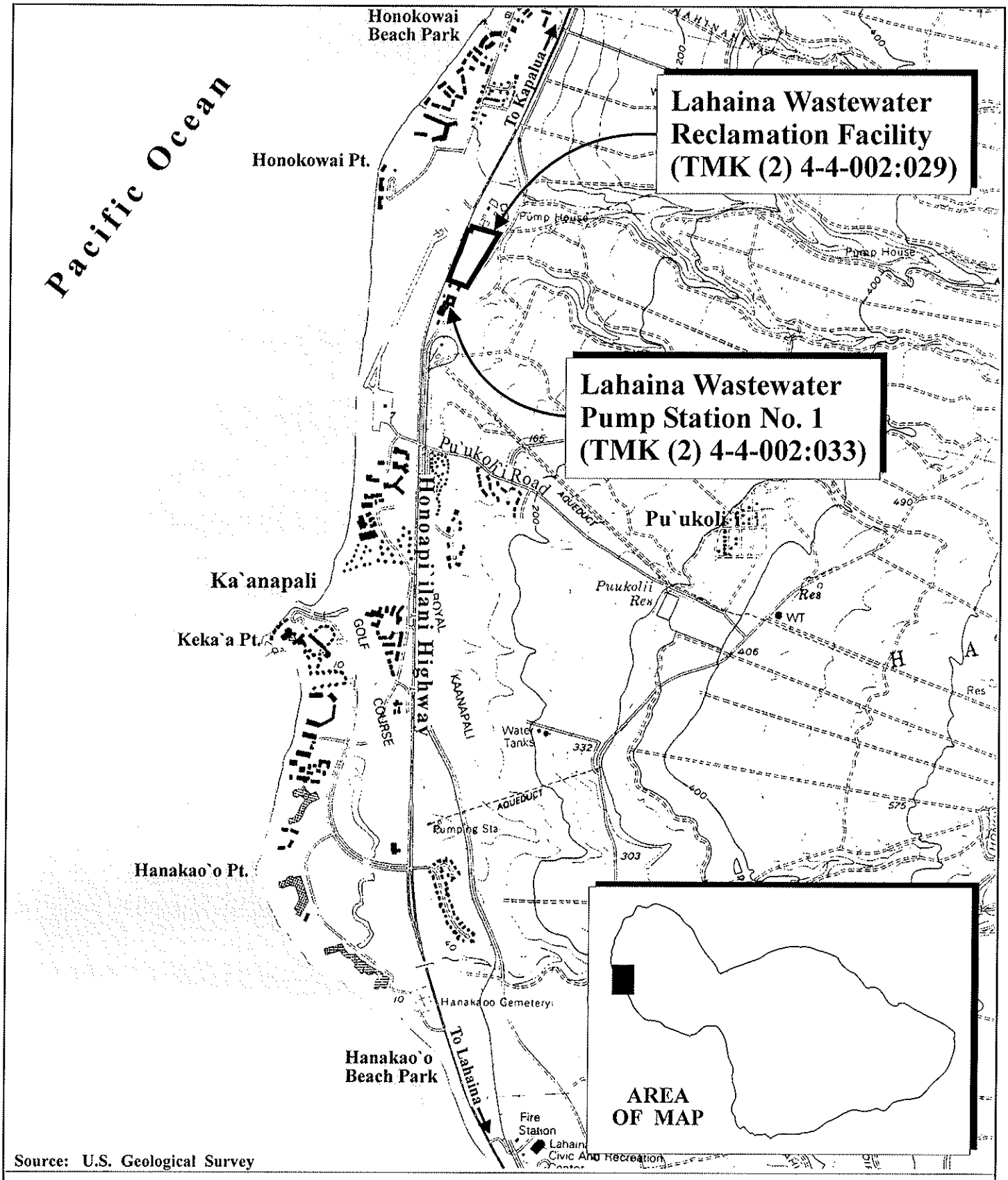
Wastewater pump station improvements are proposed by the County of Maui, affecting Tax Map Key Nos. (2) 4-4-002:029 and 033, located in Honokowai, Maui, Hawai`i to the east (mauka) of Honoapi`ilani Highway. See **Figure 1**. Specifically, Lahaina Wastewater Pump Station (WWPS) No. 1 (Parcel 33) is located along Halawai Drive and the Lahaina Wastewater Reclamation Facility (WWRF) (Parcel 29) is located along Honoapi`ilani Highway at its intersection with Lower Honoapi`ilani Road. See **Figure 2**.

Both properties are currently being used to provide wastewater services for the Lahaina area and are owned by the County of Maui.

B. PROPOSED ACTION

The County of Maui, Department of Environmental Management, Wastewater Reclamation Division proposes to upgrade the existing Lahaina WWPS No. 1. Lahaina WWPS No. 1 is the largest of 16 wastewater pumping stations servicing West Maui and one (1) of two (2) pump stations discharging to the Lahaina WWRF. The pump station is currently serviced by a 1,600 feet long, 20-inch diameter force main. The pump station improvements will include a new submersible pumping station, electrical/emergency generator building, fuel tank, and odor control system. See **Figure 3**.

In addition, a new 30-inch force main will be installed between Lahaina WWPS No. 1 and the Lahaina WWRF. Specifically, the new force main will extend from Lahaina WWPS No. 1 along Halawai Drive and along an existing cane haul road (via a new utility easement) to the Lahaina WWRF. See **Figure 4** and **Figure 5**. The existing pumping station and 20-inch force main will continue to be used until the existing pumps reach the end of their service life. The existing force main will serve as a backup line in the future.



Source: U.S. Geological Survey

Figure 1 Lahaina Wastewater Pump Station No. 1 Modifications

Regional Location Map

0 1000 Feet
500 2000

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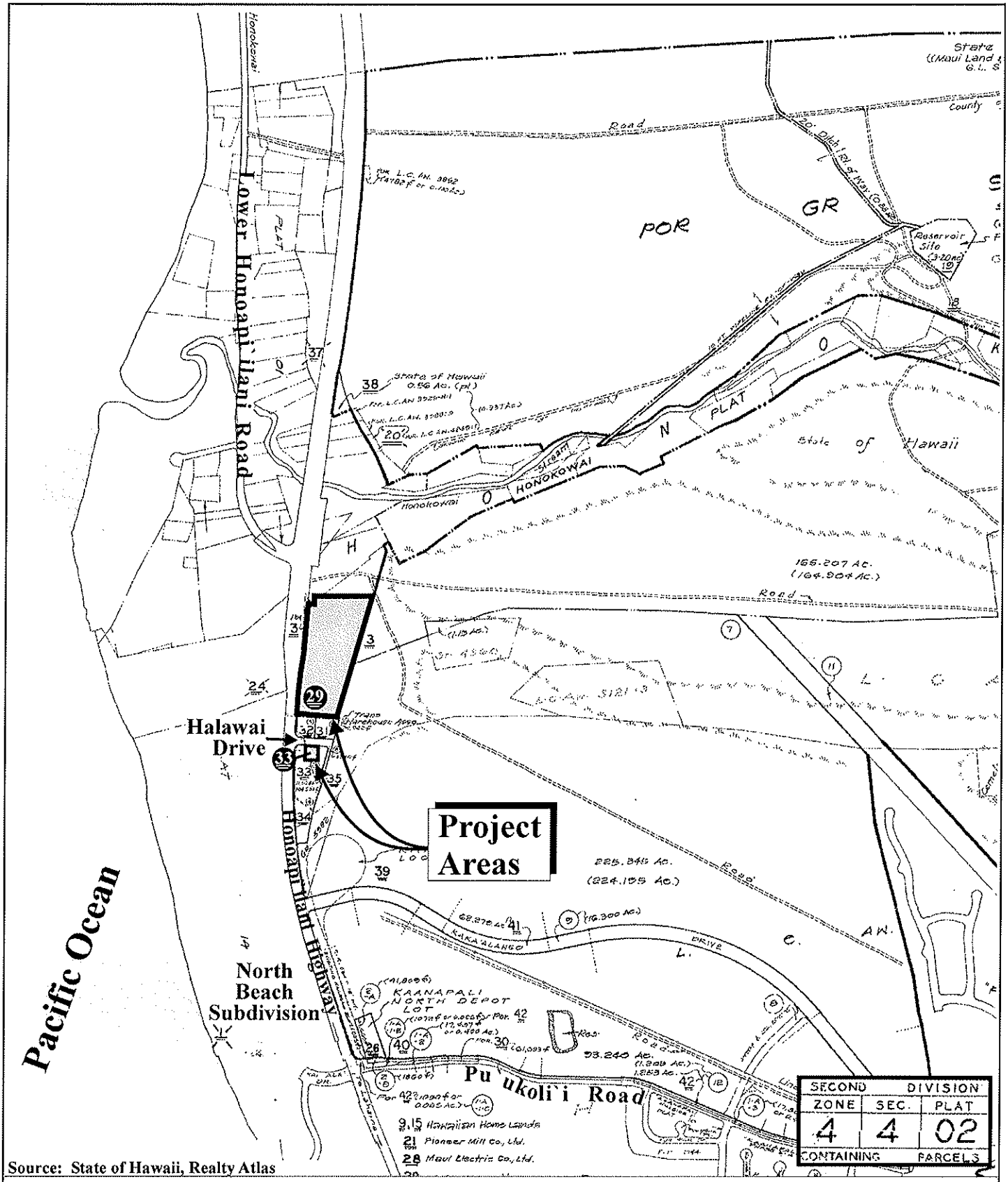
Prepared for: County of Maui, Dept. of Environmental Management

HPD/LahWWPS1/regloca



Source: State of Hawaii, Realty Atlas

Figure 2

Lahaina Wastewater Pump Station No. 1 Modifications

Site Location and Tax Map Key

Prepared for: County of Maui, Dept. of Environmental Management

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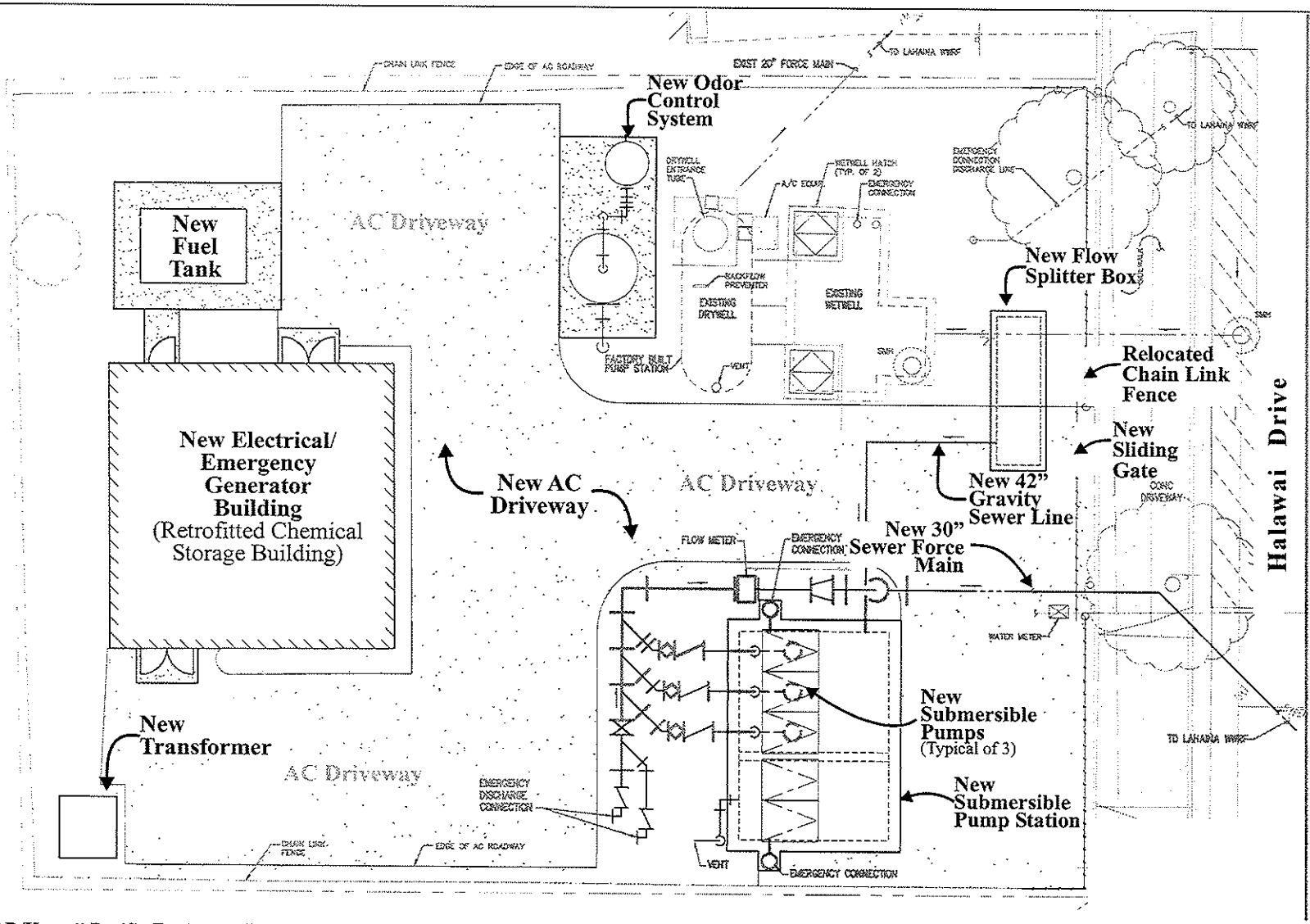
HPE/LahWWPS1/sitelocation



Source: HDR/Hawaii Pacific Engineers, Inc.

Figure 3 Lahaina Wastewater Pump Station No. 1 Modifications

NOT TO SCALE

Pump Station Site Plan

Prepared for: County of Maui, Dept. of Environmental Management

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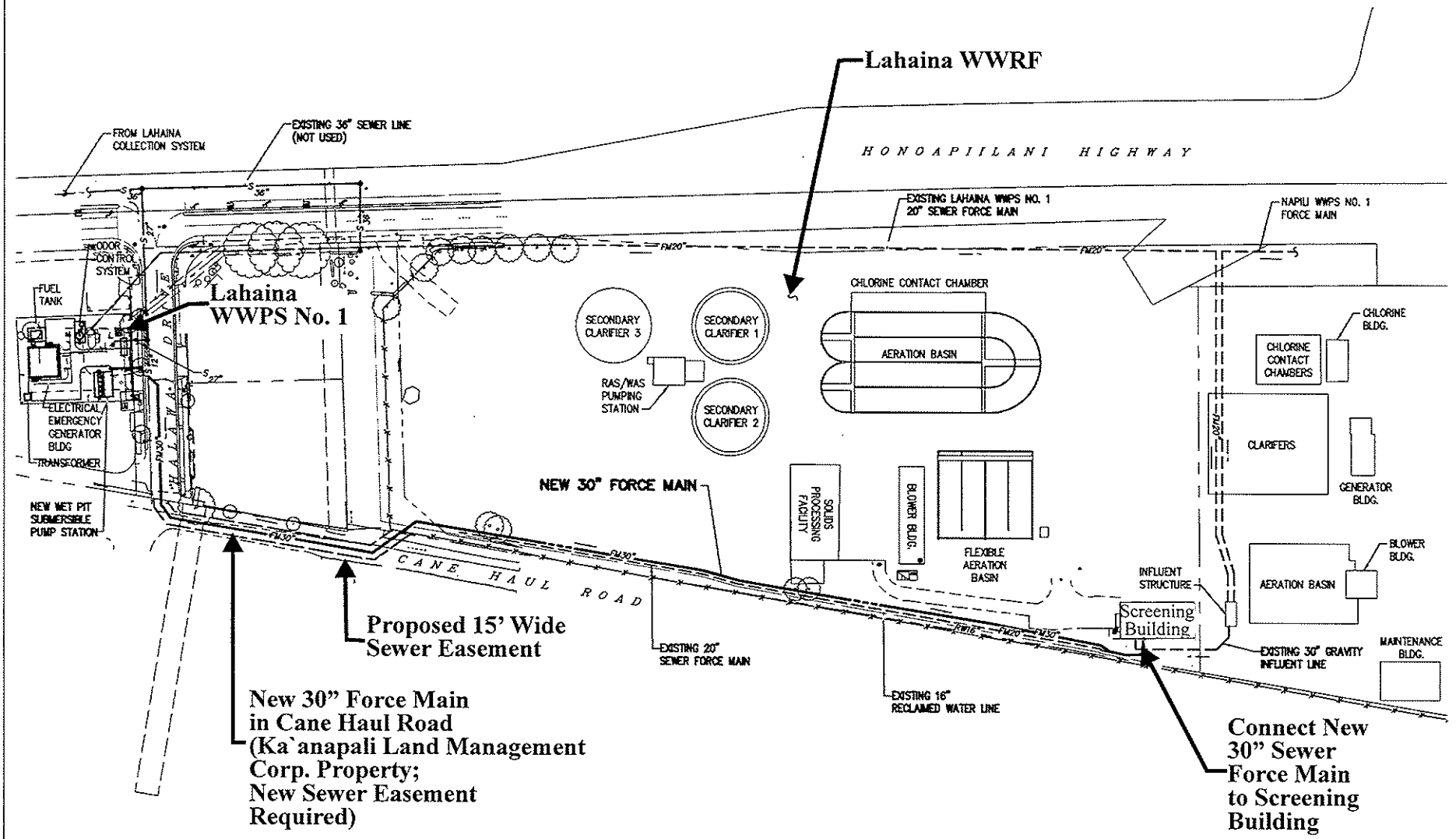
HPE/LahWWPS1/siteplan



Source: HDR/Hawaii Pacific Engineers, Inc.

Figure 4 Lahaina Wastewater Pump Station No. 1 Modifications

NOT TO SCALE

New Force Main Alignment

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HPE/LahWWPS1/newforcemain

Southwestern View from Within WWPS No. 1

Southern View from Within the WWTP of Proposed Force Main Alignment

Source: Munekiyo & Hiraga, Inc.

Figure 5 Lahaina Wastewater Pump Station No. 1 Modifications Site Photos

Prepared for: County of Maui, Dept. of Environmental Management

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HPD/LahWWPS1/sitephotos

C. PROJECT NEED

Lahaina WWPS No. 1 was constructed in the late 1970s and has a capacity of approximately 7 million gallons per day (mgd). Lahaina WWPS No. 1 currently does not have sufficient capacity to handle peak wet-weather flows, which are estimated to be as high as 10 mgd. A portable engine-driven pump and temporary force main are currently used to provide the required additional capacity. Future developments in the service area are expected to increase the peak wet-weather flow to approximately 20 mgd within a 25 to 30 year time period. Peak wet-weather flows are projected to be as high as 25 to 30 mgd under the assumed ultimate full-development conditions.

D. CHAPTER 343, HAWAI`I REVISED STATUTES REQUIREMENT

The proposed improvements will be funded by the County of Maui on lands owned by the County of Maui. The use of County lands and funds is a trigger for an environmental impact analysis pursuant to Chapter 343, Hawai`i Revised Statutes (HRS). In particular, based on the anticipated scope of work, the proposed action requires the preparation and processing of an Environmental Assessment.

E. IMPLEMENTATION TIME FRAME

The implementation of the proposed improvements sought by the applicant will commence upon receipt of regulatory and construction permits and approvals. It is estimated that site construction will be initiated in mid-2008 and will be completed by mid-2010.

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

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A. PHYSICAL SETTING

1. Surrounding Land Uses

a. Existing Conditions

Lahaina WWPS No. 1 is located in Honokowai, east (mauka) of Honoapi`ilani Highway. Various car rental agencies are located adjacent to Lahaina WWPS No. 1 along Halawai Drive. The North Beach resort area is located west (makai) of Honoapi`ilani Highway. The area mauka of the site was previously cultivated in sugar cane, but is currently fallow.

The Lahaina WWRF is located less than a tenth of a mile north of Lahaina WWPS No. 1 and is adjacent to Honoapi`ilani Highway, which borders the WWRF site along its western extent. Honokowai Marketplace and the North Beach resort area are located across Honoapi`ilani Highway. The area mauka of the Lahaina WWRF was previously cultivated in sugar cane, but is currently fallow.

b. Potential Impacts and Proposed Mitigation Measures

The proposed action is intended to provide additional wastewater capacity for the West Maui region. The project is not anticipated to have an adverse effect on surrounding commercial, resort, and agricultural uses.

2. Climate

a. Existing Conditions

Like most areas of Hawai`i, Lahaina's climate is relatively uniform year-round. Lahaina's tropical latitude, its position relative to storm tracts and the Pacific anticyclone, and the surrounding ocean combine to produce this stable

climate. Variation in climate among different regions on Maui is largely left to local terrain.

Average temperatures in Lahaina range between 66 degrees and 88 degrees Fahrenheit. August and September are historically the warmest months, while January and February are the coolest (Maui County Data Book, 2006).

Rainfall in Lahaina is highly seasonal, with most precipitation occurring between November and April when winter storms hit the area. Situated on the leeward side of the West Maui Mountains, this region receives most of its rainfall in late afternoon and early evening, after sea breezes take moisture upslope during the day. Precipitation data collected at the Kapalua-West Maui Airport station show that, on average, March is the wettest month with 6.39 inches of precipitation, while December is the driest with just 0.45 inch (Maui County Data Book, 2006).

Wind patterns in the Lahaina area are also seasonal. The northeasterly trade wind occurs 90 percent of the time during the summer, and just 50 percent of the time during the winter. Wind patterns also vary on a daily basis, with trade winds generally being stronger in the afternoon. During the day, winds blow onshore toward the warmer land mass. In the evening, the reverse occurs, as breezes blow toward the relatively warm ocean.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will not have an adverse effect on the climate. The proposed project will have a low profile and is not anticipated to alter wind patterns in the area.

3. Topography, Soils, and Agricultural Productivity Characteristics

a. Existing Conditions

The project sites are characterized by relatively level terrain. The properties generally slope in a westerly direction at a grade of less than one (1) percent. Onsite elevations range from approximately 20 to 30 feet above mean sea level.

Underlying the project site are the soils from the Pulehu-Ewa-Jaucas association. The Soil Survey of the Islands of Kaua`i, O`ahu, Maui, Moloka`i, and Lana`i, State of Hawai`i characterizes the soils of this association as well-drained and occurring in basins and alluvial fans. Soils of this association have developed in alluvium derived from basic igneous rock. Typical uses in this soil type are sugar cane and truck crop cultivation and pasture. See **Figure 6**.

Moreover, soils underlying the project site are of the Ewa Series, more specifically Ewa silty clay loam, 0 to 3 percent slopes (EaA). This soil has very slow runoff and the erosion hazard is no more than slight. This soil is often used for sugar cane cultivation and homesites. Additionally, the soils underlying a very small portion of the project site are classified as Wahikuli stony silty clay, 7 to 15 percent slopes (WcC). This soil has slow to medium runoff and the erosion hazard is slight to moderate. This land type is used primarily for sugar cane and a small acreage is used for homesites. See **Figure 7**.

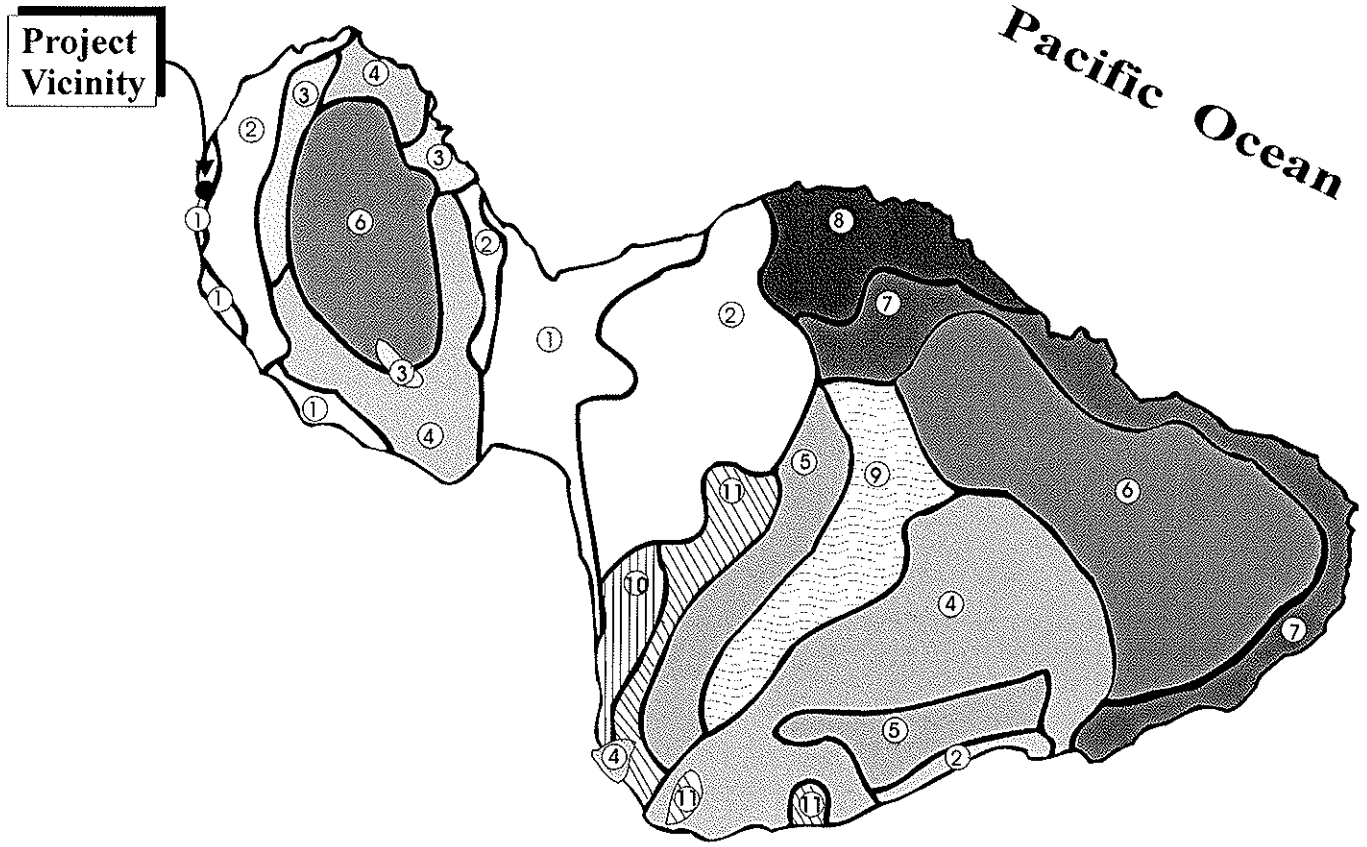
In 1977, the State Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawai`i (ALISH), based primarily, though not exclusively, on their soil characteristics. The three (3) classes of ALISH lands are: "Prime", "Unique" and "Other Important" agricultural lands, with the remaining non-classified lands termed "Unclassified".

When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season, and moisture supply needed to produce sustained crop yields economically; while "Unique" agricultural lands possess a combination of soil quality, growing season, and moisture supply to produce sustained high yields of a specific crop. "Other Important" agricultural lands include those important agricultural lands that have not been rated as "Prime" or "Unique". As reflected by the ALISH map for the Honokowai region, the proposed project is comprised of lands that have been defined as "Prime" agricultural lands. See **Figure 8**.

Lastly, regarding soil productivity, the University of Hawai`i Land Study Bureau classifies productivity characteristics on a scale of "A" to "E" with

LEGEND

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



Base Map Source: USDA Soil Conservation Service

Figure 6

Lahaina Wastewater Pump Station No. 1 Modifications

Soil Association Map

NOT TO SCALE

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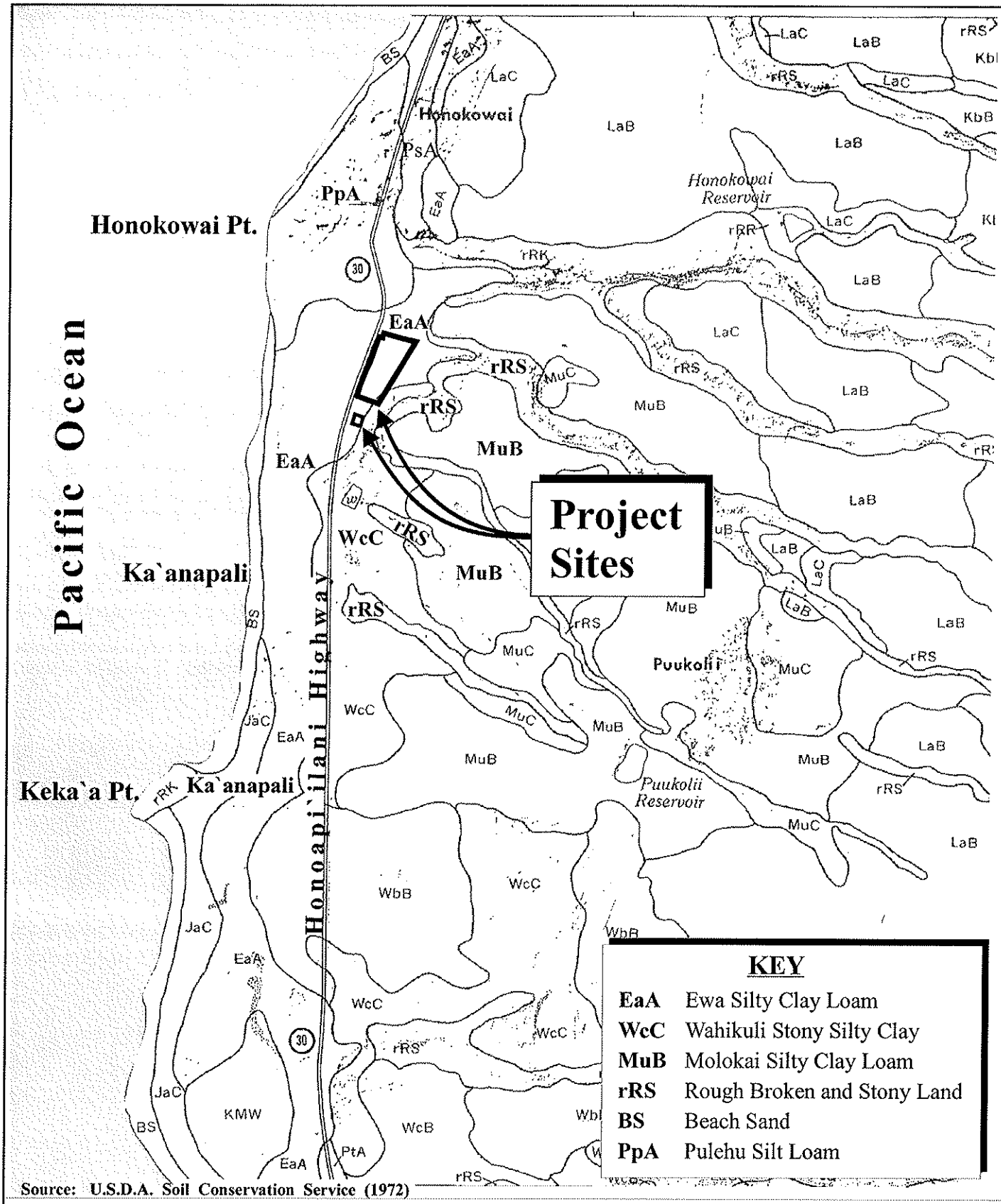
HPE/LahWWPS1/soils



Source: U.S.D.A. Soil Conservation Service (1972)

Figure 7 Lahaina Wastewater Pump Station No. 1 Modifications

Soil Classification Map

NOT TO SCALE

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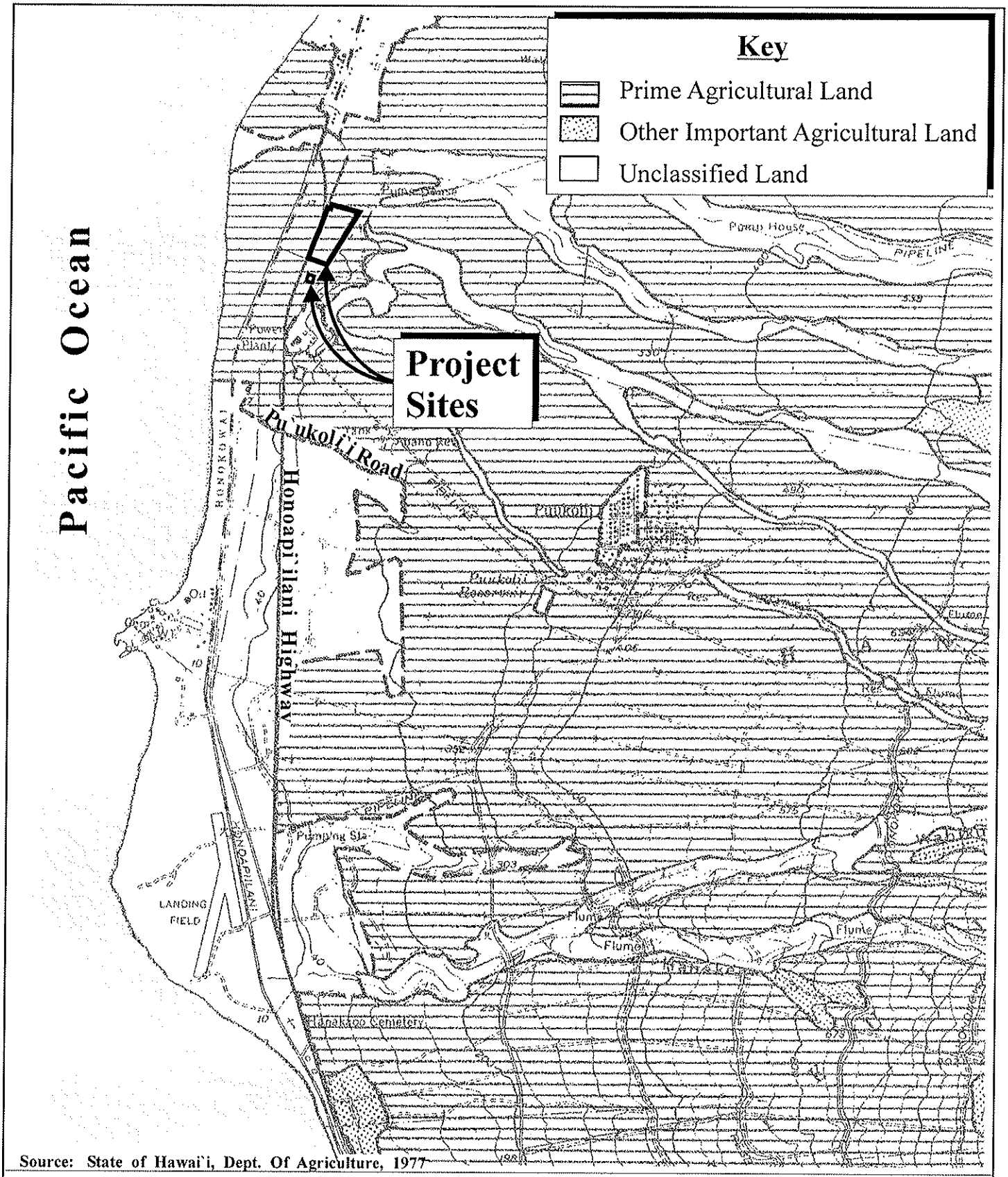
HPE/LahWWPS1/SOILCLAS



Source: State of Hawai`i, Dept. Of Agriculture, 1977

Figure 8 Lahaina Wastewater Pump Station No. 1 Modifications ALISH Map

NOT TO SCALE

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HPE/LahWWPS1/ALISH

lands designated as "A" reflecting the highest productivity and "E" representing lands ranked lowest. The letters are followed by numbers which further classify the soil types conveying information such as texture, drainage, and stoniness. Land underlying the project sites is classified as A71i, which reflects soil which is nonstony, is well-drained, and is moderately fine textured (well-suited for machine tillability). The primary existing use of this land type is sugar cane cultivation and grazing.

b. Potential Impacts and Proposed Mitigation Measures

The topographic character of the site will not be altered, nor would soil composition be changed considerably. Site work at Lahaina WWPS No. 1 will be performed within areas already graded for pump station use. Further, the grade along the force main alignment will be maintained.

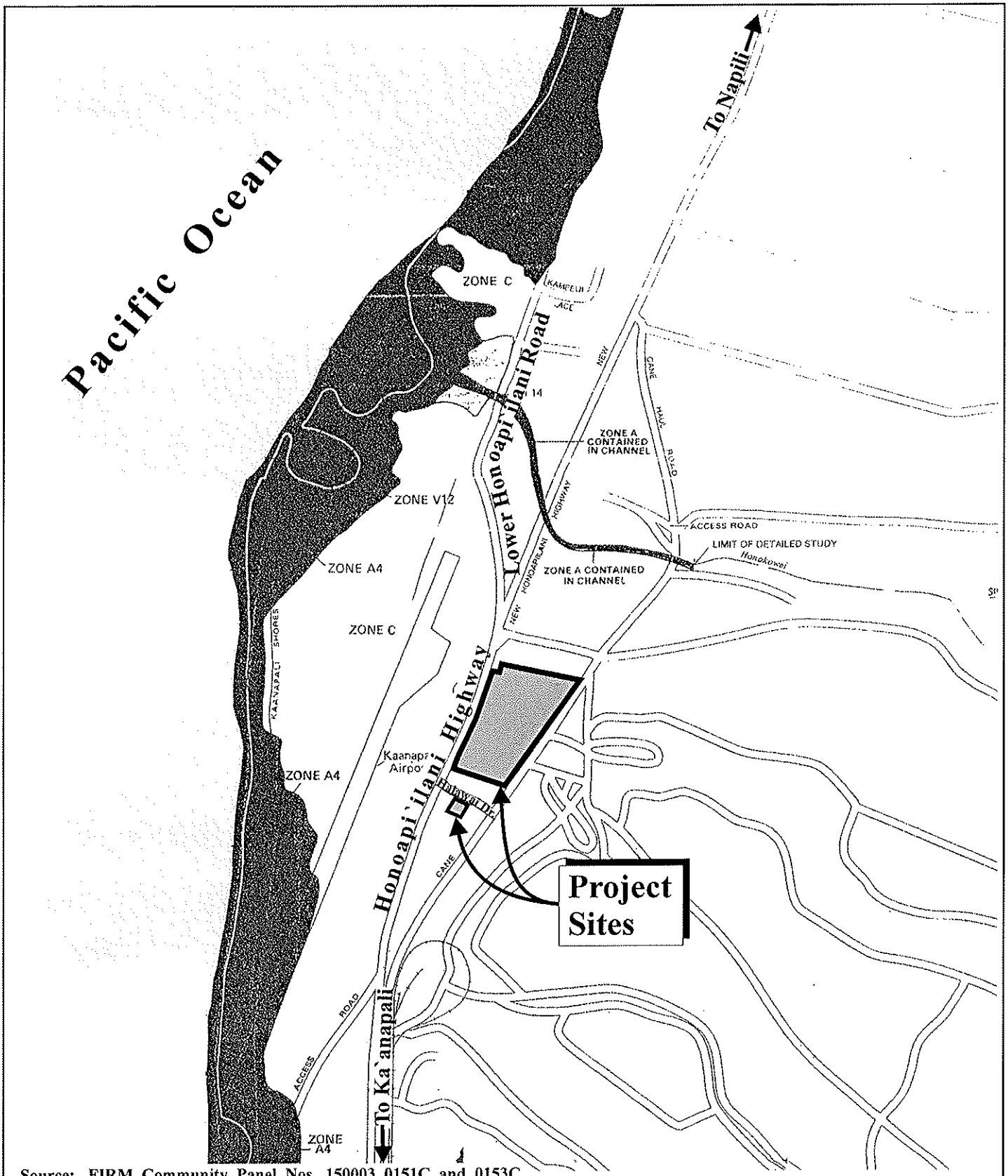
Although the project site is located on lands classified as "Prime" agricultural lands, the two (2) subject parcels have already been designated and developed for public service use. The small portion of private lands that will be utilized to locate the subsurface force main is contained within the existing cane haul road alignment. Therefore, the proposed project is not anticipated to adversely affect the topography and soils of the area. Additionally, the proposed action will not adversely affect agricultural productivity parameters for the island.

4. Flood and Tsunami Hazards

a. Existing Conditions

As indicated by the Flood Insurance Rate Map (FIRM) for the area, the subject properties are located in Zone C, which denotes an area of minimal flooding and low flood risk. See **Figure 9**. Specifically, the Federal Emergency Management Agency (FEMA) describes areas in Flood Zone C as follows.

> Areas outside the 1-percent annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance



Source: FIRM Community Panel Nos. 150003 0151C and 0153C

Figure 9 Lahaina Wastewater Pump Station No. 1 Modifications

NOT TO SCALE

Flood Insurance Rate Map

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Dept. of Environmental Management

HPE/LahWWPS1/FIRM

flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.

In addition, the project sites are situated in locations which are outside of the tsunami inundation area.

b. Potential Impacts and Proposed Mitigation Measures

There are no restrictions on development in Flood Zone C. Moreover, because the project is located outside of the tsunami inundation area, there are no threats to the surrounding areas from coastal wave action. No adverse impact to flood conditions is anticipated as a result of this project.

5. Flora and Fauna

a. Existing Conditions

The project sites are currently used in the provision of wastewater distribution and treatment. Low-lying weeds and grasses may be found in the unpaved areas of the project sites, as well as kiawe and koa haole. There are no known rare, endangered, or threatened species of plant life in the vicinity of the proposed project.

Fauna typically found in the vicinity of the project sites include mongoose, mice, and rats. Animals such as feral dogs and cats can also be generally found in the area, due to the site's proximity to agricultural and residential lands. All species of fauna, which may be found at or near the project sites, are considered common. There are no known rare, endangered, or threatened species of animal life in the vicinity of the proposed project.

b. Potential Impacts and Proposed Mitigation Measures

Given that the flora and fauna at the project sites are generally limited to non-native, abundant species, the proposed project is not anticipated to have a negative impact on the biological resources in the region. It is noted that the Lahaina WWPS No.1 and the Lahaina WWRF both contain perimeter fencing for security. Thus, both sites are controlled with respect to animal and habitat intrusion.

6. Streams, Wetlands, and Reservoirs

a. Existing Conditions

According to the United States Department of the Interior, Fish and Wildlife Service, National Wetland Inventory Map, there are three (3) wetland features in the general vicinity of the project sites. The Honokowai Stream is located approximately 1,000 feet north of the project sites. In addition, both the Honokowai Reservoir and the Pu`ukoli`i Reservoir are located approximately one (1) mile northeast and southeast, respectively, from the project sites. Outside of these three (3) wetland features, there are no wetlands in the vicinity of the project sites.

b. Potential Impacts and Proposed Mitigation Measures

The project sites are situated outside of the flood area attributable to the three (3) wetland features. Moreover, in light of the limited scope of the project and its distance away from the noted wetland features, the proposed project is not anticipated to have any impact on streams or reservoirs in the region.

7. Air and Noise Quality

a. Existing Conditions

Airborne pollutants that do exist can largely be attributed to vehicular exhaust from Honoapi`ilani Highway and adjoining roadways. The prevailing trade winds disperse particulates generated by this source. Another airborne particulate source is the fallow sugar cane land mauka of the project sites, which causes dust to reach the project sites. However, fugitive dust from fallow agricultural lands are not considered problematic in terms of air quality conditions at the site.

Wastewater odors from the Lahaina WWPS No. 1 have not been a major problem in the past despite various light industrial and commercial businesses occupying the adjacent parcels. A chemical scrubber-type odor control system is currently used at Lahaina WWPS No. 1 to minimize nuisance odors that may otherwise emanate from the pump station wetwell and manholes. The system performs adequately but is proposed to be replaced as the system is nearing the end of its useful life. Wastewater odors

in the area that may be noticeable during periods of little or no wind are likely primarily due to odors generated by the nearby Lahaina Wastewater Reclamation Facility, or less than optimal performance from the pump station odor control system due to equipment malfunctions or need for chemical dosage adjustments.

Existing noise at the project vicinity is primarily attributed to vehicular traffic. Limited truck traffic currently utilizes the existing unimproved agricultural road which provides access to the fields. There are no adverse aircraft related noise conditions (related to the Kapalua-West Maui Airport) which impinge upon the project sites. Noise from the existing emergency generator and odor control equipment has not been a source of noise complaints.

b. Potential Impacts and Proposed Mitigation Measures

The proposed action is not expected to have a direct impact on air or noise quality. There may be a temporary impact on air and noise quality attributable to construction activities associated with the Lahaina WWPS No. 1 improvements and the force main installation. These would, however, be limited, given the small size and scope of improvements. Best Management Practices (BMPs), such as dust control measures, including regular watering and sprinkling, will be implemented to mitigate impacts associated with construction activities.

A new state-of-the-art two stage odor control system consisting of a biological odor scrubber and activated carbon polishing unit is proposed to be installed at the Lahaina WWPS No. 1. The new system is expected to be reliable and have equal or better odor removal capabilities compared to the existing odor control system.

The new emergency generator building will be provided with extensive noise attenuation features to comply with applicable maximum community noise level limits at the property line. The emergency generator will be operated only during power outages and periodic routine equipment testing similar to existing practice. The manufacturer of the new odor control system will be required to meet maximum sound level limits to ensure that applicable noise level limits at the property line are not exceeded.

8. Archaeological Resources

a. Existing Conditions

An archaeological inventory survey was completed for the project sites by Scientific Consultant Services, Inc. (SCS) in December 2007. See **Appendix "A"**. The archaeological inventory survey comprised of a combination of archival research, field work, and laboratory analysis. The survey was conducted along the proposed force main alignment between the Lahaina WWTF and Lahaina WWPS No. 1. However, due to the previously disturbed, confined space within Lahaina WWPS No. 1 and the existing pavement along Halawai Drive, those specific areas were not excavated.

SCS researched previous archaeological studies in the vicinity of the project site to determine if the subject property had previously undergone an archaeological survey. Based on the archival research they performed, SCS determined that the project site had likely not previously undergone an archaeological inventory survey. Previous archaeological surveys did reveal, however, that sites likely to be encountered in the project area may include early historic house foundations, other stone alignments, and historic artifacts.

The field work involved the execution of a systematic pedestrian survey of the entire project area to identify and document any historic and/or traditional archaeological surface features and to assess the nature and extent of landscape modification. In addition to the pedestrian survey, ten (10) stratigraphic trenches were mechanically excavated to basal strata (base layer) throughout the project area to screen for any artifacts or cultural deposits. No artifacts or cultural deposits were encountered during the subsurface investigation.

Laboratory analysis entailed digital drafting of plan view maps and stratigraphic profiles for publishing and archival storage. Since no cultural material was found, radio carbon dating for this project was not necessary. A thorough soil analysis was performed and photographs of individual stratigraphic trench profiles were included in the archaeological inventory survey.

b. Potential Impacts and Proposed Mitigation Measures

As previously mentioned, there were two (2) areas, namely along Halawai Drive and within Lahaina WWPS No. 1, which were not excavated. Although no historic or cultural deposits are anticipated in these two (2) areas, based on cultural material found during other archaeological inventory surveys in the vicinity, the archaeological consultant recommends archaeological monitoring be performed as construction excavation takes place in these two (2) areas.

In general, the applicant will employ appropriate management and coordination practices during construction activities to ensure that impacts to potential archaeological and historic properties are mitigated. Based on the foregoing, the proposed project is not anticipated to generate adverse impacts on the historic or archaeological resources of the region.

Lastly, in accordance with Section 6E-43.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR) and the Office of Hawaiian Affairs (OHA) will be contacted.

9. Cultural Resources

a. Existing Conditions

The West Maui area is one which transitioned from a historically agrarian economy to the whaling industry to sugar cane plantations to tourism in the present day. The majority of the farming was situated on the lower portions of the stream valleys where there were broader alluvial flat lands or on bends in the streams where alluvial terraces could be modified to take advantage of stream flow. Although remaining farming in the West Maui area has been in decline over the last decade, the plantation nature of West Maui's past is still pervasive today.

The Honokowai region of West Maui in particular contains a culturally significant area in Pu`u Keka`a, which contains the area presently known as

"Black Rock" and is located approximately 1.0 mile south of the project site. According to legend, the lands surrounding Pu`u Keka`a were once areas of intense cultivation and the home of the Maui chief, Kaka`alaneo, when he ruled West Maui.

Pu`u Keka`a was also made famous by being the birthplace of the sons of chiefs and was long associated with ghosts, strange occurrences, and the skeletons of defeated invaders (Fornander, 1918-19). There have been numerous skeletal remains found in the vicinity of Pu`u Keka`a, largely attributed to the occurrences of several bloody battles in the area. It was also believed that Pu`u Keka`a was a leina a ka`uhane, or soul's leap, similar to O`ahu's Ka`ena Point.

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

A Cultural Impact Assessment was prepared by Scientific Consultant Services, Inc. in October 2007, to evaluate the probability of impacts on identified cultural resources including values, beliefs, objects, records, properties, and stories occurring within the project area. See **Appendix "B"**.

The archival historic and cultural source research performed did not reveal any cultural practices existent either in the past or presently onsite and did not indicate adverse cultural impacts arising from the proposed action. The project sites have been designated and used for public wastewater collection, transmission, and treatment for years and the new force main alignment largely follows the existing cane haul roadway.

Additionally, the cultural consultant sought consultation via letter request from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O`ahu; the Maui Planning Department Cultural Resources Commission; Na Kupuna O Maui; the Hawaiian Civic Club, Lahaina; the National Hawaiian Preservation Council; and the State Historic Preservation Division Cultural Historian. Based on the non-response by these sources, it is reasonable to conclude that the exercise of Native Hawaiian rights, or any ethnic group relating to cultural practices, will not be affected by the proposed action at the project sites.

In general, the applicant will employ appropriate management and coordination practices to ensure that impacts to cultural values and customs are appropriately mitigated. Based on the foregoing, the proposed project is not anticipated to generate significant negative impacts on the cultural resources of the region.

10. Scenic and Open Space Resources

a. Existing Conditions

The project sites are located mauka of Honoapi`ilani Highway with the West Maui Mountains visible to the east and the islands of Moloka`i and Lana`i visible to the west. The project sites are not located within a scenic view corridor.

b. Potential Impacts and Proposed Mitigation Measures

The proposed Lahaina WWPS No. 1 modifications will be visually consistent with the rest of the equipment existing at the site. The new force main will be installed as a subsurface utility element, such that scenic and open space resources will not be impacted. The proposed project is not anticipated to adversely affect scenic and open space resources in the area.

B. SOCIO-ECONOMIC SETTING

1. Land Use and Community Character

a. Existing Conditions

The vast majority of lands in West Maui are either State designated "Conservation" or "Agricultural". Generally, "Conservation" lands occupy the higher elevations, while the "Agricultural" district spans the middle ground. Major exceptions to this trend are the Honolua Stream and Pohakupule Gulch areas, where the "Conservation" district extends down to sea level.

"Urban" designated lands, then, are left to occupy the lower elevations along the coast. Kapalua and Ka`anapali contain Community Plan designations

reflective of their resort nature. The communities of Kahana and Napili contain a mixture of resort, residential, and business uses.

Lahaina, meanwhile, encompasses a diverse mix of land uses, including residential, business, light and heavy industrial, recreational, and agricultural uses. The town of Lahaina is the commercial center of West Maui. The town contains several shopping centers and retail business areas, and serves as a hub for the region's residential housing. To the east (mauka) of the Pioneer Mill smokestack in Lahaina, there exists a multitude of single-family homes for island residents.

West Maui's attraction can be attributed to its year-round dry and warm climate, complemented by its many white-sand beaches and scenic landscapes. Visitor accommodations are located in Lahaina and the resort communities of Ka`anapali, Kahana, Napili, and Kapalua. The State of Hawai`i's Kapalua-West Maui Airport at Mahinahina links the region to O`ahu and other neighbor islands.

Diversified agriculture and pineapple fields occupy much of the land in the West Maui region. Maui Land & Pineapple Company's fields span along the slopes of the West Maui Mountains north of Lahaina.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is located within and between existing County of Maui wastewater facilities and is, therefore, not anticipated to significantly impact neighboring land uses or the character of the community.

2. Population and Demography

a. Existing Conditions

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

The subject property is located near the western coast of Maui, within the West Maui Community Plan region. Just as the County's population has grown, the resident population of the West Maui region has also increased. The estimated population of Lahaina in 2000 was 17,967 (SMS, June 2006), which comprised 15.3 percent of the island's population. The projection of the resident population for this region in 2010 is estimated to be 21,577 (SMS, June 2006). The overall West Maui population in 2000 differed from the County in terms of age and ethnic distribution as reflected in **Table 1**. West Maui has a larger percentage of its population in the eligible labor force than the County as a whole.

As noted in the preceding table, 66 percent (66%) of West Maui's population is in the labor force age bracket of 20 to 64 years, while Countywide, 61 percent (61%) of the population is in this age category. West Maui has a slightly higher median age of 39.3 years, when compared to the Countywide median of 36.8 years.

Table 1. Age and Ethnicity

AGE AND ETHNICITY		
	Maui County	**West Maui**
Population	128,094	17,748
Age		
Under 5	7 percent	7 percent
5 to 19	21 percent	17 percent
20 to 44	37 percent	42 percent
45 to 64	24 percent	24 percent
65 and older	11 percent	10 percent
Median Age	36.8 years	39.3 years
Ethnicity		
Caucasian	34 percent	55 percent
Japanese	10 percent	5 percent
Hawai`ian	9 percent	6 percent
Filipino	17 percent	13 percent
All Others	30 percent	21 percent
Source: U.S. Census Bureau, 2000.		

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not a direct population generator and, as such, is not anticipated to impact population or demography of the region.

3. Labor Force

a. Existing Conditions

As of September 2007, the unemployment rate for Maui County and the island of Maui both stood at 3.5 percent (State Department of Labor and Industrial Relations, October 2007).

In terms of the profile of employed persons, West Maui generally follows the Countywide trends for the labor force characteristics shown in **Table 2.**

Table 2. Labor Force Characteristics

Occupational Category	Maui County	West Maui
Agriculture	3 percent	2 percent
Manufacturing	2 percent	<1 percent
Construction	4 percent	2 percent
Transportation, Communication, and Utility	4 percent	2 percent
Trade	20 percent	22 percent
Banking & Finance	4 percent	4 percent
Service	31 percent	40 percent
Government	10 percent	4 percent
Self-employed	23 percent	23 percent
Source: SMS, June 2006		

However, more West Maui workers were employed in the service industry (40 percent) than the Countywide profile (31 percent). Because of the West Maui's emphasis on service jobs, most other job sectors exhibited slightly lower distribution rates.

b. Potential Impacts and Proposed Mitigation Measures

On a short-term basis, the project will support construction and construction-related employment. No significant negative impacts on labor conditions are anticipated.

4. Economy

a. Existing Conditions

The economy of Maui is heavily dependent upon the visitor industry. The dependency on the visitor industry is especially evident in West Maui, one of the State's major resort destination areas. As such, a community of tourism service sector workers has developed in the area. This group includes former

sugar workers and their families, younger mobile workers, and immigrants from Mexico, Asia, and other Pacific Islands.

Pioneer Mill Company, Ltd. had in the past handled agriculture, another vital component of the West Maui economy. Until the cessation of sugar cane cultivation in September 1999, Pioneer Mill cultivated most of its approximately 6,700 acres of fee simple and leased lands. Ka`anapali Land Management Corp. (successor to Pioneer Mill Company, Ltd.) is in the process of diversifying its agricultural operations by utilizing portions of its lands to grow seed corn, with a portion of its land set aside for coffee production. In addition, Maui Land & Pineapple Company's fields are an important component of the region's agricultural base.

b. Potential Impacts and Proposed Mitigation Measures

In the short term, the project will have a beneficial impact on the local economy during the period of construction. The proposed project is viewed as an infrastructure system upgrade needed to accommodate existing and future demands. While primarily considered a public health and safety-related action, the proposed improvements will help to sustain the economic vitality of the West Maui region through provision of infrastructure system capacity.

C. PUBLIC SERVICES

1. Police and Fire Protection

a. Existing Conditions

The proposed project area is within the Lahaina Police Station service area, which includes the entire Lahaina district. The Lahaina Station, built in the early 1970s, is located in the Lahaina Civic Center complex at Wahikuli. The Lahaina Patrol includes 54 full-time personnel, including management-level officers and field police officers. Additional personnel consist of public safety aides and administrative support staff.

Fire prevention, suppression, and protection services for the Lahaina District are provided by personnel housed at the Lahaina Fire Station, also located in

the Lahaina Civic Center, and the Napili Fire station, located about four (4) miles to the north of the project area. The Lahaina Fire Station includes an engine and a ladder company and is staffed by approximately 30 full-time personnel. The Napili Fire Station consists of an engine company, including approximately 15 full-time fire-fighting personnel.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to require a need for additional police or fire protection.

2. Medical Facilities

a. Existing Conditions

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

Private medical offices, however, are found in West Maui. For example, regular hours are offered by the Maui Medical Group, Lahaina Physicians, West Maui Healthcare Center, and Kaiser Permanente Lahaina Clinic.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to affect the service capabilities of emergency medical or general care operations.

3. Recreational Facilities

a. Existing Conditions

West Maui has numerous recreational facilities offering diverse opportunities for the region's residents. These facilities include several County and State parks and beach parks. Approximately one-third of the County parks are situated along the shoreline and offer excellent swimming, diving, and snorkeling areas. In addition, Ka`anapali and Kapalua Resorts operate world-class golf courses available for public use.

Recreational facilities in Lahaina town include the Lahaina Aquatic Center, the West Maui Youth Center, and the Lahaina Recreation Center. The Lahaina Aquatic Center contains an Olympic-size swimming pool, a children's wading pool, a paved parking lot, and office and storage space, as well as shower, restroom, and changing room facilities. The 15-acre Waine`e Park expansion includes new fields, parking, and washroom facilities. The West Maui Youth Center has a building for youth activities, as well as paved parking, an outdoor playground, and a basketball court. The Lahaina Recreation Center has baseball fields and other playfields for soccer and football, as well as restrooms and paved parking facilities.

The clear ocean waters and well-developed reef systems along the Lahaina coast offer many recreational opportunities for residents. Fishing, by shorecasting and netting, is practiced in the waters near the outlet of Kauaula Stream and Makila Point. Edible seaweed collecting, octopus fishing, and spearfishing occur on the adjacent reef flat.

An inventory of Maui's coral reefs, published by the Army Corps of Engineers, documents excellent visibility in deeper waters off Makila Point, with extensive coral cover. This water quality characteristic is important to the commercial diving charter and glass-bottom boats operating out of Lahaina Harbor.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to impact recreational facilities in the region.

4. Educational Facilities

a. Existing Conditions

The West Maui region is served by four (4) public schools (Lahainaluna High School, Lahaina Intermediate School, Princess Nahi`ena`ena Elementary School, and Kamehameha III Elementary School) operated by the State of Hawai`i, Department of Education (DOE) and two (2) smaller private schools (Sacred Hearts School and Maui Preparatory Academy). All four (4) of the public schools are located within Lahaina town and three (3) of those schools

are located along Lahainaluna Road, mauka of Honoapi`ilani Highway. The enrollments in the four (4) schools have grown significantly in concert with the growth of residential development in the area. See **Table 3**.

Maui Community College (MCC), which is located in Kahului, is a branch of the University of Hawai`i system. In addition, there is an MCC-Lahaina Education Center that opened in Fall 2007. MCC is the primary higher education institution serving Maui.

Table 3. Actual and Projected Enrollments at Department of Education Schools

	Capacity	Actual Enrollment		Projected Enrollment					
School	SY 05-06	SY 04-05	SY 05-06	SY 06-07	SY 07-08	SY 08-09	SY 09-10	SY 10-11	SY 11-12
Lahainaluna High School	969	1,038	1,033	1,000	907	810	765	762	796
Lahaina Intermediate	571	637	578	596	565	581	545	500	490
Kamehameha III Elementary	646	702	744	766	817	869	958	1,033	1,077
Princess Nahi`ena`ena Elementary	612	664	598	630	620	617	636	651	653

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not a direct population generator and, as such, is not anticipated to impact educational facilities in the region.

D. INFRASTRUCTURE

1. Roadways

a. Existing Conditions

Access to the Lahaina region is provided by Honoapi`ilani Highway from Central (Wailuku/Kahului) and South (Kihei/Wailea) Maui. The following is a summary of the major roadways in the vicinity of the project sites.

Honoapi`ilani Highway

This principal arterial roadway provides north-south regional mobility and access to communities in the region. For most of its length, Honoapi`ilani Highway is a two-lane, two-way arterial roadway with median left-turn lanes provided at major intersections. From Lahaina town (at Lahainaluna Road) to the Honokowai Stream bridge (at the Lahaina WWTP), Honoapi`ilani Highway functions as a four-lane arterial roadway.

Lower Honoapi`ilani Road

This roadway follows the West Maui coastline in a north-south direction, generally parallel to and west of Honoapi`ilani Highway. This two-way, two-lane, County collector road primarily serves hotels/resorts, commercial areas, and residential communities of Honokowai, Kahana, Napili, and Kapalua.

Halawai Drive

This two-way, two-lane, County roadway serves several car rental agencies, Lahaina WWPS No. 1 and a commercial/industrial warehouse facility on the east side of Honoapi`ilani Highway. Access to portions of the North Beach resort area is provided on the west side of Honoapi`ilani Highway at its intersection with Halawai Drive.

Pu`ukoli`i Road

This two-way, two-lane County roadway extends east from Honoapi`ilani Highway and serves several condominium and residential subdivisions.

b. Potential Impacts and Proposed Mitigation Measures

The State is currently in the process of developing a major roadway which will significantly alleviate the congestion along Honoapi`ilani Highway that exists today. The State's Lahaina Bypass will be developed in phases and will eventually span from Launiupoko in the south to Honokowai in the north. The first phase of the bypass highway will connect Ikena Street with Keawe Street. Future phases of the bypass highway will roughly parallel Honoapi`ilani Highway to the east.

The proposed project entails work at existing wastewater facilities. In the short term, there will be an increase in the number of vehicle trips to the project sites during the construction phase, though the increase in vehicle trips on Honoapi`ilani Highway will be minimal. Maintenance activities related to the pump station modifications or force main installation are not anticipated to increase as a result of the project. Therefore, traffic in the region is not anticipated to be impacted by the implementation of the project.

2. Water

a. Existing Conditions

The West Maui region is served by the County's Department of Water Supply domestic water system. The County water system services the coastal areas from Launiupoko to Ka`anapali and from Honokowai to Napili. The County's system includes both surface and groundwater sources.

The sources of water for Lahaina are four (4) deepwells located above Alaeloa and referred to as Napili Wells 1, 2, and 3, and Honokohau Well A. These wells are supplemented by water treatment plants above Honokowai and Lahainaluna High School that draw surface water from the Honolua Ditch and Kanaha Valley. Several miles of 12- and 16-inch lines and two (2) in-line booster stations convey water from these sources to consumers in Lahaina. Storage is provided by a 1.5 million gallon (MG) storage tank above Wahikuli and a 1.0 MG tank on Lahainaluna Road.

b. Potential Impacts and Proposed Mitigation Measures

A Preliminary Engineering Report was prepared by HDR/Hawai`i Pacific Engineers, Inc. in August 2007, excerpt of which is included in **Appendix "C".** The proposed project is not anticipated to require substantial potable water usage over that which is currently being used at the project sites. As mentioned, the proposed project is being pursued to improve the existing wastewater transmission facilities for the West Maui area. Therefore, no significant impact on the domestic water supply is anticipated as a result of the proposed action.

3. Wastewater Systems

a. Existing Conditions

The County Department of Environmental Management's Wastewater Reclamation Division provides sanitary sewer service for the West Maui region.

Wastewater from the Ka`anapali and Lahaina areas is treated at the County's Lahaina Wastewater Reclamation Facility (WWRF), which is part of the project site. The WWRF's total treatment capacity is 9.0 million gallons per day (mgd), with 6.0 mgd for secondary treatment and 3.0 mgd for R-1 treatment. Presently, the facility treats about 5.4 mgd of wastewater. About 1.2 mgd of the R-1 treated effluent is used to irrigate the Royal Ka`anapali golf courses, the landscaped areas along Honoapi`ilani Highway, and the landscaped median of Ka`anapali Parkway. The remaining treated effluent (4.2 mgd) is disposed into four (4) injection wells located within the facility. Under the conditions of its Environmental Protection Agency (EPA) permit, the County is allowed to dispose a maximum flow of 6.7 mgd into the injection wells.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is being sought to respond to the growing demand for wastewater collection, transmission, and treatment in the West Maui region. The proposed upgrades are intended to ensure that Lahaina WWPS No. 1 may accommodate wastewater for the projected future development in the service area. While the proposed project itself is not anticipated to generate significant negative impacts, it is intended to prevent potentially significant impacts in the future regarding wastewater capacity.

4. Solid Waste

a. Existing Conditions

Single-family residential refuse collection is provided in Lahaina by the County's Department of Environmental Management's Solid Waste Division. Private refuse collectors provide solid waste disposal services for multi-family, commercial, and institutional accounts. With the exception of the

Hana region, residential and commercial solid waste from throughout the island is transported to the Central Maui Landfill at Puunene.

A refuse transfer station at Olowalu accepts household and green wastes, as well as used oil, for transport to the Central Maui Landfill in Puunene. The disposal of commercial and institutional refuse is not permitted at the Olowalu transfer station.

b. Potential Impacts and Proposed Mitigation Measures

Construction-related waste will be disposed of in accordance with policy and practice directives established by the applicant's Solid Waste Division to ensure that there are no adverse impacts to the County's Central Maui Landfill. In the long term, the proposed project is not anticipated to generate solid waste and, as such, is not anticipated to impact solid waste facilities in the region.

5. Drainage

a. Existing Conditions

The project sites gently slope in a westerly direction and vary in elevation from approximately 20 feet above mean sea level (amsl) at its western extent to approximately 30 feet amsl along its northeastern extent.

The project sites are situated within the limits of the 2,140-acre Lahaina subwatershed, one of two (2) subwatersheds that comprise the 4,920-acre Lahaina Watershed. The other subwatershed is the 2,780-acre Kauaula Watershed.

The Lahaina subwatershed rises from the Pacific Ocean to an elevation of 2,561 feet amsl. The coastal area of the subwatershed is relatively flat and has been developed for residential and commercial uses. The area above the developed flatland to about the 1,400-foot elevation is gently sloping and was formerly utilized for growing sugar cane. The remaining upper area of the Lahaina subwatershed is steep and was previously utilized for sugar cane cultivation or pasturing.

b. Potential Impacts and Proposed Mitigation Measures

It is anticipated that post-development drainage flows will increase as a result of the proposed project due to the addition of impermeable surfaces. The construction of the new submersible pump station, the expanded electrical/emergency generator building, and the new asphalt concrete pavement will be the primary generators of the increased drainage flows.

Nonetheless, the increase in onsite runoff will be accommodated through the construction of gravel filled trench drains at Lahaina WWPS No. 1. As a result, the proposed project is not anticipated to significantly impact drainage conditions in the area.

6. Electrical, Telephone, and CATV Service

a. Existing Conditions

Electrical, telephone, and cable television (CATV) services for the West Maui region are provided by Maui Electric Company, Ltd., Hawaiian Telcom, and Oceanic Time Warner Cable Company, respectively.

b. Potential Impacts and Proposed Mitigation Measures

Electrical service is already provided at the project sites by Maui Electric Company. The electrical consultant will discuss the electrical transformer upgrade and relocation requirements associated with the proposed improvements with Maui Electric staff prior to the start of construction and determine the specific improvements that will be required. Maui Electric did not note any significant concerns regarding electrical service in early consultation with them. As a result, the proposed project is not anticipated to significantly impact electrical service in the area.

E. CUMULATIVE AND SECONDARY IMPACTS

The proposed project is not an integral part of a larger growth action; however, the County of Maui's ongoing General Plan update process will involve the formulation of a Maui Island Plan which would delineate future urban and rural growth boundaries. As such, landowners in the region may seek to have portions of their respective land holdings placed on the Maui Island Plan map for purposes of defining future development potential in the West Maui area.

Should currently undeveloped lands be identified as potential future areas for urban and/or rural growth, planning for such areas would need to consider infrastructure upgrade opportunities. For example, wastewater system capacity may limit the potential build-out of these lands. Upon completion of the General Plan update, the respective community plans, including the West Maui Community Plan, will be updated. The timeframe for updating of the community plans has not yet been scheduled. However, the overall timeframe of the General Plan covers a planning horizon up to the year 2030.

The County of Maui acknowledges that future regional growth opportunities in West Maui are probable. The proposed project is intended to satisfy the current and future demands placed on the wastewater infrastructure system.

Similar to cumulative impacts, secondary impacts are those which have the potential to occur later in time, 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 wastewater projects, for example, can occur because they can induce development by removing one of the impediments to growth – available wastewater capacity.

Aside from the direct development impacts discussed in the previous sections of this chapter, secondary impacts may be attributed to the project's effects on the region's overall development potential. That is, the provision of increased wastewater system capacity may affect development rate and patterns. However, particularly in the West Maui region, other infrastructure constraints, such as roadway congestion and water availability, will likely dictate growth parameters. Therefore, in general, the proposed pump station modifications and force main installation by themselves are not considered generators of significant secondary impacts.

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

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

A. STATE LAND USE DISTRICTS

Chapter 205, Hawai`i Revised Statutes, relating to the Land Use Commission, establishes four (4) major land use districts in which all lands in the state are placed. These districts are designated as "Urban", "Rural", "Agricultural", and "Conservation". The subject property is located within the "Urban" district. See **Figure 10**. The proposed Lahaina WWPS No. 1 modifications and force main installation are permitted uses within the "Urban" designation.

B. HAWAI`I STATE PLAN

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

1. **Section 226-14, Objective and policies for facility systems – in general. To achieve this objective, it shall be State policy to:**

    a. Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities 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.

2. **Section 226-15, Objective and policies for facility systems – solid and liquid wastes. To achieve this objective, it shall be State policy to:**

    a. Encourage the adequate development of sewerage facilities that complement planned growth.

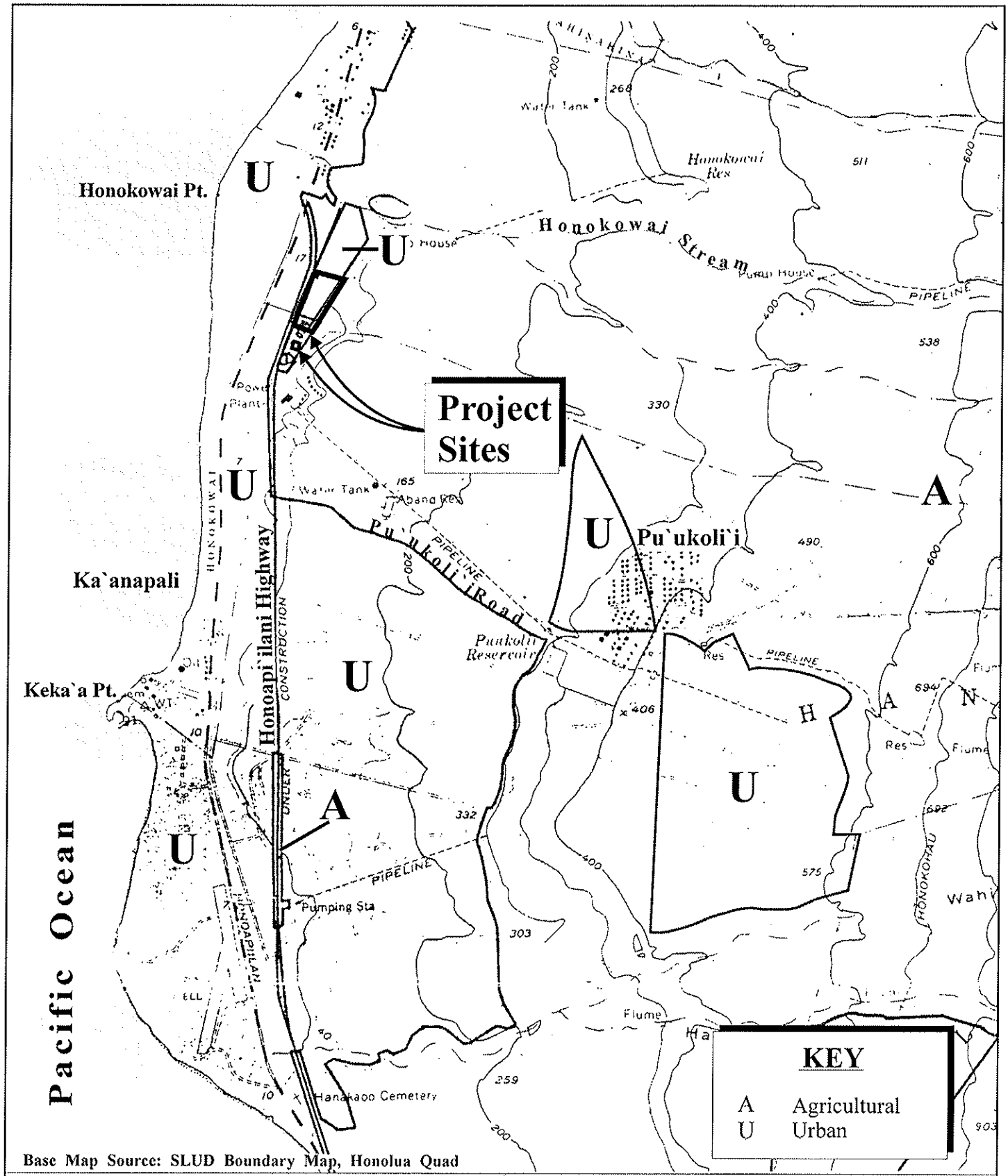


Figure 10 Lahaina Wastewater Pump Station No. 1 Modifications

State Land Use District Classifications

0 500 1000 2000 Feet

Prepared for: County of Maui, Dept. of Environmental Management

MUNEKIYO & HIRAGA, INC.

HPD/LahWWPS1/SLUD

b. Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.

c. Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.

3. **Section 226-27, Objective and policies for socio-cultural advancement – government. To achieve this objective, it shall be State policy to:**

a. Provide for necessary public goods and services not assumed by the private sector.

b. Minimize the size of government to that necessary to be effective.

c. Assure that government attitudes, actions, and services are sensitive to community needs and concerns.

The objective of the proposed project is to provide government services which respond to the public's concerns regarding wastewater capacity in the region. The proposed project will ensure that there is sufficient wastewater capacity to manage existing demands and to complement planned growth in the area. This facility improvement is an integral component to the West Maui capital improvement program in the provision of efficient government services and will be developed in accordance with applicable health and safety standards. Consequently, the proposed project is consistent with the goals, objectives, policies, and priorities of the Hawai`i State Plan.

C. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the Maui County Charter, the General Plan shall:

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

water and sewage systems, visitor destinations, urban design and other matters related to development."

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

Theme Number 2

Prepare a Directed and Managed Growth Plan

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

The proposed action is in keeping with the following General Plan objectives relating to Population, Environment, Economic Activity (General), Housing, Liquid and Solid Waste, and Government.

POPULATION

Objective

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

Policies

- Manage population growth so that the County's economic growth will be stable and the development of public and private infrastructures will not expand beyond growth limits specified in the appropriate community plans or negatively impact our natural resources.

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

ENVIRONMENT

Objective

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

Policy

- Support programs to reduce air, land, and water pollution.

ECONOMIC ACTIVITY (General)

Objectives

- To provide an economic climate which will encourage controlled expansion and diversification of the County's economic base.

- Utilize an equitable growth management program which will guide the economic well-being of the community.

Policies

- Support programs, services, and institutions which provide economic diversification.

- Encourage a sustainable rate of economic development which is linked to the carrying capacity of the infrastructure systems and the fiscal ability of the County to maintain those systems.

HOUSING

Objectives

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

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

Policy

- Provide or require adequate physical infrastructure to meet the demands of present and planned future affordable housing needs.

LIQUID AND SOLID WASTE

Objective

- To provide efficient, safe, and environmentally sound systems for the disposal and reuse of liquid and solid waste.

Policy

- Establish programs for the development of waste disposal systems which anticipate planned growth.

GOVERNMENT

Objective

- Improve the delivery of services by government agencies to all community plan areas.

Policies

- Support programs that will increase the overall effectiveness of government so as to provide greater responsiveness to the needs of our people.

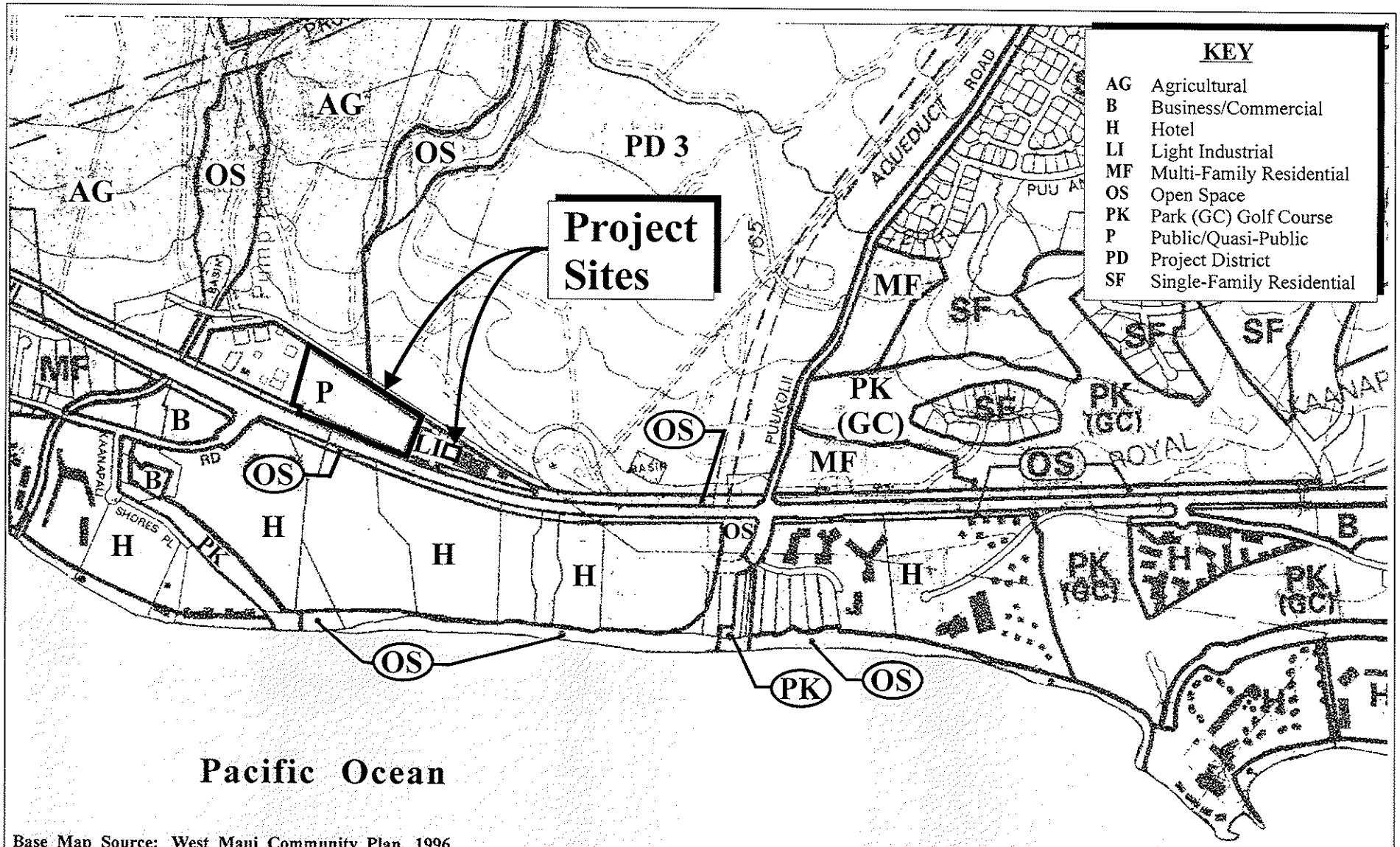
- Insure that necessary services not provided by the private sector are made available by government.

The proposed project will improve the delivery of wastewater services to the West Maui region and will ensure that there is adequate wastewater capacity to accommodate planned growth in accordance with the West Maui Community Plan. In the provision of upgrading the County of Maui's wastewater distribution and facility systems, potential impacts to the County's unique environmental resources (i.e. spillage, etc.) will be minimized. The proposed project is in accordance with the objectives and policies of the Maui County General Plan.

D. WEST MAUI COMMUNITY PLAN

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

The project sites are located within the West Maui Community Plan region and are currently designated "Public/Quasi-Public" and "Light-Industrial" in the community plan. See **Figure 11**. The proposed project is in keeping with, among others, the following goals, objectives, and policies of the West Maui Community Plan.



Base Map Source: West Maui Community Plan, 1996

Figure 11

Lahaina Wastewater Pump Station No. 1 Modifications

West Maui Community Plan Land Use Designations

NOT TO SCALE

Prepared for: County of Maui, Dept. of Environmental Management

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HPE/LahWWPS1/cplud

LAND USE

Goal

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

Objectives and Policies

- Preserve and enhance the mountain and coastal scenic vistas and the open space areas of the region.

- Establish an appropriate supply of urban land within the region to meet the needs of the community over the next 20 years. The Community Plan and its map shall define the urban growth limits for the region and all zoning requests and/or proposed land uses and developments shall be consistent with the West Maui Community Plan and its land use map.

HOUSING

Goal

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

Objectives and Policies

- Accommodate the 20-year housing needs of the planning region.

- Plan, design, and construct off-site public infrastructure improvements (i.e., water, roads, sewer, drainage, police and fire protection, and solid waste) in anticipation of residential developments defined in the Community Plan and consistent with the directed and managed growth plan required by the County General Plan.

INFRASTRUCTURE

Goal

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

Objectives and Policies (Liquid and Solid Waste)

- Improve sewage treatment services for Lahaina and provide services to residential expansion areas in the following manner:

  a. Improve facilities, operations, and processing at the existing plant to reduce odors and leakage.

  b. Recycle wastewater.

  c. Provide landscaped buffer areas around the periphery of the existing plant.

  d. Extend sewage treatment service to populated areas not currently serviced.

GOVERNMENT

Goal

Government that demonstrates the highest standards of fairness, responsiveness to the needs of the community, fiscal integrity, effectiveness in planning, and implementing programs and projects to accommodate a stable social and economic well-being for residents, a fair and equitable approach to taxation, and efficient and results-oriented management.

Objectives and Policies

- Coordinate and direct future public and private development, including capital improvement projects, consistent with the Community Plan and the island-wide directed and managed growth plan required by the General Plan.

- Insure that adequate infrastructure is or will be available to accommodate planned development.

- Improve the availability of government services to the community.

As noted, the proposed project is in conformance with various goals, objectives, and policies of the West Maui Community Plan. The project will be undertaken to satisfy the current and future demands of wastewater infrastructure in the West Maui region. Moreover, the proposed modifications to Lahaina WWPS No. 1 and the proposed force main installation are consistent with the underlying "Public/Quasi-Public" and "Light-Industrial" community plan designations.

E. COUNTY ZONING

The lands underlying the project sites are zoned "P-1, Public/Quasi-Public" and "M-1, Light-Industrial" in the Maui County zoning maps. See **Figure 12**. According to Maui County Code Section 19.31, government buildings and facilities are allowed uses within the "Public/Quasi-Public" zoning district. Similarly, according to Maui County Code Section 19.08, buildings or premises used by the Federal, State, or County governments for public purposes are permitted uses within the "Light-Industrial" zoning district. Therefore, the proposed project is in conformance with the underlying Maui County zoning designations.

F. COASTAL ZONE MANAGEMENT/SPECIAL MANAGEMENT AREA

The Hawai`i Coastal Zone Management Program (HCZMP), as formalized in Chapter 205A, HRS, establishes objectives and policies for the preservation, protection, and restoration of natural resources of Hawai`i's coastal zone. Although the proposed project is not within the County of Maui's Special Management Area, consideration of County coastal zone objectives and policies will be carried out. See **Figure 13**.

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

1. Recreational Resources

Objective

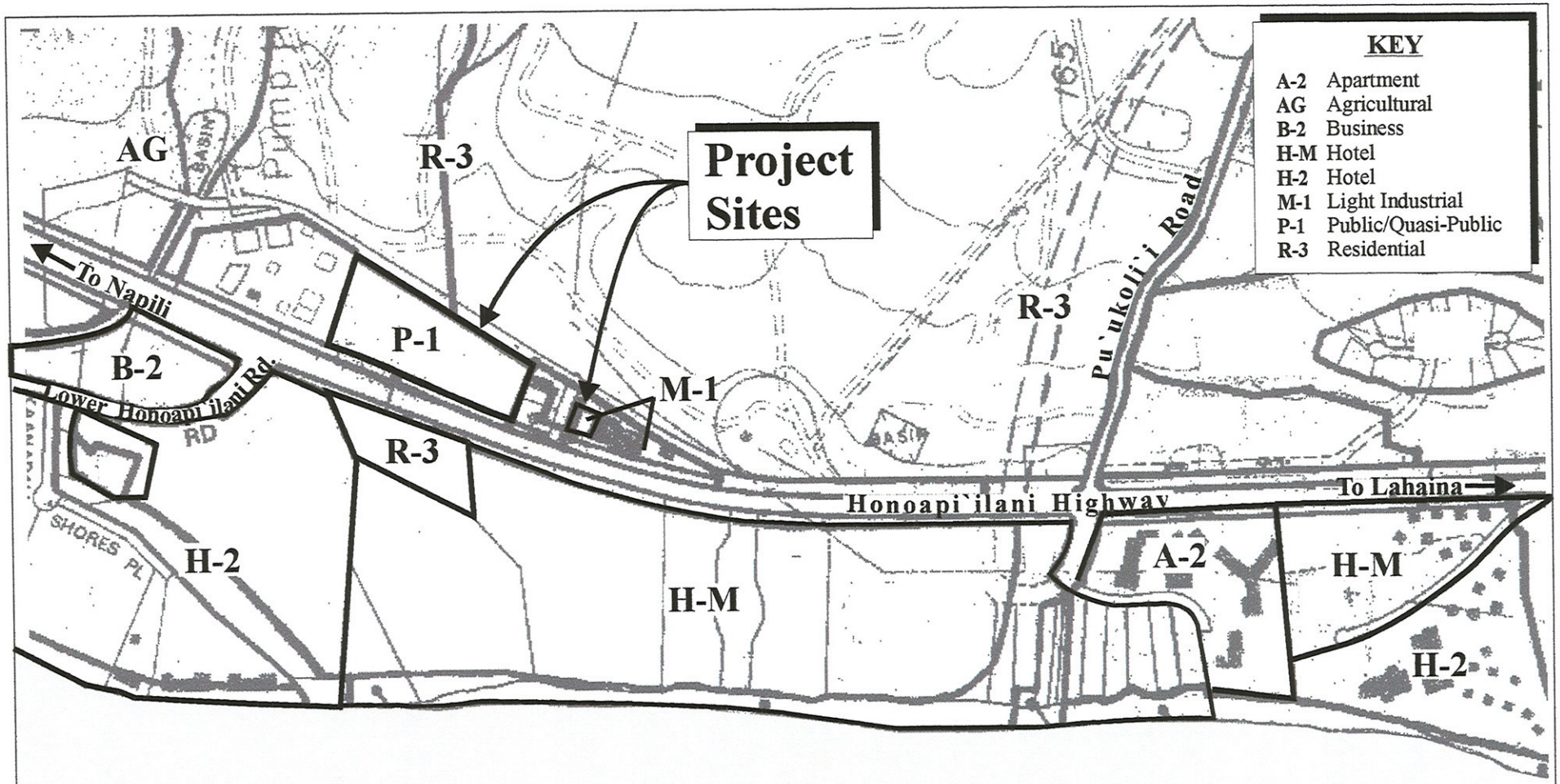
Provide coastal recreational opportunities accessible to the public.

Policies

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

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

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



Source: County of Maui, Department of Planning, 2007

Figure 12

Lahaina Wastewater Pump Station No. 1 Modifications

Maui County Zoning Designations

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Dept. of Environmental Management

HPE/LahWWPS1/zoning

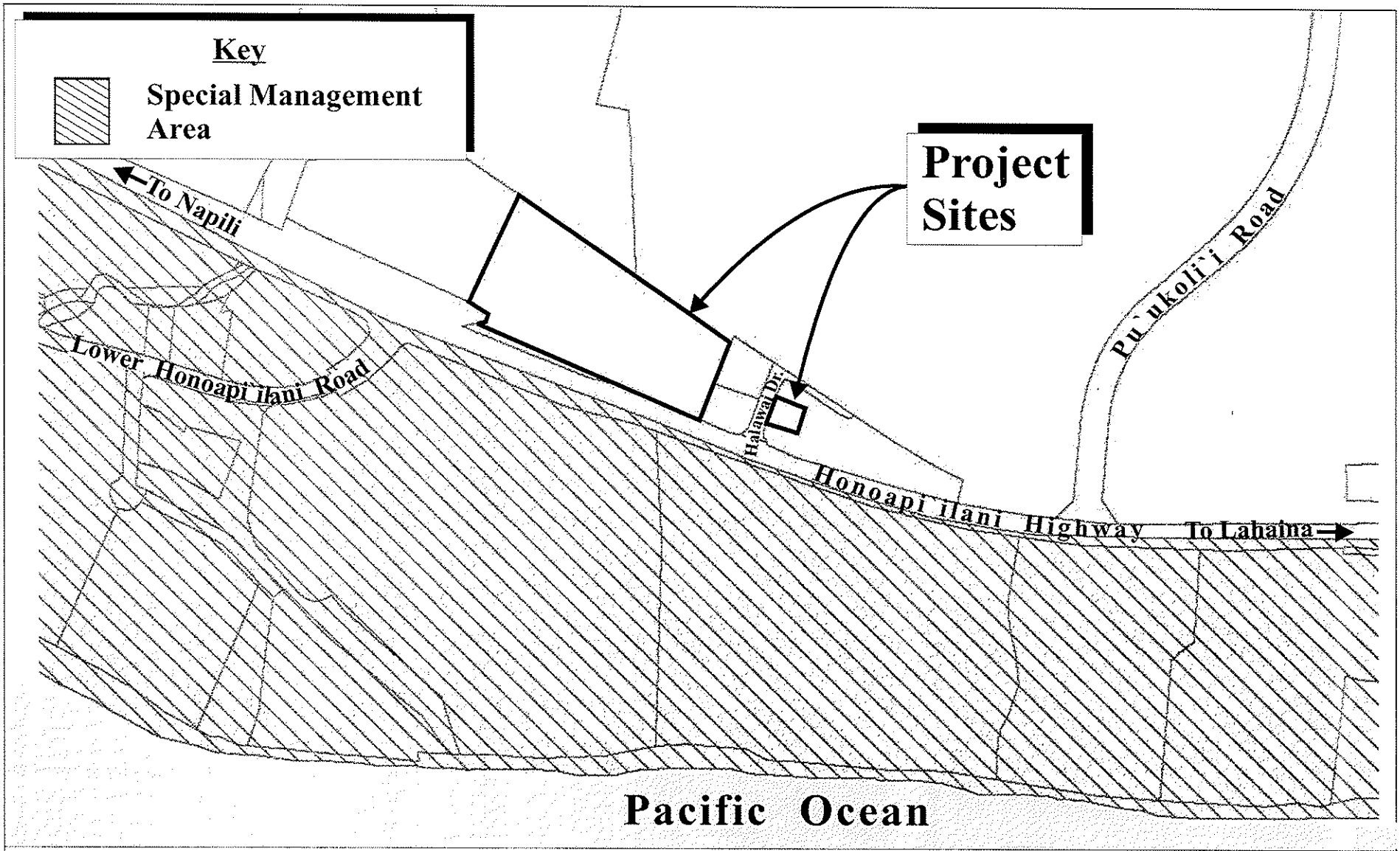


Figure 13

Lahaina Wastewater Pump Station No. 1 Modifications

SMA Boundary Map

NOT TO SCALE

Prepared for: County of Maui, Dept. of Environmental Management

MUNEKIYO & HIRAGA, INC.

HPE/LahWWPS/smaboundary

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

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

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

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

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

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

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

Response: The subject property is located inland, away from the coastline. The proposed action is, therefore, not anticipated to adversely impact existing coastal recreational resources.

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 Hawai`ian and American history and culture.

Policies

(A) Identify and analyze significant archaeological resources;

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

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

Response: An archaeological inventory survey was undertaken by Scientific Consultant Services, Inc. in 2007 in order to identify, protect, and preserve historic resources. The archaeological investigation did not reveal any significant historic resources at or between the project sites. In accordance with Section 6E-43.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR) and the Office of Hawaiian Affairs (OHA) will be contacted.

3. **Scenic and Open Space Resources**

Objective

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

Policies

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

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

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

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

Response: The project sites are not located within a significant coastal view corridor. The proposed improvements will occur within and between existing public

infrastructure systems and is not anticipated to have an adverse impact on shoreline views or open space resources.

4. Coastal Ecosystems

Objective

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

Policies

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

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

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

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

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

Response: With implementation of Best Management Practices (BMPs), the proposed project should have minimal long-term adverse effects on downstream coastal ecosystems. Appropriate BMPs and erosion-control measures will be implemented to ensure that coastal ecosystems are not adversely impacted by construction activities.

5. Economic Uses

Objective

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

Policies

(A) Concentrate coastal dependent development in appropriate areas;

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

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

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

(ii) Adverse environmental effects are minimized; and

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

Response: Short-term employment opportunities during project construction will be generated, and there will be no significant, adverse economic impacts associated with the proposed project. Further, the proposed project is not located at or near the coastline and will, therefore, not directly impact coastal development. The proposed action is not contrary to the objective and policies for economic use.

6. Coastal Hazards

Objective

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

Policies

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

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

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

(D) Prevent coastal flooding from inland projects.

Response: According to the Flood Insurance Rate Map for the area, the project sites are located within Zone "C", an area of minimal flooding. In addition, the project sites are not located within environmentally sensitive areas that are subject to natural hazards. The proposed project is not anticipated to affect the region's susceptibility to coastal hazards.

7. Managing Development

Objective

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

Policies

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

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

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

Response: Opportunities for public understanding of the proposed project are provided for during processing of the Environmental Assessment (EA) in accordance with Chapter 343, HRS, notice and public review provisions. All aspects of development will be conducted in accordance with applicable Federal, State, and County standards. Early consultation with agencies and interested parties was conducted for formulation of this Draft EA.

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 previously mentioned, the EA document will be processed in accordance with Chapter 343, HRS, and opportunity for comment by agencies and the public will be provided. The proposed project does not contradict the objectives of public awareness, education, and participation.

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: In broad objective terms, the proposed project will utilize appropriate BMPs to manage overall drainage and erosion control for the project sites. Further, the proposed project will not involve construction near shoreline areas and is not, therefore, anticipated to have an adverse effect on the local beach environment.

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: Appropriate BMPs and erosion control measures will be implemented to ensure that coastal ecosystems are not adversely impacted by construction activities.

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

> No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:
>
> (1) Directly illuminates the shoreline and ocean waters; or

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

Response: The proposed project is not located on or near the shoreline. The project does not contain lighting which is directed across property boundaries towards the shoreline.

IV. SUMMARY OF UNAVOIDABLE ENVIRONMENTAL IMPACTS

IV. SUMMARY OF UNAVOIDABLE ENVIRONMENTAL IMPACTS

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

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

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

In the long term, the proposed project is not anticipated to result in any significant, long-term, adverse environmental effects.

V. ALTERNATIVES TO THE PROPOSED ACTION

V. ALTERNATIVES TO THE PROPOSED ACTION

The applicant has looked at a variety of options in accommodating the proposed project.

A. PREFERRED ALTERNATIVE

The proposed development plan, outlined in Section I. Project Overview, represents the preferred alternative. This alternative, which entails upgrades and expansion at and between existing wastewater facilities, presents the most cost-effective and viable alternative as much of the capital infrastructure is already existent onsite. In addition, various components of the pumping station will require replacement as they approach the end of their useful lives.

B. NO ACTION ALTERNATIVE

As previously mentioned, there is already a need to increase wastewater system capacity in the West Maui region. The no action alternative would not address the adequacy of wastewater treatment for current wet-weather conditions and planned growth.

C. POSTPONED ACTION ALTERNATIVE

Similar to the no action alternative, the postponed action alternative does not address the wastewater system capacity issues and will only exacerbate the issue as new development projects are brought on line.

D. ALTERNATIVE LOCATIONS

Alternative locations were not extensively considered due primarily to cost considerations. Upgrade and expansion of wastewater services are generally concentrated at existing facilities due to the capital costs related to the installation of redundant systems elsewhere. Further, in light of various pump components approaching the end of their useful lives, it is prudent to perform the upgrade/expansion of equipment at the current sites. This

methodology is consistent with Hawai`i State Plan objectives to provide public resource capacities at reasonable costs to the general public.

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The development of the proposed project would involve the commitment of lands and funds. In addition, labor and material resources would be expended as part of the project's construction phase. Commitments of these resources are considered irreversible and irretrievable. These commitments, however, are also considered appropriate in the context of providing sufficient wastewater capacity to satisfy the current and future demands of the West Maui region.

VII. FINDINGS AND CONCLUSIONS

VII. FINDINGS AND CONCLUSIONS

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

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

   As mentioned in Chapter II of this document, the archaeological inventory survey concluded that no historic properties would be affected while the cultural impact assessment of the project area concluded that no significant impacts to cultural practices were anticipated. Refer to **Appendix "A"** and **Appendix "B"**, respectively. There are no sensitive natural resources impacted by the proposed action.

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

   The proposed project will not curtail the range of beneficial uses of the environment. Development of specific site plans will allow for the identification of applicable Best Management Practices (BMPs) to minimize any construction-related impacts.

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

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

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

   The proposed project will directly benefit the local economy by providing construction and construction-related employment in the short term. The project will provide increased wastewater capacity by means of an upgraded system intended to

ensure the health and safety of West Maui residents and visitors. No impacts to cultural practices are anticipated as a result of the project.

5. **Substantially affects public health.**

The proposed project is designed to benefit public health and safety by upgrading the performance integrity of the wastewater collection system.

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

There will be no adverse effect on public services, such as police, fire, medical, educational, and waste collection services. Moreover, the proposed project will not impact population parameters. The proposed action is a needed upgrade to the County of Maui's wastewater system.

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

Aside from short-term impacts related to dust and noise generated during construction, there will not be a degradation of environmental quality. These potential dust and noise impacts will be mitigated through utilization of appropriate Best Management Practices. In the long term, the proposed project is intended to maintain or improve environmental quality, by reducing the likelihood of sewer spillage.

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

The proposed project does not involve a commitment to larger actions. While the impacts assessed in this document are based on the entire action, the design of the project considers long-range planning opportunities as discussed in the "Cumulative and Secondary Impacts" Section II.E. herein.

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

As previously noted, flora and fauna are generally limited to non-native, abundant species at the project sites. There are no known rare, threatened, or endangered species at the project sites.

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. Noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance, will be used during construction activities. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawai`i, Department of Health Administrative Rules Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules. No long-term air or water quality or ambient noise level impacts are anticipated.

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 project lands are currently wholly within Flood Zone C, an area of minimal flooding. No other foreseeable environmental effects attributed to environmentally sensitive areas are anticipated in conjunction with the project.

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

The proposed project will not affect any previously identified scenic vistas or viewplanes and will not adversely impact the visual character of the project area.

13. Requires substantial energy consumption.

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

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

Based on the foregoing analysis, it is anticipated that the proposed action will result in 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:

1. **State of Hawai`i**

   A. NPDES Permits, as applicable

2. **County of Maui**

   A. Construction Permits

IX. PARTIES CONSULTED IN THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

IX. PARTIES CONSULTED IN THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

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

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

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

3. Gordon Furutani, Field Office Director
U. S. Department of Housing and Urban Development
500 Ala Moana Boulevard, Suite 3A
Honolulu, Hawai`i 96813-4918

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

5. Dan Davidson, Executive Director
Hawai`i Housing Finance and Development Corporation
677 Queen Street
Honolulu, Hawai`i 96813

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

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

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

9. Ron Okamura, Complex Area Superintendent
State of Hawai`i
Department of Education
54 High Street, 4th Floor
Wailuku, Hawai`i 96793

10. Alec Wong, P.E., Acting Chief
Clean Water Branch
State of Hawai`i
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawai`i 96814

11. Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawai`i
Department of Health
54 High Street
Wailuku, Hawai`i 96793

12. Laura H. Thielen, Chairperson
State of Hawai`i
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawai`i 96809

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

14. Barry Fukunaga, Director
State of Hawai`i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai`i 96813

cc: Fred Cajigal

15. Anthony J. Ching, Executive Officer
State of Hawai`i
State Land Use Commission
P.O. Box 2359
Honolulu, Hawai`i 96804

16. Rosalyn H. Baker, Senator
Hawai`i State Senate
Hawai`i State Capitol, Room 210
415 S. Beretania Street
Honolulu, Hawai`i 96813

17. Angus L.K. McKelvey, Representative
House of Representatives
Hawai`i State Capitol, Room 315
415 S. Beretania Street
Honolulu, Hawai`i 96813

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

19. Haunani Apoliona, Board of Trustee Chair
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai`i 96813

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

21. Charmaine Tavares, Mayor
County of Maui
200 South High Street
Wailuku, Hawai`i 96793

22. Gen Iinuma, Administrator
Maui Civil Defense Agency
200 South High Street
Wailuku, Hawai`i 96793

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

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

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

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

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

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

29. Cheryl Okuma, Director
County of Maui
Department of Environmental Management
200 South High Street
Wailuku, Hawai`i 96793

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

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

32. G. Riki Hokama, Council Chair
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

33. Danny Mateo, Council Vice Chair
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

34. Councilmember Michelle Anderson
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

35. Councilmember Gladys Baisa
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

36. Councilmember Jo Anne Johnson
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

37. Councilmember Bill Medeiros
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

38. Councilmember Michael J. Molina
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

39. Councilmember Joseph Pontanilla
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

40. Councilmember Mike Victorino
Maui County Council
200 South High Street
Wailuku, Hawai`i 96793

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

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

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

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

45. Mahealani Strong, Executive Director
West Maui Taxpayers Association
P.O. Box 10338
Lahaina, Hawai`i 96761

46. May Fujiwara
Lahaina-Honolua Senior Citizens Club
P. O. Box 1086
Lahaina, Hawai`i 96767

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LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

September 10, 2007

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

Dear Mr. Ginoza:

Subject: Early Consultation for Wastewater Pump Station
Lahaina, TMK: 4-4-002: 033 and 029

The Department of Education has no comment or concern.

Thank you for the opportunity to comment. If you have any questions, please call Heidi Meeker of the Facilities Development Branch at (808) 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

c: Randolph Moore, Assistant Superintendent, OBS
Duane Kashiwai, Public Works Administrator, FDB

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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

09019PKP.07

September 10, 2007

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

Dear Mr. Ginoza:

Subject: Lahaina Wastewater Pump Station No. 1 Modifications, Lahaina, Maui, Hawaii

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

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

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

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

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

2. Please call the Army Corps of Engineers at (808) 438-9258 to see if this project requires a Department of the Army (DA) permit. Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office.

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

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

   b. Hydrotesting water.

   c. Construction dewatering effluent.

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

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

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

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

Sincerely,

Joanna Seto

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

KP:np

MUNEKIYO & HIRAGA, INC.

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

Mark Alexander Roy

January 23, 2008

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

SUBJECT: Early Consultation Request for Proposed Lahaina Wastewater Pump Station No. 1 Modifications; Lahaina, Maui, Hawai`i; TMK Nos. 4-4-002:029 and 033

Dear Mr. Wong:

We are writing to you on behalf of the applicant, the County of Maui, Department of Environmental Management, to thank you for your department's letter dated September 10, 2007, providing comments on the proposed Lahaina Wastewater Pump Station No. 1 Modifications project in Lahaina, Maui, Hawai`i.

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

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

2. The applicant will consult with the Army Corps of Engineers to determine whether or not a Department of the Army (DA) permit is required. A discussion of the applicability of a DA permit will be included in the Draft Environmental Assessment (EA). We note that projects which require a DA permit will also require a Section 401 Water Quality Certification (WQC) from the Clean Water Branch.

3. The applicant does not anticipate discharging wastewater, including storm water runoff, into State surface waters. In addition, affected areas during construction activities will be kept under one (1) acre total, therefore, a National Pollutant Discharge Elimination System (NPDES) permit will not be required.

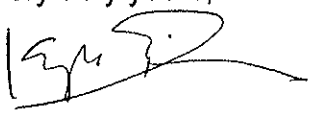
4. An archaeological inventory survey was completed for the project and was submitted to the State Historic Preservation Division (SHPD) for review and approval. In the event a Notice of Intent (NOI) or NPDES permit application is needed, the SHPD's determination letter for the project will be submitted with the application.

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

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

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

Very truly yours,



Kyle Ginoza, Project Manager

KG:lfm
cc: Roy Abe, HDR/Hawai`i Pacific Engineers, Inc.
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SEP 0 6 2007

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

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

September 5, 2007

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

Dear Mr. Ginoza:

Subject: **Lahaina Wastewater Pump Station No. 1 Modifications**
TMK: (2) 4-4-002: 033, Lahaina, Hawai`i

Thank you for the opportunity to participate in the early consultation process for the proposed modifications to the Lahaina Wastewater Pump Station No. 1. The following comments are offered:

1. 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.

2. 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: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html be reviewed, and any comments specifically applicable to this project should be adhered to.

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

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

c: EPO

MUNEKIYO & HIRAGA, INC.

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

MARK ALEXANDER ROY

January 23, 2008

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

SUBJECT: Early Consultation Request for Proposed Lahaina Wastewater Pump Station No. 1 Modifications; Lahaina, Maui, Hawai`i; TMK Nos. 4-4-002:029 and 033

Dear Mr. Matsubayashi:

We are writing to you on behalf of the applicant, the County of Maui, Department of Environmental Management, to thank you for your letter dated September 5, 2007, providing comments on the proposed Lahaina Wastewater Pump Station No. 1 Modifications project in Lahaina, Maui, Hawai`i.

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

1. Pursuant to Hawai`i Administrative Rules (HAR), Chapter 11-46, "Community Noise Control", a noise permit will be secured prior to commencement of construction, as applicable.

2. The planning, design, and construction of the project will be undertaken in accordance with the maximum allowable sound levels as set forth by HAR, Chapter 11-46. An acoustics consultant is part of the project team, who will ensure that sound levels are appropriately evaluated.

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

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

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

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Roy Abe, HDR/Hawai`i Pacific Engineers, Inc.
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SEP 2 1 2007

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 18, 2007

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

Attention: Mr. Kyle Ginoza

Gentlemen:

Subject: Lahaina Wastewater Pump Station No. Modifications, Lahaina, Maui, Tax Map Key: (2) 4-4-2:33, 29

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

Sincerely,

Russell Y. Tsuji
Administrator

LINDA LINGLE
GOVERNOR

SEP 2 1 2007

BARRY FUKUNAGA
DIRECTOR

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

IN REPLY REFER TO:

STP 8.2613

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

September 17, 2007

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

Dear Mr. Ginoza:

Subject: Lahaina Wastewater Pump Station No. 1 Modifications
Draft Environmental Assessment, Early Consultation
TMK: 4-4-002: 033 and 4-4-002: 029

Thank you for your notification of the subject project by the Department of Environmental Management.

The project is not anticipated to significantly impact our State transportation facilities.

We appreciate the opportunity to provide comments.

Very truly yours,

BARRY FUKUNAGA
Director of Transportation

c: Jeffrey Hunt, Maui Planning Department

SEP 1 0 2007

PHONE (808) 594-1888

FAX (808) 594-1865

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

HRD07/3187

September 5, 2007

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

RE: Lahaina Wastewater Pump Station No. 1 Modifications, Lahaina, Maui, TMKs 4-4-002:033, and02 9.

Dear Mr. Ginoza,

The Office of Hawaiian Affairs (OHA) is in receipt of your request for written comments seeking early consultation in preparation of a Draft Environmental Assessment (DEA) for the Lahaina Wastewater Pump Station (WWPS) No. 1 modifications in Lahaina, Maui. OHA has the following comments.

OHA notes that the current capacity of WWPS No. 1 is 7 million gallons per day (mgd) and that future estimates for needed capacity are a stunning four times (up to 30 mgd) of this current amount. While this early request does describe the pump station improvements themselves, it does not state the capacity that the improvements will generate in terms of mgd. OHA looks forward to seeing this kind of analysis and information presented in a DEA.

Further, OHA would like to point out that part of the project falls on ceded lands (TMK 4-4-002:029). As such, we request that they be treated with the respect due to them as they are part of the 1.8 million acres of land that belongs to the Hawaiian monarchy that were transferred to the state when Hawai'i became a U.S. state. In addition, OHA urges that future documents refer to this parcel as ceded lands so that their special status is known to others and to facilitate their continued registry and the creation and maintenance of an accurate ceded lands inventory.

OHA also requests your assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during ground disturbance or excavation, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

Thank you for the opportunity to comment, and we look forward to continued correspondence. If you have any further questions or concerns please contact Grant Arnold at (808) 594-0263 or granta@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

C: Thelma Shimaoka, Community Resource Coordinator
Office of Hawaiian Affairs, Maui Office
140 Ho'ohana St., Ste. 206
Kahului, Hawai'i 96732

MUNEKIYO & HIRAGA, INC.

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

Mark Alexander Roy

January 23, 2008

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

SUBJECT: Early Consultation Request for Proposed Lahaina Wastewater Pump Station No. 1 Modifications; Lahaina, Maui, Hawai`i; TMK Nos. 4-4-002:029 and 033

Dear Mr. Namu`o:

We are writing to you on behalf of the applicant, the County of Maui, Department of Environmental Management, to thank you for your letter dated September 5, 2007, providing comments on the proposed Lahaina Wastewater Pump Station No. 1 Modifications project in Lahaina, Maui, Hawai`i.

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

1. The proposed wastewater capacity improvements, including the resulting estimated flow in million gallons per day (mgd), will be expanded upon in the Draft Environmental Assessment (EA).

2. We note your comment regarding ceded lands and will forward this information to the applicant.

3. We note your comment about assurances should *iwi kupuna* or Native Hawaiian cultural or traditional deposits be found during ground disturbance or excavation. The Department of Environmental Management assures that work will cease and the appropriate agencies will be contacted pursuant to applicable law. This language will be included in the Draft EA.

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

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

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Roy Abe, HDR/Hawai`i Pacific Engineers, Inc.
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SEP 12 2007

CHARMAINE TAVARES
Mayor

TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

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

DEPARTMENT OF PARKS & RECREATION

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

September 6, 2007

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

Dear Mr. Kyle Ginoza

Subject: Request for proposed Lahaina Wastewater Pump Station No. 1 Modifications TMK (2) 4-4-002:033 and (2) 4-4-002:029

We have reviewed the proposed improvements for the Lahaina Wastewater Pump Station No. 1 Modifications, and we have no comments or objections to the subject project.

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

Sincerely,

TAMARA HORCAJO
Director, Parks & Recreation

xc: Patrick Matsui, Chief of Planning & Development

TH:PM:tk

CHARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

COLLEEN M. SUYAMA
Deputy Director

OCT 17 2007

COUNTY OF MAUI
DEPARTMENT OF PLANNING

October 15, 2007

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

Dear Mr. Ginoza:

SUBJECT: PRE-CONSULTATION COMMENTS IN PREPARATION OF A DRAFT ENVIRONMENTAL ASSESSMENT FOR LAHAINA WASTEWATER PUMP STATION NO. 1 MODIFICATIONS LOCATED AT TMK: (2) 4-4-002:029 & 033, LAHAINA, MAUI, HAWAII (EAC 2007/0030)

The Maui Department of Planning (Department) is in receipt of your request for comments, dated August 23, 2007, in preparation of a Draft Environmental Assessment (DEA) for the above-referenced project. The Department understands that the proposed action includes the following:

- The Applicant is Munekiyo & Hiraga, Inc., on behalf of the County of Maui, Department of Environmental Management, Wastewater Division;

- The Applicant proposes to upgrade the existing Lahaina Wastewater Pump Station No. 1, located in Honokowai, Maui, Hawaii. The proposed upgrade includes a new submersible pumping station, electric/emergency generator building, fuel tank, and odor control system. In addition, a new 30-inch force main will be installed between Lahaina Wastewater Pump Station No. 1 and the Lahaina Waste Water Reclamation Facility. The action will increase the capacity from approximately 7 million gallons per day to manage expected increased capacity into the future.

Based on the foregoing, the Department provides the following comments as pre-consultation in preparation of the Draft Supplemental EA:

1. The land use designations for the project area are as follows:
   - State Land Use – Urban

- Community Plan – Single-Family (West Maui)
- County Zoning – M-1 Light Industrial
- Other – Located outside of the Special Management Area

2. Please confirm Flood Zone information through the Planning Department Zoning and Enforcement Division;

3. The Department concurs that the proposed use of county lands is a "trigger" that requires compliance with Chapter 343, Hawaii Revised Statutes (HRS);

4. The County of Maui, Department of Environmental Management, Wastewater Division, will be the final accepting authority;

5. Provide a more complete project description to include how the proposed improvements will mitigate the projected anticipated peak wet weather flows into the future to include anticipated development;

6. The County Public Works Department and Police Department should be contacted for comments; and

7. Refer to Chapter 19.24 of the Maui County Code for zoning regulations.

Thank you for the opportunity to comment. Please include the Department on the distribution list for the Draft EA. Should you require further clarification, please contact Staff Planner Jim Buika at james.buika@mauicounty.gov or 270-6271.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

xc: James A. Buika, Staff Planner

CIY:JAB:bv

Project File
General File

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MUNEKIYO & HIRAGA, INC.

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

Mark Alexander Roy

January 23, 2008

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

SUBJECT: Early Consultation Request for Proposed Lahaina Wastewater Pump Station No. 1 Modifications; Lahaina, Maui, Hawai`i; TMK Nos. 4-4-002:029 and 033

Dear Mr. Hunt:

We are writing to you on behalf of the applicant, the County of Maui, Department of Environmental Management, to thank you for your department's letter dated October 15, 2007, providing comments on the proposed Lahaina Wastewater Pump Station No. 1 Modifications project in Lahaina, Maui, Hawai`i.

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

1. The applicant submitted a Zoning and Flood Confirmation Request Form to the Department of Planning Zoning and Enforcement Division to confirm the flood zone information. Review of the Flood Insurance Rate Map (FIRM) for the area revealed that the project sites are located wholly in flood zone "C", an area of minimal flooding and low flood risk.

2. The proposed modifications will result in increased wastewater flow capacity, which is necessary to accommodate the projected anticipated peak wet weather flows in the future. A more thorough project description will be included in the Draft Environmental Assessment (EA).

3. The applicant has contacted the County Department of Public Works and the Police Department for comments. Their comment letters and responses to those letters will be included in the Draft EA. In addition, each of those agencies will receive a copy of the Draft EA for further comment.

4. The proposed project will be developed in compliance with Chapter 19.24 of the Maui County Code regarding the "M-1, Light Industrial" zoning regulations.

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

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

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

Very truly yours,

Kyle Ginoza, Project Manager

KG:lfm
cc: Roy Abe, HDR/Hawai`i Pacific Engineers, Inc.
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SEP 1 1 2007

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

September 6, 2007

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

Dear Mr. Ginoza:

SUBJECT: Lahaina Wastewater Pump Station No. 1 Modifications;
TMK (2) 4-4-002:033 and (2) 4-4-002:029, Lahaina, Hawaii

Thank you for your letter of August 23, 2007, requesting comments on the above subject.

We would like to defer any comments and/or recommendations until the Environmental Assessment has been submitted for this project.

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

Very truly yours,

Assistant Chief Wayne T. Ribao
for: Thomas M. Phillips
Chief of Police

c: Jeff Hunt, Planning Department

SEP 2 6 2007

CHARMAINE TAVARES
Mayor

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

MICHAEL M. MIYAMOTO
Deputy Director

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

DAVID TAYLOR, P.E.
Wastewater Reclamation Division

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

TRACY TAKAMINE, P.E.
Solid Waste Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND ENVIRONMENTAL MANAGEMENT
DEVELOPMENT SERVICES ADMINISTRATION
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793
September 21, 2007

Kyle Ginoza, Project Manager
MUNEKIYO & HIRAGA, INC.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Subject: LAHAINA WASTEWATER PUMP STATION NO. 1
MODIFICATIONS
TMK (2) 4-4-002:033, 029

Dear Mr. Ginoza:

We reviewed the subject application and have no comments at this time.

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

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SEP 0 7 2007

CHARMAINE TAVARES
Mayor

CHERYL K. OKUMA, Esq.
Director

GREGG KRESGE
Deputy Director

TRACY TAKAMINE, P.E.
Solid Waste Division

DAVID TAYLOR, P.E.
Wastewater Reclamation Division

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

September 5, 2007

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

SUBJECT: LAHAINA WASTEWATER PUMP STATION NO. 1 MODIFICATIONS EARLY CONSULTATION TMK (2) 4-4-002:029 AND 033

Dear Mr. Ginoza,

We have reviewed the subject application and have the following comments:

1. Solid Waste Division comments

   a. None.

2. Wastewater Reclamation Division comments:

   a. None.

If you have any further questions regarding this memorandum, please contact Gregg Kresge at 270-8236.

Sincerely,

Cheryl K. Okuma

Cheryl Okuma, Director

X. REFERENCES

X. REFERENCES

County of Maui, The General Plan of the County of Maui, September 1990 Update.

County of Maui, West Maui Community Plan, February 1996.

County of Maui, Office of Economic Development, Maui County Data Book, December 2006.

Federal Emergency Management Agency, Flood Insurance Rate Map Community/Panel No. 150003 0161C and 0163C, August 1998.

HDR/Hawai`i Pacific Engineers, Lahaina Wastewater Pump Station No. 1 Modifications Preliminary Engineering Report, August 2007.

Scientific Consultant Services, Inc., An Archaeological Assessment of Lahaina Wastewater Pump Station No. 1 Improvements, December 2007.

Scientific Consultant Services, Inc., A Cultural Impact Assessment of Wastewater Pump Station No.1, October 2007.

SMS, Maui County Community Plan Update Program: Socio-Economic Forecast, June 2006.

State of Hawai`i, Department of Agriculture, Agricultural Lands of Importance to the State of Hawai`i, January 1977.

State of Hawai`i, Department of Labor and Industrial Relations, http://hawaii.gov/labor, October 2007.

State of Hawai`i, Land Use Commission, http://luc.state.hi.us/, October 2006.

University of Hawai`i, Land Study Bureau, Detailed Land Classification, Island of Maui, May 1967.

U. S. Department of Agriculture, Soil Conservation Service, The Soil Survey of the Islands of Kaua`i, O`ahu, Maui, Moloka`i and Lana`i, State of Hawai`i, August 1972.

APPENDIX A.

Archaeological Inventory Survey

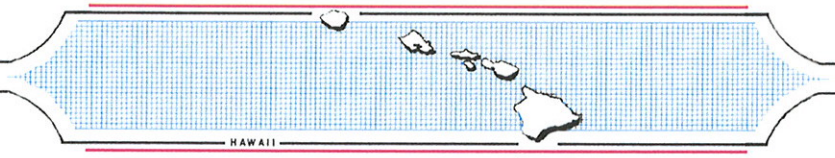
SCS Project Number 871-AA-1

AN ARCHAEOLOGICAL ASSESSMENT OF LAHAINA WASTEWATER PUMP STATION NO. 1 IMPROVMENTS, HONOKŌWAI AHUPUA`A, LĀHAINĀ DISTRICT MAUI ISLAND, HAWAI`I [TMK (2)4-4-002:033 & (2)4-4-002:029]

Prepared by:
Randy Ogg, B.A.
and
Michael F. Dega, Ph.D.
December 2007

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

SCIENTIFIC CONSULTANT SERVICES Inc.



711 Kapiolani Blvd. Suite 975 Honolulu, Hawai`i 96813

ABSTRACT

At the request of Munekiyo & Hiraga, Inc., Scientific Consultant Services (SCS), Inc. conducted an Archaeological Inventory Survey of the route for the installation of a 30 ft (9.11m) force main planned to connect the Lahaina Wastewater Pump Station No. 1 (WWPS No.1) [TMK (2) 4-4-002:033] to the Lahaina Wastewater Reclamation Facility (WWRF) [TMK (2) 4-4-002:029], Honokōwai Ahupua`a, Lāhainā District, Island of Maui. This proposed route will exit the Lahaina Wastewater Pump Station No. 1 into Halawai Drive, turning southwest and will follow the street a short distance, after which it will pass under an earthen berm at the end of the street to the Pioneer Sugar Cane Haul Road. The proposed line follows the *makai* (west) side of the Old Cane Haul Road for about 225 ft (68.58m) and then jogs underneath the perimeter fence of the Lahaina Wastewater Reclamation Facility (WWRF). The line then follows along the inside of the fence on the east side of the facility for a distance of 800 ft (68.58 m) and terminates at the Screening Building. A total of 10 stratigraphic trenches were excavated along this proposed right of way, eight along the inside of the perimeter fence of the Lahaina Wastewater Reclamation Facility and two on the *makai* (west) side of the old Pioneer Sugar Cane Haul Road. Because the results of the Inventory Survey were negative, this report is being written as an Archaeological Assessment.

Stratigraphic Trenches 1 through 8 were located along the inside of the perimeter fence of the Lahaina Wastewater Reclamation Facility. The investigations revealed no evidence of traditional Hawaiian occupation. Most of the trenches revealed evidence of historic sugar cane cultivation. Stratigraphic Trench 1 (ST-1) and Stratigraphic Trench 2 (ST-2) uncovered portions of a water line which transported reclaimed water from a large tank at the southeast corner of the Solids Processing Facility in a southwesterly direction, probably to the golf course at Ka`anapali. This line is about 10 ft (3.04 m) in diameter and is wrapped in purple fabric (indicating reclaimed water). The matrix at the bottom of the trench, surrounding the pipe, was composed of imported sand. A buried asphalt pavement was exposed in ST-9 and ST-10; apparently this was the original Cane Haul Road, which preceded the existing road now used by Hawaiian Cement. Exposed in the profile walls of almost all of the trenches (ST-1 through ST-10) were the thin, flat black plastic tubing that is characteristic of modern sugar cane irrigation systems.

During the inventory survey archaeological subsurface testing was not conducted at the Lahaina Wastewater Pump Station No. 1. The enclosure is too small and densely packed with its component buildings, pipelines and other facilities to be a practical place to excavate. Archaeological subsurface testing was not conducted at Halawai`i Drive. Less than 100 ft (30.48 m) of the 1,600 ft (487.68 m) line will be buried below the street. Excavation below the pavement of the highly trafficked street proved impractical and dangerous.

No historic sites or cultural materials were identified on the ground surface or in subsurface contexts during the Archaeological Inventory Survey. However, given the above information, it is recommended, as a precautionary measure, that Archaeological Monitoring be performed as construction excavation takes place in these two areas.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

At the request of Munekiyo & Hiraga, Inc., Scientific Consultant Services (SCS), Inc., conducted an Archaeological Inventory Survey of the proposed alignment for a 30 ft (9.144 m) sewer force main which will connect the Lahaina Wastewater Pump Station No. 1 (WWPS) [TMK: (2) 4-4-002:033] to the Lahaina Wastewater Reclaimation Facility (WWRF)[TMK: (2) 4-4-002:29], Honokōwai Ahupua`a, Lāhainā District, Island of Maui (Figures 1 through 3). The Lahaina Wastewater Pump Station No. 1 (WWPS), less than one acre, is located on the south side of Halawai Street. It is a very short, paved street with no outlet. The Lahaina Wastewater Reclamation Facility (WWRF), 7.930 acres, is located at 3300 Honoapi`ilani Highway, Lahaina. The area between these two facilities, including portions of Halawai Drive and the old Pioneer Sugar Cane Haul Road, which now has heavy traffic to and from the Hawaiian Cement facility, were also included in this survey. The overall project area is comprised of a 1,600 ft (487.68 m) long, 15 ft (4.572 m) wide sewer easement which comprises approximately 0.5 acres. The actual area of ground disturbance by trenching for the new 30 ft (9.144 m) force main will be approximately 6,400 ft^2 (594.5 m; 0.147 acres). The entire project area has already been impacted by development.

The Archaeological Inventory Survey was conducted on September 11 and 12, 2007 by SCS archaeologists Randy Ogg, B.A., and Tyler Cremeens, B.A., under the direct supervision of Michael Dega, Ph.D., Principal Investigator. Since the project area has been developed into a commercial/ industrial area, and probably has been previously graded and plowed multiple times, testing was performed mechanically with a small excavator. A total of ten stratigraphic trenches were excavated along, or close to, the proposed alignment of the new 30 ft (9.144 m) force main, eight trenches were placed along the inside of the WWRF perimeter fence and two of the trenches were placed along the *makai* (west) side of the Pioneer Sugar Cane Haul Road (Figure 4). As the results of the Inventory Survey were negative, this report has been reclassified as an Archaeological Assessment.

ENVIRONMENTAL SETTING

The project area is located west-northwest of Pu`u Kukui, the summit of the West Maui Mountains. It is situated within the coastal plain of West Maui, 1,500 ft (457.2 m) from the shoreline, approximately 20 feet above mean sea level (amsl), and across the Honoapi`ilani Highway from what once was the Ka`anapali Airport.

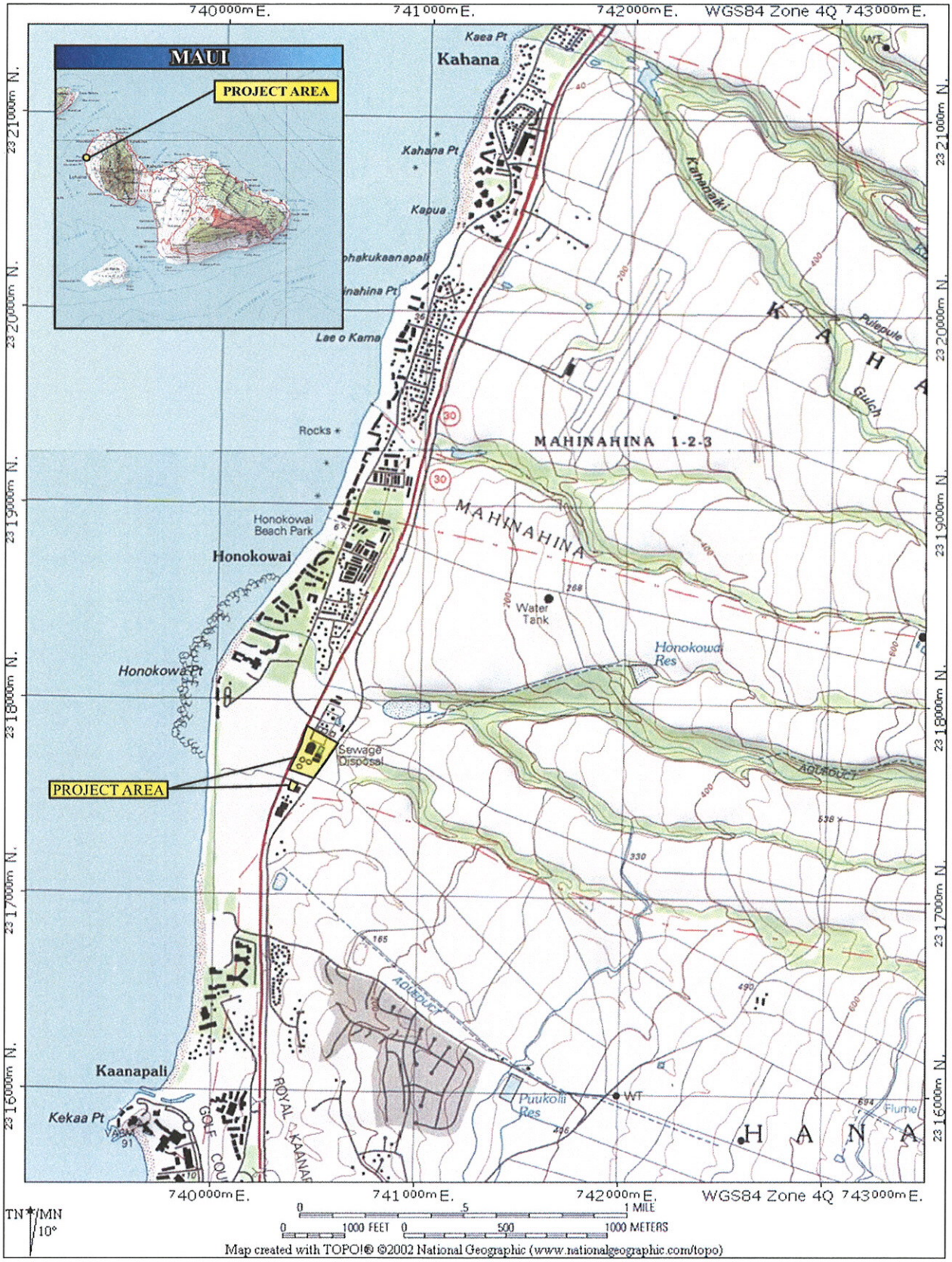


Figure 1: USGS Quadrangle Map (Lahaina) Showing Project Area.

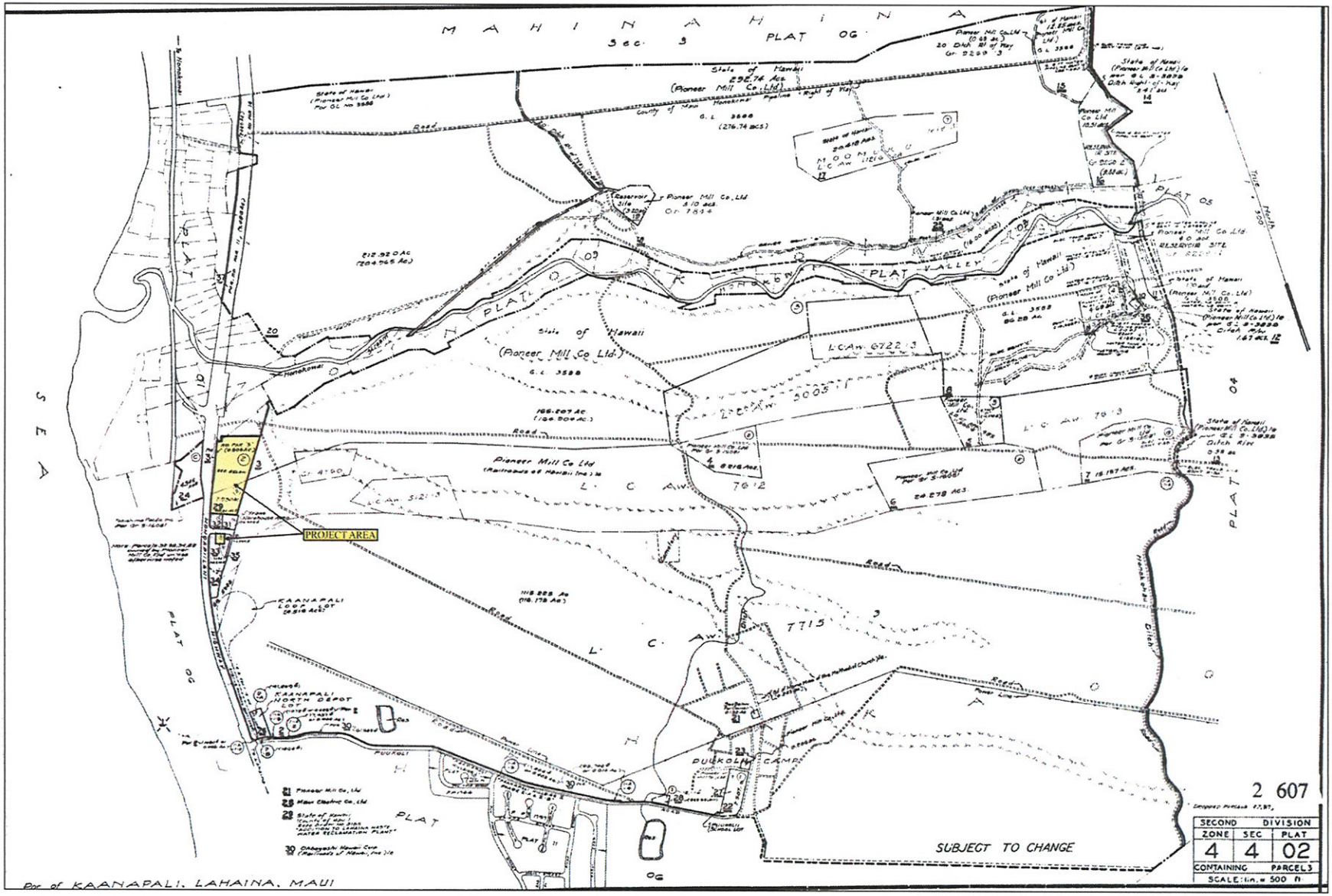


Figure 2: Tax Map Key [TMK: (2) 4-4-002:033 and 029] Showing Project Area.

Figure 3: Satellite Photo Showing Project Area.

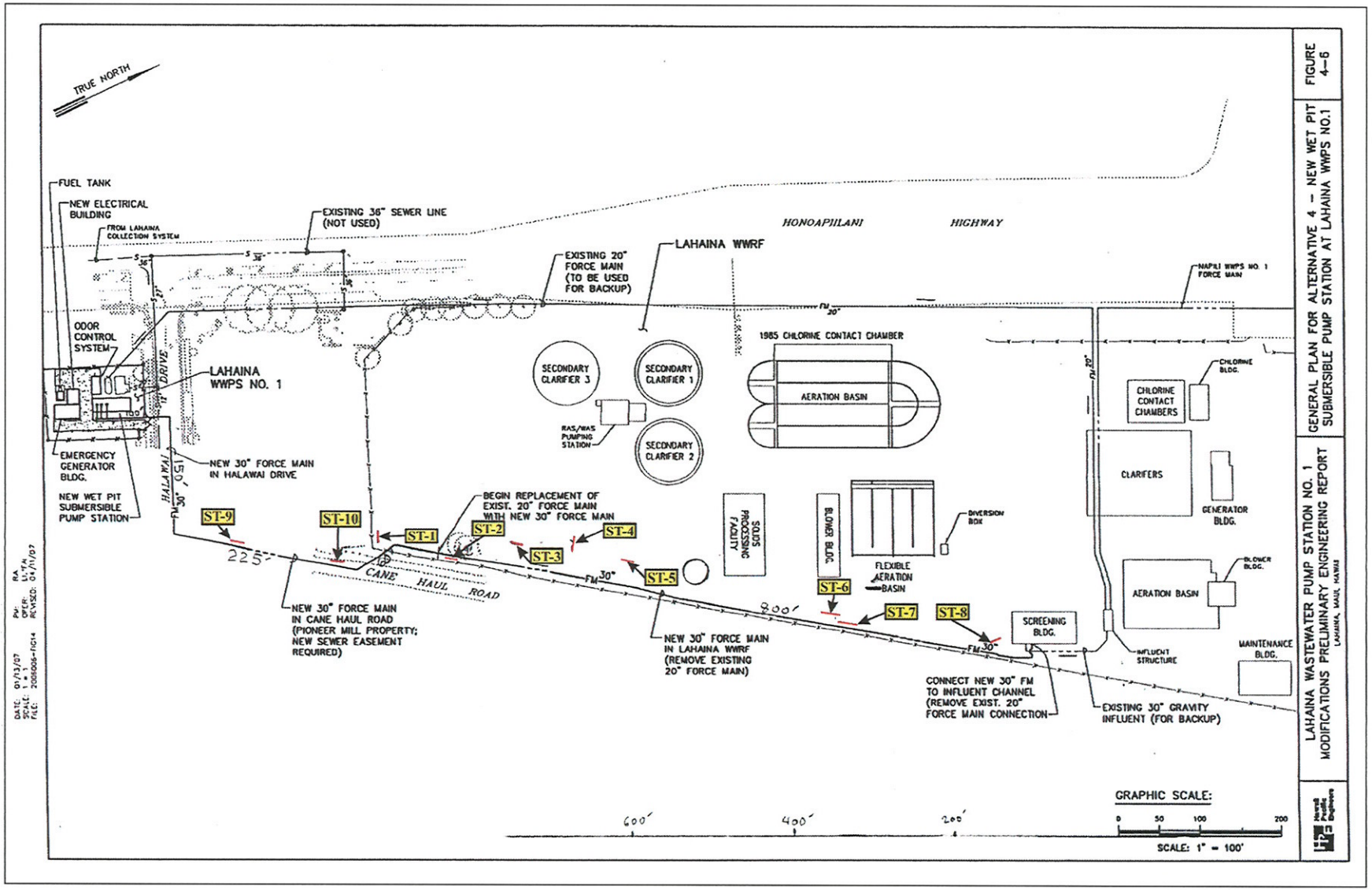


Figure 4: Project Area Plan View Map Showing Stratigraphic Trench Locations.

The survey area is nearly level, with a very subtle seaward slope, and was utilized during sugar cane cultivation in historic times. Honokōwai Stream, which flows from the mountains through a narrow canyon, passes by the north end of the sewage treatment plant before emptying into the sea. The southernmost of two branches of this stream, named Kapaloa Stream, originates at the summit of Pu`u Kukui (5,788 ft, 1,215 m). The overall basin of this stream is large enough to accumulate a dependable water supply. The sugar plantations had drawn water from both branches of the stream through a tunnel/aqueduct system.

RAINFALL, SOILS, AND VEGETATION

Rainfall is seasonal, with most falling between November and April. The annual rainfall for the coastal region where the project is located averages 20ft (50 m) (Armstrong 1983). According to Foote *et al.* (1972, Map 94) the soil in the project area falls into the Ewa Series. These soils typically develop in alluvium derived from basic igneous rock (*ibid*: 29). These well-drained soils are nearly level to moderately sloping and are used for producing sugarcane and truck crops as well as for pasture lands. The specific soil type in the project area is Ewa silty clay loam (EaA). This type of soil occurs at 0 to 3 percent slopes, exhibits slow runoff, and a slight erosion hazard. In addition to being used in the production of sugarcane and truck crops, this type of soil is also ideal for home sites (Foote *et al.* 1972:30)

Vegetation cover is predominantly *koa haole* (*Leucaena glauca)* with weedy shrubs and grass. Ornamental trees have been planted in the along the *mauka* (east) side of the Lahaina Wastewater Treatment Facility. Several *kiawe* trees (*Prosopis pallida*) and Java Plum (*Syziguim jambolana*) trees are in the area.

CULTURAL HISTORICAL CONTEXT

PAST POLITICAL BOUNDARIES

Traditionally, West Maui has been divided into two districts (*moku*), the Lahaina and Wailuku Districts, which were the main population centers in this region of Maui (Kirch 1985 and Handy and Handy 1978). The districts (*moku*) were further divided into more basic units, *ahupua`a*, which were customarily wedge-shaped land units that extended from the shoreline to the central mountain summits. Extended household groups therefore had access to the resources of both the sea and that of various elevation zones up to the summits. Ideally, this allowed the residents of each *ahupua`a* to be self sufficient by providing access for them to the resources of several different environmental zones (Lyons 1875:111). The *`ili laina* or *`ili* were smaller land divisions administered by the chief who controlled the *ahupua`a* in which they were located (Lyons 1875:33; Lucas 1995:40). The *mo`o`aina* were narrow strips of land within the *`ili*. The

land holding of a tenant residing within an *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located within the *ahupua`a* of Honokōwai which translated means literally "bay drawing water" (Pukui *et al.,* 1974:49).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production, marine exploitation and animal husbandry. The exploitation of the various environmental zones within each *ahupua`a* also included the collection of plants and birds. During pre-Contact times there were primarily two types of agriculture, wetland and dry land. Wetland agriculture was utilized in areas of suitable physiography with dependable water supplies. Stream valleys with perennial streams provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) cultivation if pond fields and irrigation ditches (*auwai*) could be built. Dry land agriculture was developed in areas with sufficient and dependable rainfall. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*), *mai`a* (banana, *Musa* sp.) and *`uala* (sweet potato, *Ipomoea batatas*) could be produced in these areas. Agricultural development on the leeward side of Maui was likely to have begun in what has been defined as the "Expansion Period" (Kirch 1985). Early settlement tended to be concentrated along the coastline where marine resources could be exploited and in stream valleys with water supplies dependable enough to sustain *lo`i* systems.

LĀHAINĀ DISTRICT SETTLEMENT PATTERNS

Settlement along the coast allowed easy access to the resources of the sea as well those of the plantations of the stream valleys and ridge flats. For this reason, the coastal lands were preferred for chiefly residence. The resources of the fish ponds along the coast were regarded as property of the chiefs.

Within each *ahupua`a* one or more trails extended from the coast to the higher elevations linking two or more economic regions and allowing the transportation of goods collected at the mountaintops or streamside plantations to the coastal residents.

Honokōwai Gulch was one of four valleys of leeward West Maui which was intensively used for the cultivation of irrigated taro. The lower portion of the gulch had been extensively modified with terraced pond-fields, habitation platform-terraces and related structures.

THE MĀHELE

The Māhele of 1848, implemented under Kauikeaouli (Kamehmeha III), divided lands between the king, the chiefs, the government, and began the process of the private ownership of land for the Hawaiian people. Awarded parcels were called Land Commission Awards (LCAs).

Through this process, the *Maka`āinana* (commoners), were able to claim the plots of land on which they had been cultivating and living. If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a royal patent after which they could take possession of the property.

The Indices of Land Commission Awards lists 114 grants totaling 186 *`āpana* in the *ahupua`a* of Honokōwai. While there are no LCAs on the subject property, several of which are in the vicinity of the present project area. Among these, LCA 5121:3 is the closest, situated just *mauka* of the present study area. This lot was awarded to an individual named Kane in January 1848 (Appendix A). Kane's claim was supported by an individual named Kuku, who attested that Kane "received these lands from his brother in the days of Kamehameha I" (Waihona Aina 2007). This 4.16 hectare (10.29 acres) is situated about 1,400 ft (426.72 m) *mauka* of the Lāhainā Wastewater Treatment Facility in the bed of Honokōwai Stream. The three sections of LCA 5121 were described as: 1) taro land 2) pasture land and 3) a house lot.

HISTORIC LAND USE

The cultivation of coffee had expanded to favorable lands on Maui by 1847-50 (Thrum 1876:46-48). This most likely included the leeward valleys of west Maui. Blight soon disrupted the production of coffee in the region.

As early as 1849, Judge A.W. Parsons operated a sugar mill in Lahaina. A sugar plantation, began in 1859 by Henry Dickenson, called the Lahaina Sugar Company, was soon followed by the Pioneer Mill Company, in 1859. It was founded by three partners: James Campbell, Henry Turton and James Dunbar. By 1900 the cane fields extended for some 10 miles along the coast and over two miles to base of the mountains, including the entire Honoapi`ilani Highway corridor.

Beginning in the 1950s and continuing into the present, resort and condominium developments along the coast have displaced plantation agriculture and destroyed many of the archaeological sites that were in that area.

PREVIOUS ARCHAEOLOGICAL RESEARCH

Early archaeological studies focused on the coastline. The earliest reported archaeological work conducted in the district of Lāhainā, was carried out by Winslow Walker as part of an island-wide archaeological survey of Maui. After 1970, with the acceleration of resort development, formal surveys were conducted along the prime coastal areas.

A Statewide Inventory of Historic Places for Maui in 1973 located petroglyphs and stone wall alignments in two different sections of Honokōwai Gulch (Bishop Museum Site -1207 and -1208) (Bishop Museum records). Archaeological survey of the Honoapiilani Highway corridor between Honokōwai (just south of the project area) and `Alaeloa (several miles north of the project area) recorded a buried midden deposit, a trail segment, a stone wall, and three retaining wall sections. The midden (Site -225), located in nearby Mahinahina Gulch, was interpreted as a temporary habitation site (Griffin and Lovelace 1977). Other studies in the Kahana area (to the north) yielded numerous traditional sites, including temporary habitations, midden deposits, and various stone stacking and alignment features consistent with inland agricultural features (*e.g.*, Komori 1983; Walker and Rosendahl 1985; Kennedy 1992).

Generalizing about traditional settlement patterns in the area, Griffin and Lovelace (1977) suggested that the *ahupua`a* of Mahinahina was of relatively marginal agricultural value, and that occupation would have been limited to short-term visits, with primary residence at the coast of Mahinahina or even in Honokowai.

An Archaeological Inventory Survey (McGerty and Spear 1996) of a 3.269-acre parcel located to the north documented a total of seven sites, several of which consisted of stone alignments and low stacking features, all interpreted as early historic. A cemetery and the area directly around it (designated Site -4218 and -4219, respectively) were permanently preserved based on the findings of this study. Extensive trenching south of the cemetery (towards the present project area) failed to yield any additional human remains or burials. No traditional Native Hawaiian artifacts were observed on the surface, nor were any recovered in excavation on Lot 3 (*ibid.*).

An Archaeological Inventory Survey (Monahan 2003) was conducted on a 3.054-acre parcel immediately adjacent to the northern portion of the current project area. Testing of eight stratigraphic trenches revealed no surface or subsurface features of potential archaeological and/or historic significance. Another Archaeological Inventory Survey was conducted

approximately 30 meters south of this on a small portion (23 m x 23 m) of the current project area (Chun and Dega 2005). Testing consisted of four backhoe trenches which, as with Monahan 2003, were devoid of any culturally significant materials or features.

In a report by Havel and Dega (2005), a parcel that lies approximately 0.68 miles north of the present study area at a similar elevation, yielded negative findings. The extent of Modern disturbance to the surface and subsurface contexts was evident throughout this study parcel.

Archival research indicates the current project area has not undergone an archaeological inventory survey. However, based on the background information, sites likely to be encountered in the project area may include early historic house foundations and other stone alignments, as well as historic artifacts (*e.g.,* bottles, hardware, etc.). Traditional sites and artifacts reflecting more temporary habitation were also possible (*e.g.,* stone tool debris, midden, hearth deposits), but, given the relatively marginal conditions in the project area, extensive permanent habitation was less likely.

Finally, given the extent of modern construction and reworking of the landscape in the project area, there was a high probability that most or all sites or features originally present in the project area have been destroyed or disturbed to a significant degree.

METHODOLOGY

FIELD METHODOLOGY

Multiple tasks were completed during this project on September 11th and 12th of 2007, by SCS Archaeologists, Randy Ogg and Tyler Cremeens under the direct supervision of the Principal Investigator of the project, Michael Dega, Ph.D.

First, a systematic pedestrian survey of the entire project area was conducted by SCS archaeologists in order to identify and document any and all Historic and/or Traditional archaeological surface features, assesses the nature and extent of landscape modification, and allowed for assessing areas amenable for testing. Following pedestrian survey, 10 stratigraphic trenches were mechanically excavated to basal strata throughout the project area. None of the excavated sediments were screened as there were no artifacts or cultural deposits encountered during excavation. All trenches were excavated into sterile substrate at a minimum depth of one meter. The trench locations were placed on an engineering plan view map (see Figure 4). Upon completion of excavation, all trenches were photographed and one wall of each excavation was stratigraphically profiled thereby documenting all of the soil layers which were present. Tasks

conducted in addition to the fieldwork include archival research, mapping, providing Munsell descriptions of stratigraphic trench profiles, drafting plan view maps, as well as analysis, interpretation, and reporting of all relevant data.

Personnel at the sewage treatment plant were consulted prior to fieldwork and locations for backhoe trenches were discussed. They advised us as to the locations of existing lines to be avoided. A total of ten trenches were excavated along the proposed 1,600 ft (487.68 m) alignment. Stratigraphic trenches -9 and -10 were along the *makai* (west) side of the Pioneer Sugar Cane Haul Road. Stratigraphic trenches -1 through -8 were excavated along the inside of the perimeter fence which bounds the east side of the Lahaina Wastewater treatment Facility. ST-1 and ST-2 were located near the approximate location where the proposed line would enter the facility from the cane haul road. ST-8 was located beside the Screening Building, which is the terminus of the proposed line.

Lahaina Wastewater Pump Station No. 1 was not tested. The compound was very small and congested with structures and pipelines. An excavation performed within the confines of the facility would most likely have revealed the presence of previously disturbed fill material. Halawai Drive was also not tested. We did not have the means to excavate through pavement.

LABORATORY METHODS

Laboratory work included digital drafting of plan view maps and stratigraphic profiles for publishing and archival storage; no cultural material was collected therefore lab analysis, and documentation was limited to that listed above. No cultural material was obtained for radio carbon dating for this project. All field notes, maps, and photographs pertaining to this project are currently being curated at the SCS facilities in Honolulu.

Soil colors were recorded using Munsell color charts, soil composition was recorded with the aid of the U.S. Department of Agriculture Soil Survey Manual on standard soil stratigraphy forms, and profiles were drawn. Overview photographs were taken of individual stratigraphic trench profiles and the project area. Color photographs were taken with a 3.2 mega-pixel digital camera.

EXCAVATION RESULTS

No archaeological features or deposits were identified either on the ground surface or in subsurface contexts during the current project. The absence of sites on the surface is attributed to the developed setting of the project area. Subsurface excavation sampling also yielded

negative results. The parcel was not extensively tested, as some areas of the study parcel were not practical locations for excavation. These locations are discussed below.

STRATIGRAPHIC TRENCH 1 (ST-1)

ST-1 measured 6.60 m long by 0.65 m wide and was oriented 120°/300° true north. The trench was excavated to a maximum depth of 1.53m and exposed three natural stratigraphic layers. Layer IA (0-20 cmbs) is a very fine brown (10 YR 4/3) silty loam with medium density roots and less than 5% pebbles. Layer IB (20-50 cmbs) is a very fine brown (10YR 4/3) silty clay loam with few roots and less than 5% rock. Layer II (50-153 cmbs) is a very fine dark brown (7.5 YR 3/4) silty loam no roots and very few pebbles (less than 1%). A plastic pipe, in a purple wrapper and surrounded by sand fill, was exposed at the southeast end of the trench, signifying reclaimed water, which was being transported to the golf course at Ka`anapali. The sediments were otherwise undisturbed. No cultural material was observed (Figures 5 and 6).

STRATIGRAPHIC TRENCH 2 (ST-2)

ST-2 measured 4.80 m long by 0.70 m wide and was oriented 030°/210° true north. The trench was excavated to a maximum depth of 1.55 m and exposed three stratigraphic layers. Layer I (0-10 cmbs) is a very fine dark brown (7.5 YR 3/3) loam with common roots and no rocks. Layer II (10-130 cmbs) is a very fine dark brown (10 YR 3/4) silty clay with common roots and no rock. Both the black plastic irrigation line and the plastic trench tape were encountered in this layer. Layer III (130-155 cmbs) is a very fine light yellowish brown sand—a fill deposit around the reclaimed water line that runs along the east side of the trench. The same plastic pipe, wrapped in purple and covered with sand, was exposed in the east wall of the trench. A plastic irrigation line and plastic trench tape was encountered at 40 and 80 cmbs in the west wall (Figures 7 and 8).

STRATIGRAPHIC TRENCH 3 (ST-3)

ST-3 measured 3.90 m long and 0.70 m wide and was oriented 035°/215° true north. It was excavated to a maximum depth of 1.50 m and exposed three stratigraphic layers. Layer I (0-30 cmbs) is a very fine brown (10 YR 4/3) loamy silt with few roots and few rocks (less than 5%). Layer II (30-100 cmbs) is a very fine dark reddish brown (5 YR 3/3) silty loam with few roots and few rocks (less than 5%). Layer III (100-135 cmbs) is a very fine dark brown (7.5 YR 3/4) loamy silt with no roots and very few rocks (less than 1%). No cultural material was observed (Figures 9 and 10).

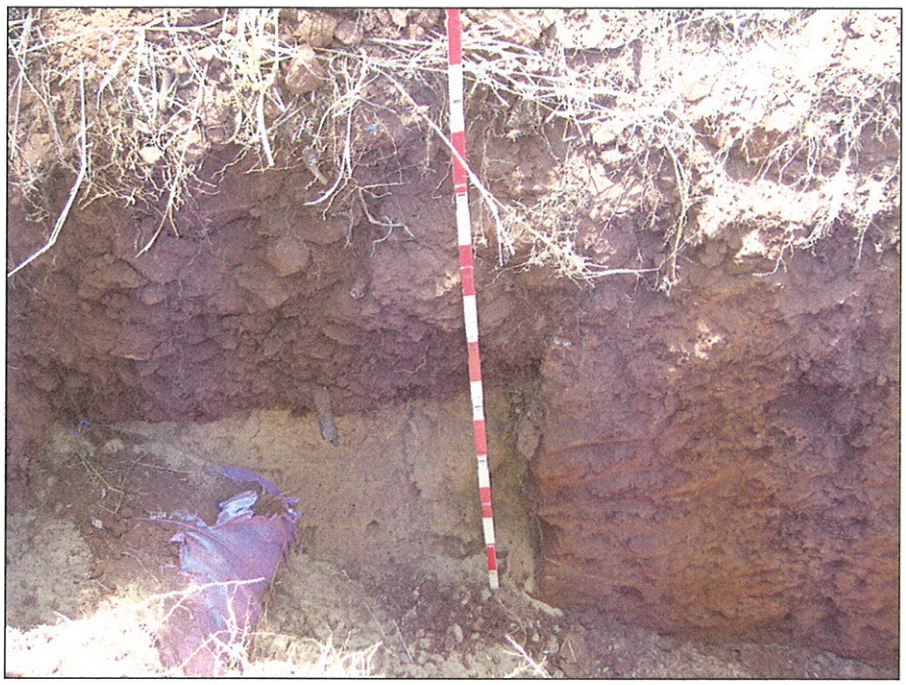


Figure 5: Photograph of ST-1 South Wall.

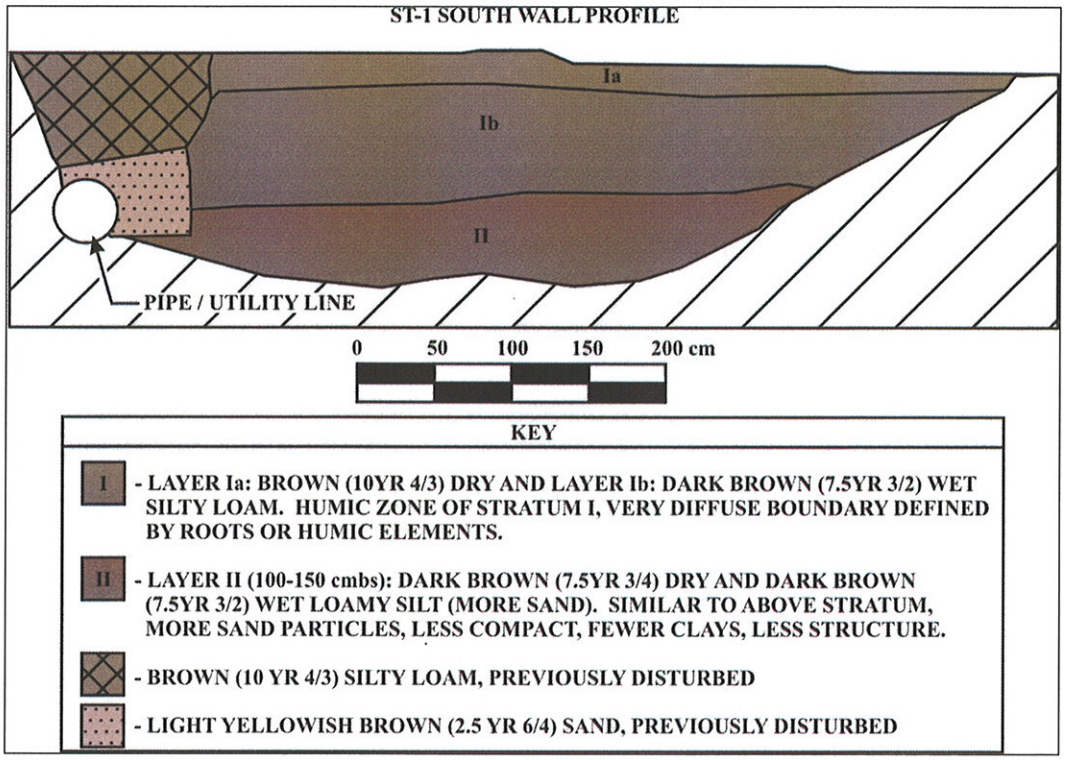


Figure 6: ST-1 South Wall Profile.

Figure 7: Photograph of ST-2 West Wall.

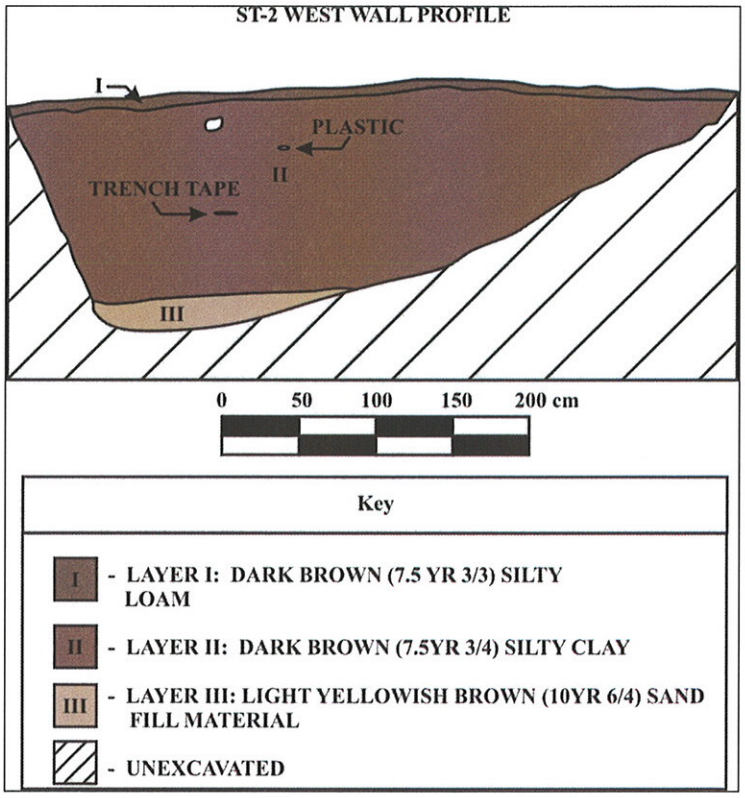


Figure 8: ST-2 West Wall Profile.

Figure 9: Photograph of ST-3 West Wall.

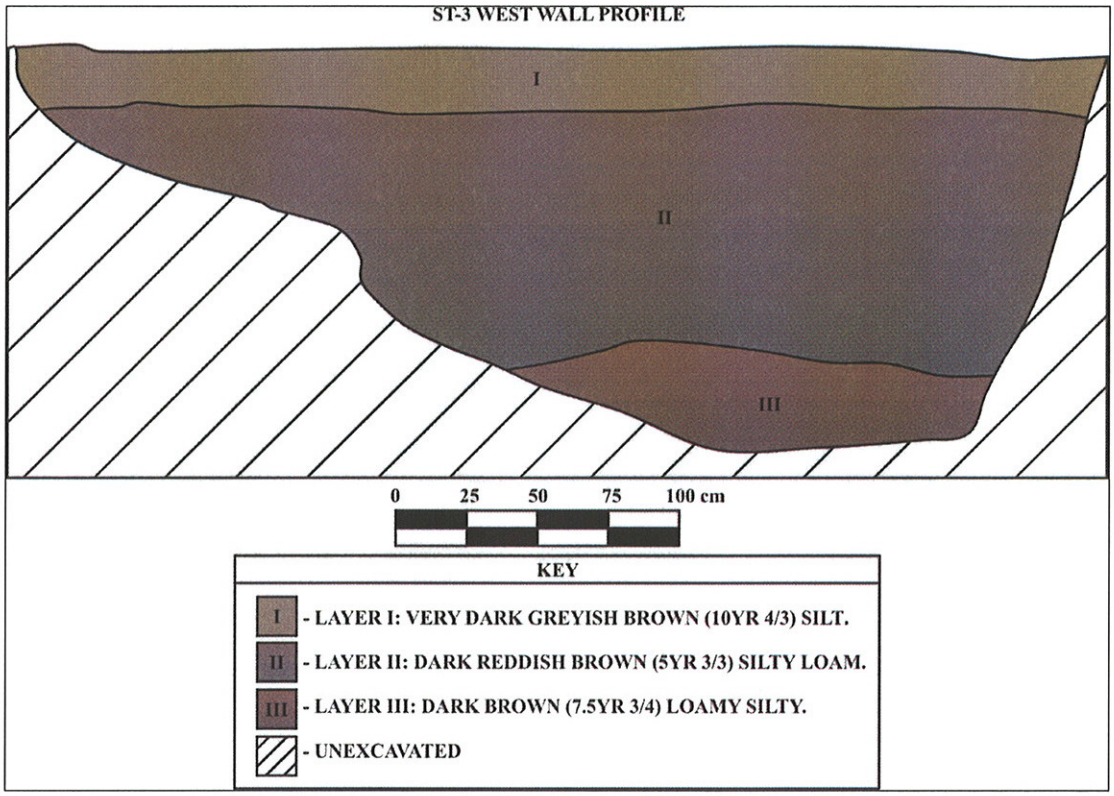


Figure 10: ST-3 West Wall Profile.

STRATIGRAPHIC TRENCH 4 (ST-4)

ST-4 measured 4.20 m long and 0.70 m wide and was oriented 126°/306° true north. It was excavated to a maximum depth of 1.55 m and exposed three stratigraphic layers. Layer I (0-10 cmbs) is a very fine olive brown (2.5 Y 4/3) loam with common roots and very few gravel (less than 1%). Layer II (10-100 cmbs) is a very fine dark yellowish brown (10 YR 3/6) silty clay with very few roots and very few coral pebbles (less than 1%). Layer III (100-155 cmbs) is a very fine dark yellowish brown (10 YR 3/6) silt with very few roots and no rock. No cultural material was observed (Figures 11 and 12).

STRATIGRAPHIC TRENCH 5 (ST-5)

ST-5 measured 4.00 m long and 0.70 m wide and was oriented 034°/214° true north. It was excavated to a maximum depth of 1.50 m and exposed five stratigraphic layers. Layer I (0-30 cmbs) is a very fine dark reddish brown (5 YR 4/2) silty loam with very few roots and few rocks (less than 5%). Layer II (30-60 cmbs) is a very fine brown (10 YR 4/3) silty loam with very few roots and some basalt pebbles and cobbles (5-10%). Layer III (60-110 cmbs) is a very fine dark reddish brown (5 YR 3/3) silty clay loam with very few roots and some basalt cobbles and pebbles (5-10%). Layer IV (110-140 cmbs) is a very fine dark reddish brown (5 YR 3/3) silty loam with no root and very few basalt pebbles (less than 1%). Layer V (140-150 cmbs) is a very fine, dark reddish brown (5 YR 3/4) silty loam with no roots and no observed rocks. No cultural material was observed (Figures 13 and 14).

STRATIGRAPHIC TRENCH 6 (ST-6)

ST-6 measured 4.0 m long and 0.70 m wide and was oriented 032°/212° true north. It was excavated to a maximum depth of 1.50 m and exposed five stratigraphic layers. Layer I (0-20 cmbs) is a fine very dark grayish brown (10 YR 3/2) silt loam with abundant roots and no rocks. Layer II (20-30 cmbs) is a very fine light brownish gray (10 YR 6/2 clay loam with common roots and no rock. Layer III (30-105 cmbs) is a very fine dark reddish brown (5 YR 3/4) silty clay with very few roots and no rock. Layer IV (105-125 cmbs) is a very fine dark brown (7.5 YR 3/4) silty clay with very few roots and no rock. Layer V (125-150 cmbs) is a very fine dark brown (10 YR 3/3) silt with no observed roots or rocks. Black plastic irrigation line in Layer III (Figures 15 and 16).

STRATIGRAPHIC TRENCH 7 (ST-7)

ST-7 measured 3.70m long and 0.70m wide and was oriented 032°/212° true north. The trench was excavated to a depth of 1.45m and exposed three stratigraphic layers. Layer I (0-25 cmbs) is a fine dark brown (10YR 3/3) silt loam with few roots and some (5-10%) basalt pebbles. Layer II (25-113 cmbs) is a very fine dark brown (7.5 YR 3/3) silty clay loam with few

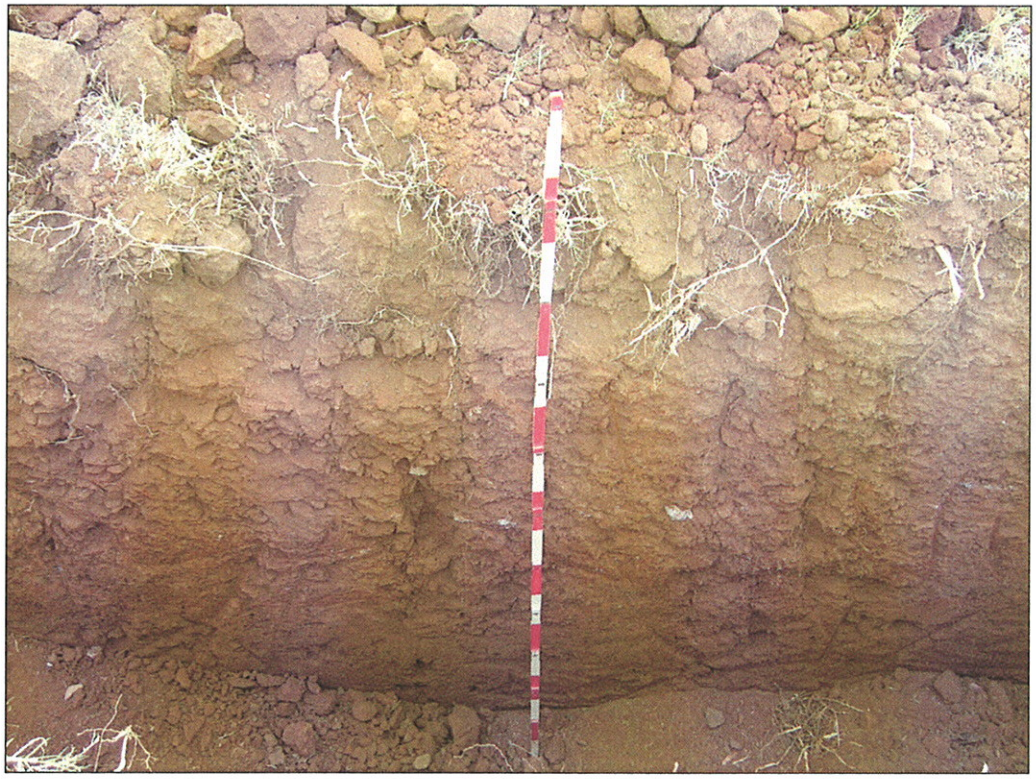


Figure 11: Photograph of ST-4 South Wall.

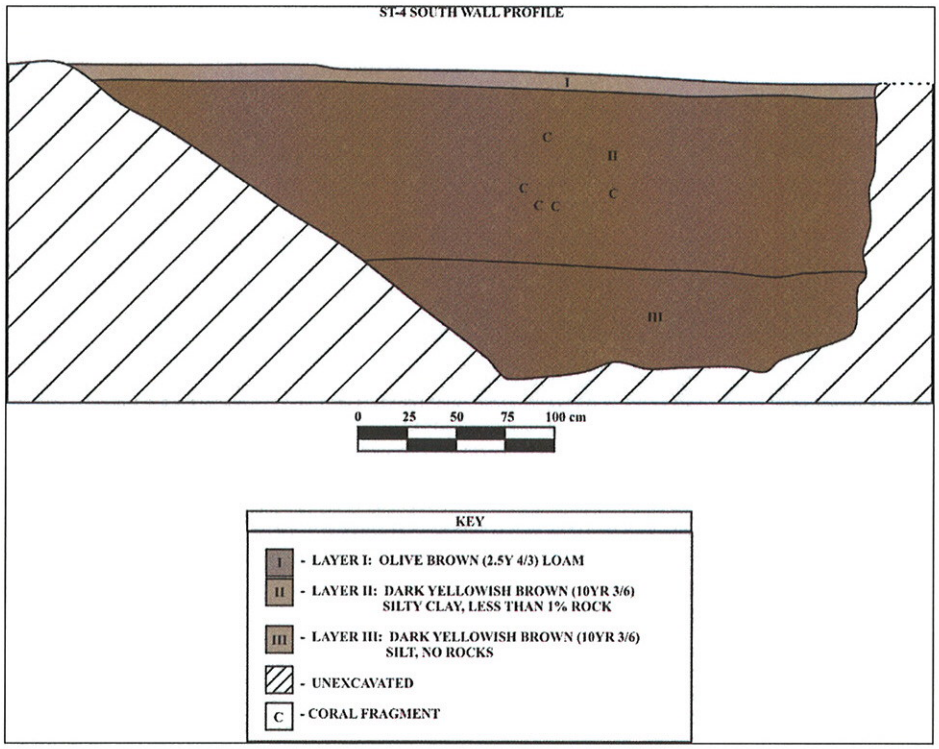


Figure 12: ST-4 South Wall Profile.

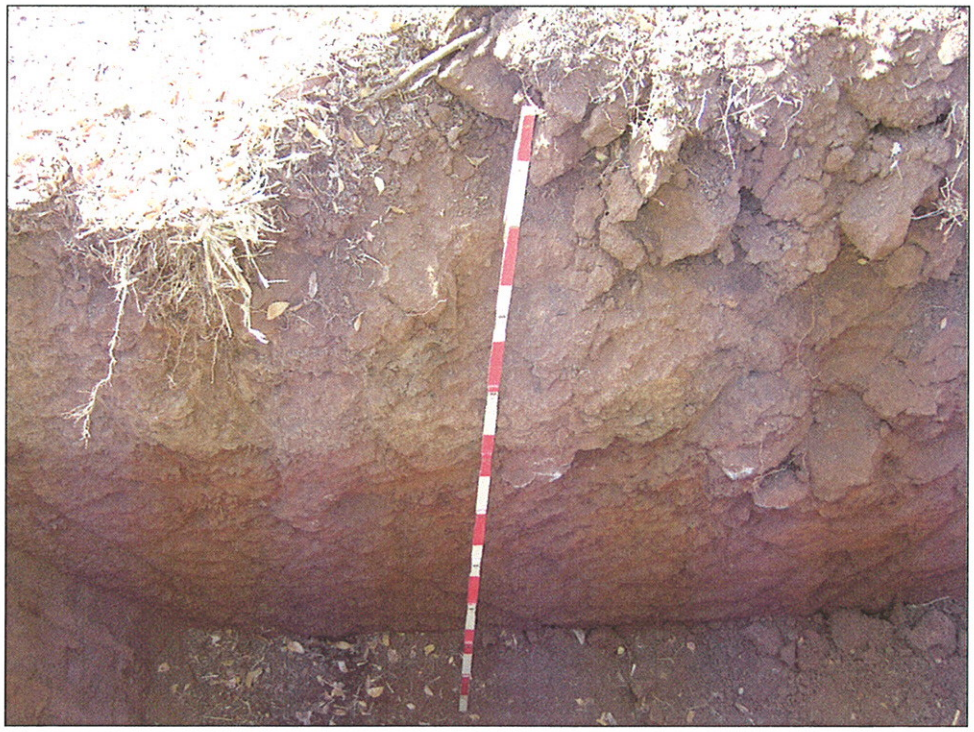


Figure 13: Photograph of ST-5 West Wall.

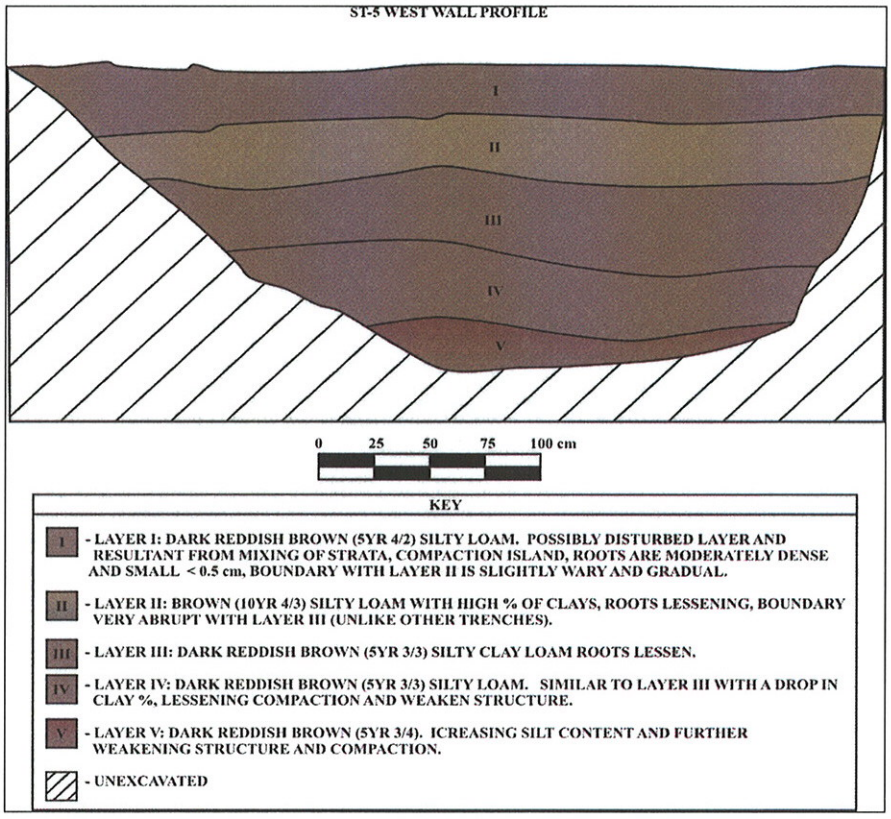


Figure 14: ST-5 West Wall Profile.

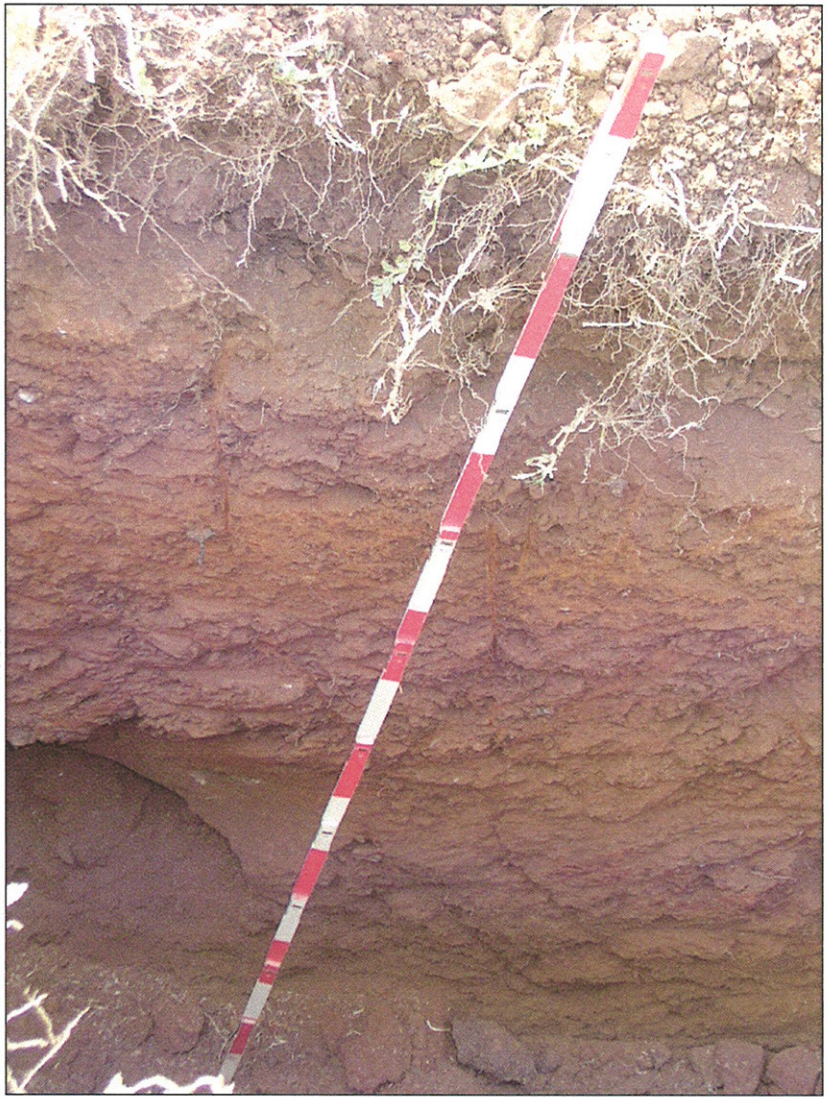


Figure 15: Photograph of ST-6 West Wall.

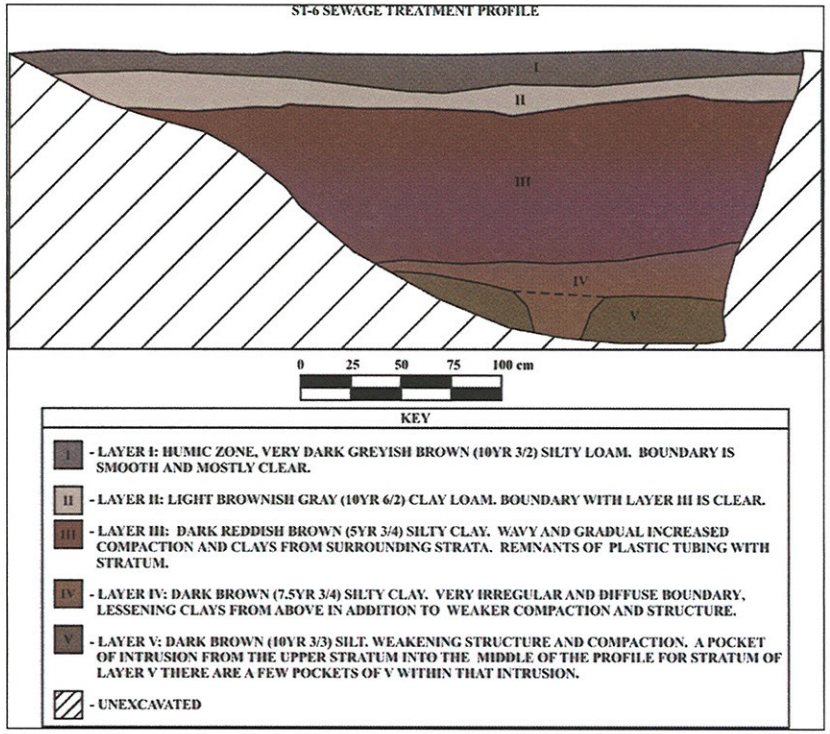


Figure 16: ST-6 West Wall Profile.

roots and some (5-10%) basalt cobbles. Layer III (113-145 cmbs) is a very fine, very dark grayish brown (10 YR 3/2) silt sandy loam with no roots and few (less than 5%) basalt pebbles. No cultural material was observed (Figures 17 and 18).

STRATIGRAPHIC TRENCH 8 (ST-8)

ST-8 measured 3.50 m long and 0.70m wide and was oriented 007°/187° true north. It was excavated to a maximum depth of 1.20 m and exposed six stratigraphic layers. Layer I (0-4 cmbs) is a very fine, dark yellowish brown (10 YR 3/4) loam with common roots and common crushed basalt gravel (10-20%). Layer II (4-20 cmbs) is a very fine olive brown (2.5 Y 4/4) silt with common roots and few basalt gravel. Layer III (20-30 cmbs) is comprised of light gray crushed basalt gravel. Layer IV (30-50 cmbs) is a very fine brown (10 YR 4/3) silt with few roots and limited basalt gravel. Layer V (50-95 cmbs) is a very fine mottled dark brown (10 YR 3/3) silty clay with no roots and very few basalt gravel (less than 1%). Layer VI (95-120 cmbs) is a very fine, dark reddish brown (5 YR 3/3) silty clay with no roots and very few (less than 1%) gravel. No cultural material was observed, but one of the layers (Layer III) was comprised of crushed rock and several other layers have gravel included in their composition (Figures 19 and 20).

STRATIGRAPHIC TRENCH 9 (ST-9)

ST-9 measured 3.40 m long and 0.70 m wide and was oriented 034°/214° true north. It was excavated to a maximum depth of 1.30 m and exposed eight stratigraphic layers. Layer I (0-5 cmbs) is a very fine gray (10 YR 5/1-4/1) silt with no roots and abundant (≥75%) crushed basalt gravel. Layer II (5-25 cmbs) is a very fine dark reddish brown (5 YR 3/3) silty clay loam with very few roots and abundant (≈50%) crushed basalt gravel. Layer III (25-40 cmbs) is a fine brown (7.5 YR 4/3) loamy sand loamy sand with abundant (50-75%) crushed rock. Layer IV (40-55 cmbs has been previously disturbed. It consists of a very fine, very dark gray (7.5 YR 2.5-3/1) clay loam with asphalt with no roots. Layer IVA (40-50 cmbs) is inclusive within Layer IV and is comprised of asphalt. Layer V (55-65 cmbs) is a very fine dark brown (7.5 YR 3/4) silt loam with no roots and abundant (50-75%) crushed basalt gravel. Layer VA (60-65 cmbs) also has been previously disturbed. This layer is a gravel (crushed basalt) layer inclusive within Layer V. Layer VI (65-130 cmbs) is a very fine dark reddish brown (5 YR 3/3) silty clay loam with no root and few rocks (~10%). Only sparse modern trash was observed (Figures 21 and 22).

STRATIGRAPHIC TRENCH 10 (ST-10)

ST-10 measured 3.60 m long and 0.70 m wide and was oriented 034°/214° true north. It was excavated to a maximum depth of 1.40 m and exposed five stratigraphic layers. Layer I (0-50 cmbs) is a very fine dark brown (10 YR 3/3) silty clay loam with common roots and limited

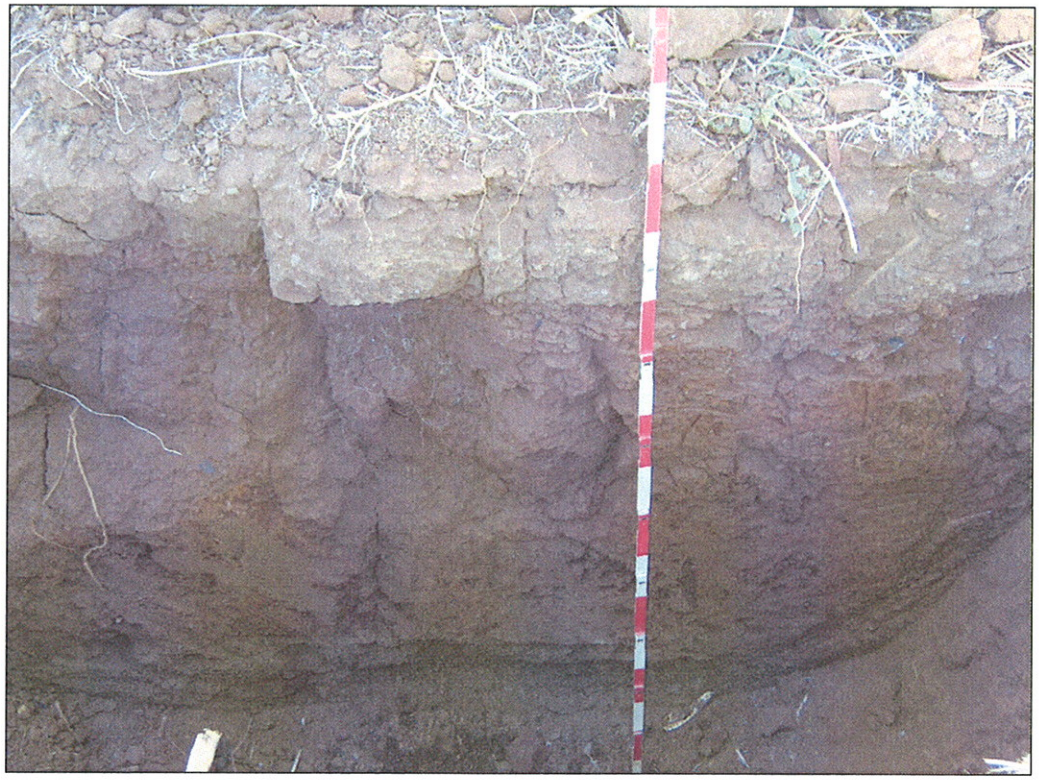


Figure 17: Photograph of ST-7 East Wall.

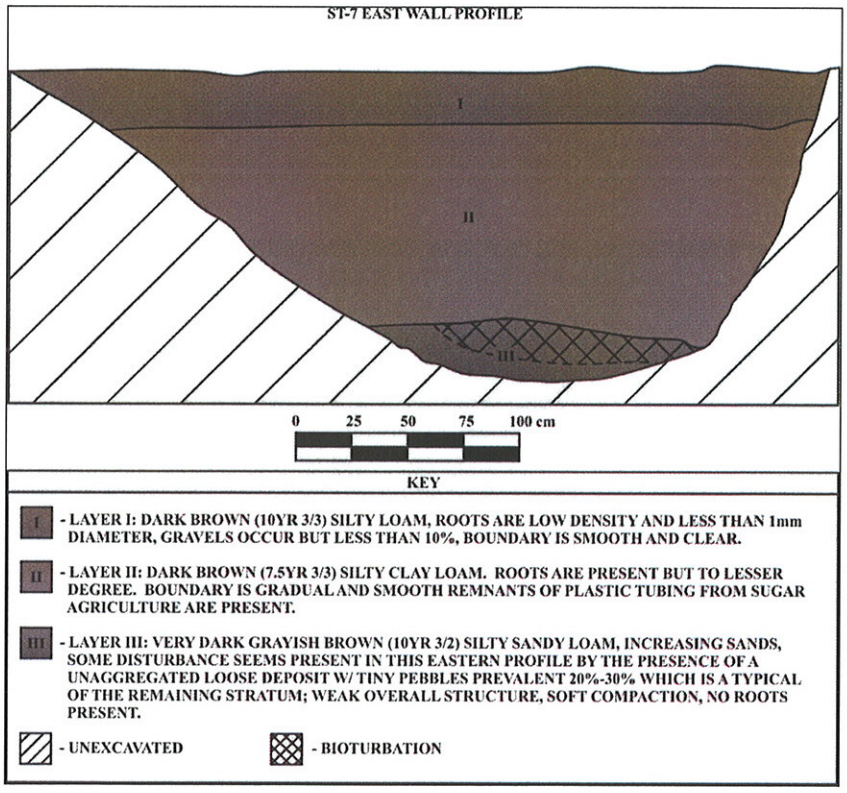


Figure 18: ST-7 East Wall Profile.

Figure 19: Photograph of ST-8 West Wall.

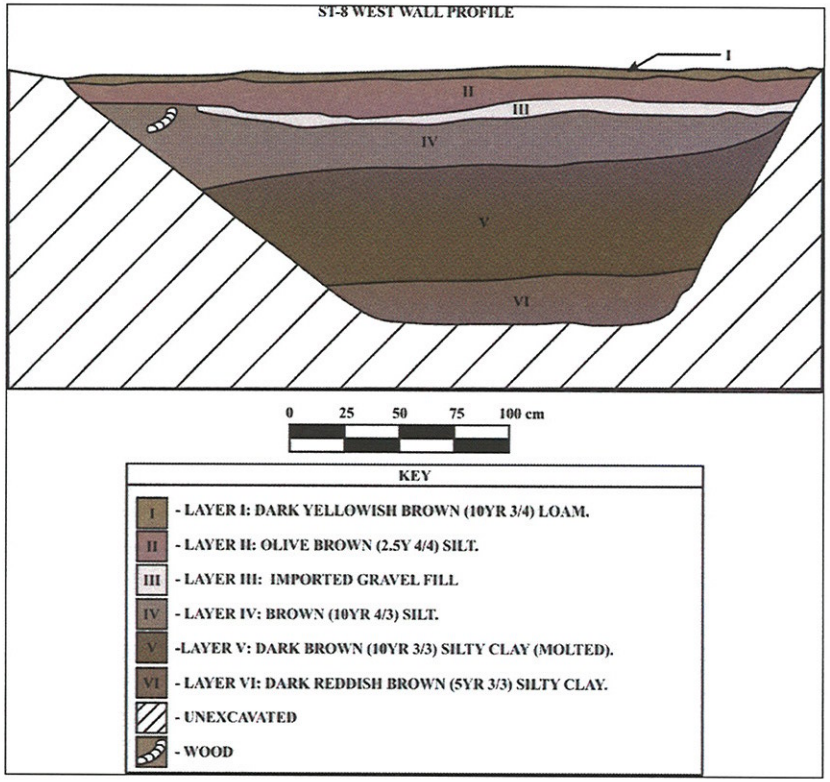


Figure 20: ST-8 West Wall Profile.

Figure 21: Photograph of ST-9 East Wall.

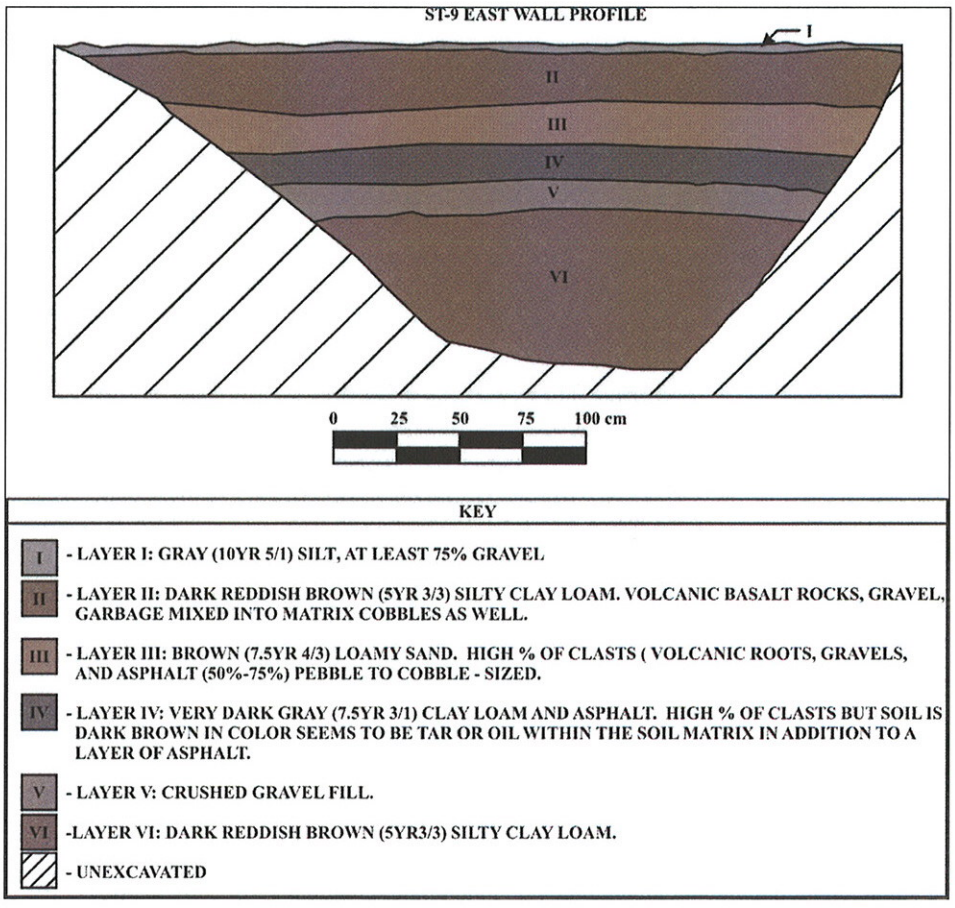


Figure 22: ST-9 East Wall Profile.

basalt gravel (less than 5%). Layer II (50-60 cmbs) is comprised of pale gray crushed basalt gravel. Layer III (60-70 cmbs) is comprised of asphalt. Layer IV (70-80 cmbs) is comprised of light gray) crushed basalt gravel (subcore). Layer V (80-140 cmbs) is a very fine dark reddish brown (5 YR 3/4) silt with no roots and no rock. No cultural material was observed (Figures 23 and 24).

DISCUSSION AND RECOMMENDATIONS

The stratigraphy recorded during this project documents extensive subsurface disturbance throughout the study area. Such subterranean impacts were expected, and are congruent with the Historic activities that were conducted in Honokōwai, including sugar cane cultivation and infrastructural development of roads and utilities in Modern times. The absence of cultural material is not conclusive of the absence of cultural modification, rather indicative of the extent of Historic and Modern disturbance to the archaeological record.

Lahaina District was densely occupied throughout the Traditional Period, with a variety of sites documented throughout the region. In the general vicinity of Honokōwai, previous archaeological work suggests that Historic Period disturbances, such as sugar cane cultivation and modern development have severely obscured the archaeological record. Hommon (1992) recorded features within narrow gulches and stream channels, while Fredericksen (2005) documented features within an undeveloped parcel near the project area (see Previous Archaeology). As these and other projects render the presence of cultural habitation unquestionable, there is a high likelihood for encountering subsurface cultural deposits, including human burials in and around the project area environs.

While this project yielded negative results, the Lahaina Wastewater Pump Station No. 1 was not tested as the enclosure is too small and densely packed with its component buildings, pipelines and other facilities to be a practical place to excavate. Halawai`i Drive was also not tested, as this road is paved and highly congested, rendering subsurface testing costly, dangerous and inefficient. It is recommended, therefore, that Archaeological Monitoring be performed as construction excavation takes place in these two areas.

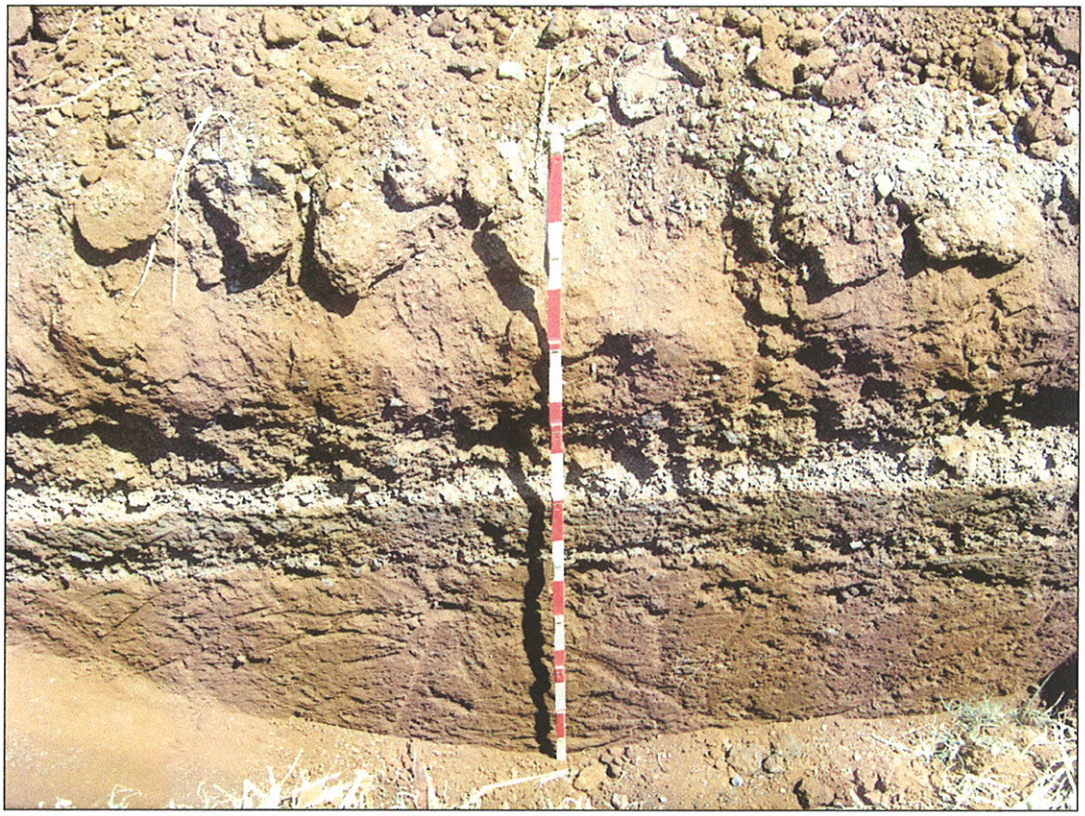


Figure 23: Photograph of ST-10 West Wall.

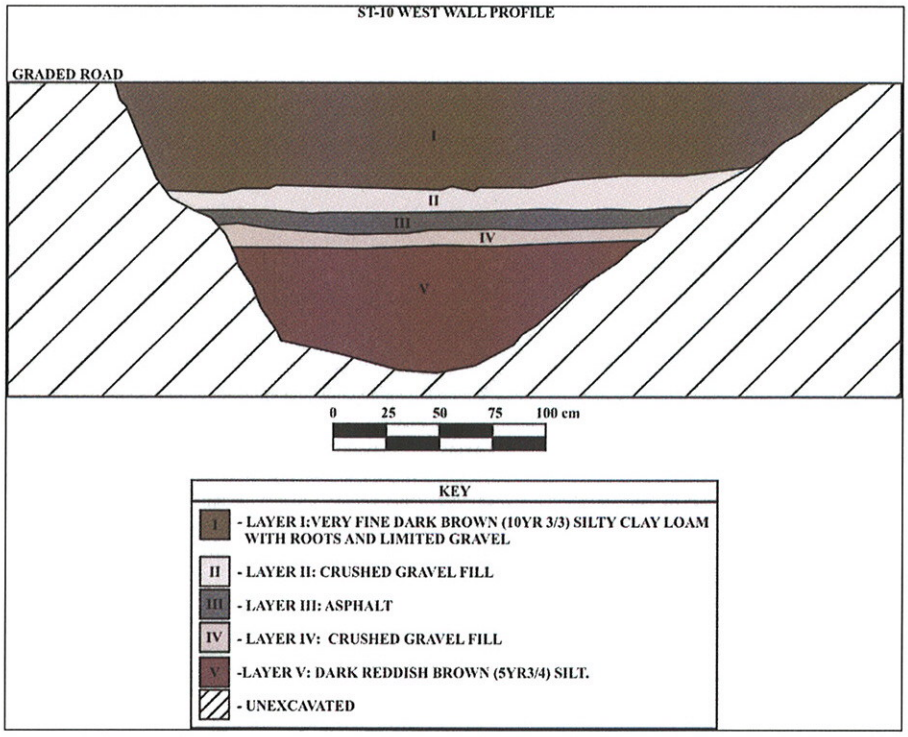


Figure 24: ST-10 West Wall Profile.

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APPENDIX A: LCA DATA

Waihona 'Aina

Your ultimate resource for Hawaiian history and land use

Mahele Database Documents

Number: 05121

Claim Number:	**05121**
Claimant:	**Kane**
Other claimant:	
Other name:	
Island:	**Maui**
District:	**Kaanapali**
Ahupuaa:	**Honokawai**
Ili:	**Kapili, Kipapa**

Apana:	**3**	Awarded:	**1**
Loi:	**1**	FR:	
Plus:	**+**	NR:	**240v6**
Mala Taro:		FT:	**367v7**
Kula:		NT:	**225v5**
House lot:	**1**	RP:	**6653**
Kihapai/Pakanu:		Number of Royal Patents:	**1**
Salt lands:		Koele/Poalima:	**Yes**
Wauke:		Loko:	**No**
Olona:		Lokoia:	**No**
Noni:		Fishing Rights:	**No**
Hala:		Sea/Shore/Dunes:	**No**
Sweet Potatoes:	1	Auwai/Ditch:	**No**
Irish Potatoes:		Other Edifice:	**No**
Bananas:		Spring/Well:	**No**
Breadfruit:		Pigpen:	**No**
Coconut:		Road/Path:	**Yes**
Coffee:		Burial/Graveyard:	**No**
Oranges:		Wall/Fence:	**Yes**
Bitter Melon/Gourd:		Stream/Muliwai/River:	**Yes**
Sugar Cane:		Pali:	**No**
Tobacco:		Disease:	**No**

Koa/Kou Trees:		Claimant Died:	**No**
Other Plants:		Other Trees:	
Other Mammals:	**No**	Miscellaneous:	**government road**

No. 5121, Kane, January 20, 1848
N.R. 240v6

Greetings to the Land Commissioners in the Hawaiian Kingdom: I hereby state my claim for kihapai, lo`is and kula, in Honokohawai Ahupua`a in Kaanapali. There is my place which I occupy.
KANE

F.T. 367-368v7
Cl. 511, Kane

Kuku, sworn, I know the lands of the claimant. They are in two pieces and a house lot in Honokowai.

No. 1 is a kalo land in Kapili.
No. 2 is a kula uala in Kapili.
No. 3 is a house lot in Kipapa.

The claimant received these lands from his brother in the days of kamehameha I. He is a son of the land, and has enjoyed the possession of the lands to this day.

No. 1 is bounded:
Mauka by Kaukau's land
Lahaina by the King's poalima
Makai by the ili of Ohia
Kahakuloa by Kaukau's land and creek.

No. 2 is bounded:
Mauka by the ili of Palaha & Haena
Lahaina by the ili of Palaha
On other two sides by the ili of Haena

No. 3 is bounded:
Mauka by the Government road
Lahaina by Akamai's land
Makai by Government lot
Kahakuloa by Naapu's lot.

N.T. 225v5
No. 5121, Kane, June 29, 1849

Kuku, sworn, He has seen three section in the ilis of Honokowai.

No. 1 - Taro land at Kanili ili.
Mauka by Kaukau
Lahaina by King's Poalima
Makai by Ohia ili
Kahakuloa by Kaukau/stream.

No. 2 - Pasture land at Kapili ili.
Mauka by Haena ili / Palaha ili
Lahaina by Palaha ili
Makai and Kahakuloa by Haena ili.

No. 3 - House lot at Kipapa ili.
Mauka by Government road
Lahaina by Akamai
Makai by Government fence
Kahakuloa by Naapu

Land from Younger brother since the time of Kamehameha I. No one has objected to him.

[Award 5121; R.P. 6653; Honokowai Kaanapali; 1 ap.; .54 Ac.; Kapili Honokowai Kaanapali; 2 ap.; 10.53 Acs 1 rood 7 rods]

APPENDIX B.

Cultural Impact Assessment

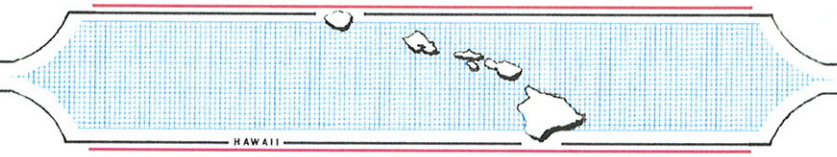
SCS Project Number 872-CIA-1

A CULTURAL IMPACT ASSESSMENT OF WASTE WATER PUMP STATION NO. 1 IN HONOKŌWAI AHUPUA`A, KA`ANAPALI, LAHAINA DISTRICT, MAUI ISLAND, HAWAI`I [TMK 4-4-02:03; 4-4-2:29]

Prepared by:
Leann McGerty, B.A.
and
Robert L. Spear, Ph.D.
October 2007

Prepared for:
Mr. Kyle Ginoza
Munekiyo and Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai`i 96793

SCIENTIFIC CONSULTANT SERVICES Inc.



711 Kapiolani Blvd. Suite 975 Honolulu, Hawai`i 96813

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

Scientific Consultant Services (SCS), Inc. has been contracted by the Munekiyo and Hiraga, Inc., to conduct a Cultural Impact Assessment on two parcels at the proposed Wastewater Pump Station No. 1, in Honokōwai Ahupua`a, Ka`anapali, Lahaina District, Maui Island, Hawai`i [TMK: 4-4-02:03; 4-4-2:29] (Figure 1).

The Constitution of the State of Hawai`i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua`a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (2000). In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikeaouli) preserved the peoples traditional right to subsistence. As a result in 1850, the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupua`a* tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawaiian Revised Statutes (HRS) 7-1. In 1992, the State of Hawai`i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, "native Hawaiian rights...may extend beyond the *ahupua`a* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner" (Pele Defense Fund v. Paty, 73 Haw.578, 1992).

Act 50, enacted by the Legislature of the State of Hawaii (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

> ...there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights...[H.B. No. 2895].

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shoreline developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other

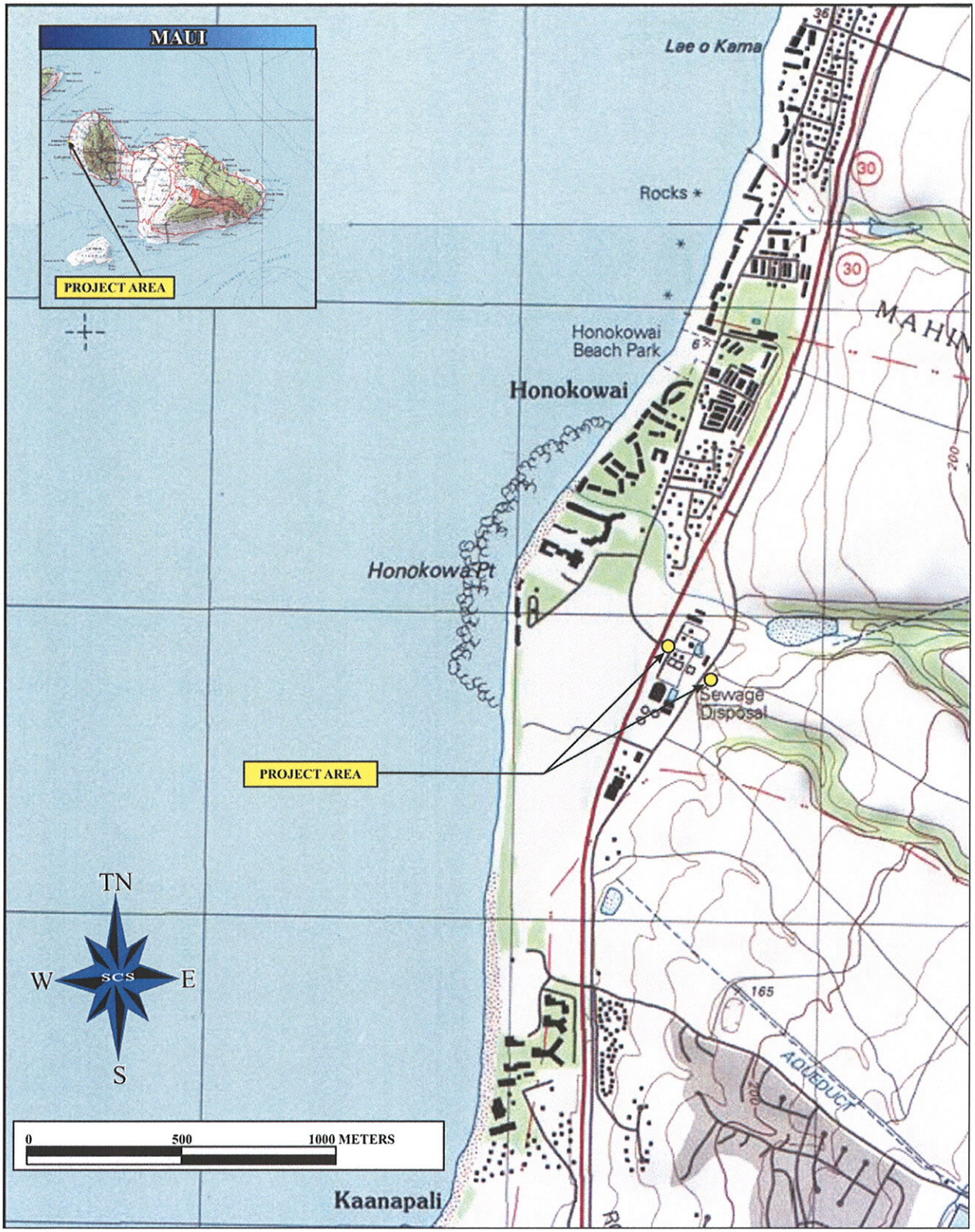


Figure 1: USGS Quadrangle Map Showing Project Area Location.

ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are...contrary to the State's environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000). Thus, not only are properties evaluated for impact to Native Hawaiians, but also for other ethnic groups as well.

Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua`a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997):

> The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religions and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural resources, including values, rights, beliefs, objects, records, properties, and stories occurring within the project area and its vicinity cultural values and rights within the project area and its vicinity (H.B. 2895, Act 50, 2000).

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Methodology", the OEQC state:

> ...information may be obtained through scoping, community meetings, ethnographic interviews and oral histories...[1997].

This report contains archival and documentary research, as well as communication with organizations possibly having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

(1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints of limitations which might have affected the quality of the information obtained;

(2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;

(3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;

(4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

(10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;

(11) the inclusion of bibliography of references, and attached records of interviews which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

INTERVIEW METHODOLOGY

Interviews are conducted in accordance with Federal and State laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise, and indeed, organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail clubs, and Planning Commissions are depended upon for their recommendations of suitable informants. These groups are invited to contribute their input, and suggest further avenues of inquiry, as well as specific individuals to interview.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to

project, but usually include: personal association to the *ahupua`a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, letters briefly outlining the development plans along with maps of the project area were sent to individuals and organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from the Maui Branch Office of Hawaiian Affairs; the Office of Hawaiian Affairs, O`ahu; the Maui Planning Department Cultural Resources Committee; Na Kupuna O Maui; the Hawaiian Civic Club, Lahaina; National Hawaiian Preservation Council; and State Historic Preservation Division Cultural Historian. If cultural resources are identified based on the information received from these organizations or additional informants, an assessment of the potential effects on the identified cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

PROJECT AREA AND VICINITY

The project area was located in Honokōwai Ahupua`a, Ka`anapali in close proximity to Honokōwai Point, and was a part of the present sewage disposal compound (Figure 2).

CULTURAL HISTORICAL CONTEXT

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu`u Kukui, forming the west end of the island (1,215m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems that watered fertile agricultural lands extending to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted productive landscapes.

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha`ōhia, during the time of the *ali`i* Kaka`alaneo (Beckwith 1940:383; Fornander places Kaka`alaneo at the end of the 15th century or the beginning of the 16th century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali`i `ai moku* (the *ali`i* who eats the island/district), which he held in trust for the gods. The title of *ali`i `ai moku* ensured rights and responsibilities pertaining to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs

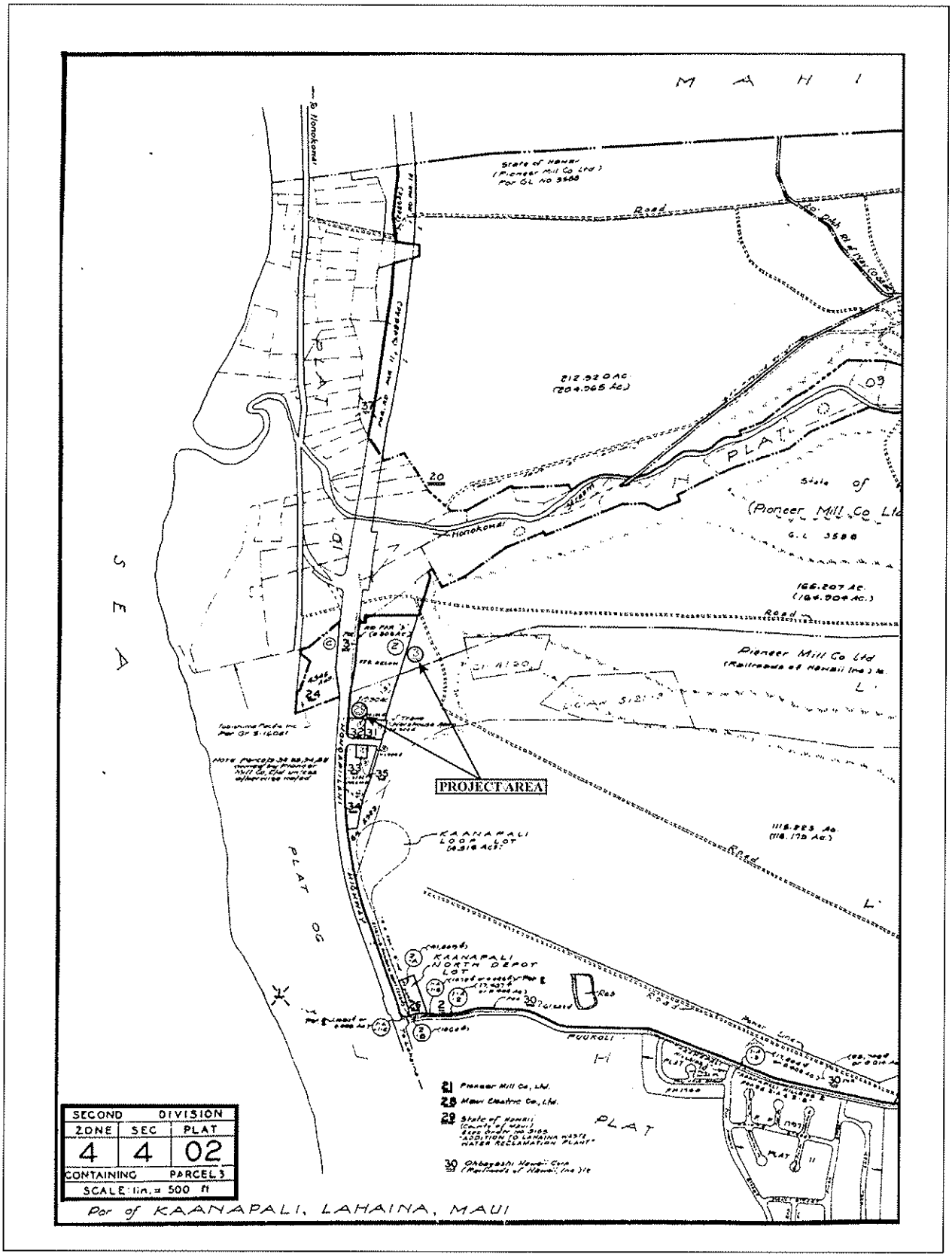


Figure 2: Tax Map Key [TMK] Showing Project Area.

received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili`ā ina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili `āina* or *`ili* were smaller land divisions next to importance to the *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (*ibid*:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in a *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in the *ahupua`a* of Honokōwai, which translated means literally "bay drawing water" and perhaps refers to the gardens known in the area (Pukui *et al.*:49).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and *mai`a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *`uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Agricultural development on the leeward side of Maui was likely to have begun early in what is known as the Expansion Period (AD 1200-1400, Kirch 1985).

WAHI PANI (LEGENDARY PLACES)

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama`āina* of the district. At least eight *heiau* were recorded in the vicinity of the ancient village of Lāhainā, fishing *ko`a* (shrine) were present along the beach and on the slopes above the bays, and petroglyphs were inscribed in many places whose meanings have yet to be fully understood (Thrum 1908, 1916, 1917; Walker 1930:103). Pearl shell was gathered

from Makaīwa Beach for the eyes of the *ki`i* (image, picture) and battles were fought along the coast (Sterling 1998). A portion of the paved trail built by Kihapi`ilani, son of the great chief Pi`ilani, was identified along the coast (*ibid*).

Honokōwai has been associated with many ancient *mo`olelo*. One concerns Maui's efforts to snare the sun and extend the day light hours to dry his mother's *kapa* (Forbes 1881). A man named Moemoe was transformed into a long rock as result of his taunting remarks concerning Maui's efforts. The rock is still by the side of the rock near Pu`u Keka`a.

Another told the story of Wahine-o-Manua, who ran from her husband, hid in the *heiau* of Haluluko`ako`a, and was protected by an owl.

> ...by the clapping of its wings [the owl] led the pursued girl through the brush till she reached the large stone mauka of Kekaa, Kaanapali, where it left her and she lay down and slept till morn, when she arose and departed. The stone is known as Pohaku o Wahine o Manua. [Thrum 1908:45]

To the south is Pu`u Keka`a, made famous by being the birthplace of the sons of chiefs and long associated with ghosts, strange occurrences, and the skeletons of defeated invaders (Fornander 1918–19, Vol. 5:542). In Fornander, S. Kaha stated:

> Concerning the great amount of human bones at this place. On account of the great number of people at this place there are numerous skeletons [this was the vicinity of several bloody battles], as if thousands of people died there; it is there that the Lahainaluna students go to get skeletons for them when they are studying anatomy. The bones are plentiful there; they completely cover the sand.
>
> This is a ghostly place. Some time a number of people came from Kaanapali (from the other side) going to Lahaina in the dark. When they came to Kekaa stones rolled down from the top of the hill without any cause. Listening to it, it seemed as if the hill was tumbling down; the people going along were startled and they explained, Kekaa is ghostly! Kekaa is ghostly!" Certainly this is a strange thing for this hill to do [*ibid*].

It was also believed that Pu`u Ka`a was a *leina a ka`uhane*, or soul's leap similar to O`ahu's Ka`ena Point. Naha says:

> It is said that when a person dies his spirit journeys to Kekaa; if he has a friend there who had previously died, that one would drive it away when the spirit is nearing Kekaa. Sometimes the spirit of a person would return and re-enter the body, and cause it to come to life again; that is what happened to those who are living again. Many souls came to this place Kekaa. It is called the Leina-a-ka-uhane, the leaping place of the soul...[*ibid*].

According to legend, the lands surrounding Pu`u Keka`a were once areas of intense cultivation and the capital and home of the Maui chief, Kaka`alaneo, when he ruled West Maui. Kaka`alaneo lived on the *pu`u* with his wife, a chiefess from Moloka`i.

> Kekaa was the capitol of Maui when Kalaalaneo was reigning over West Maui...Many houses were constructed and people cultivated a great deal of potatoes, bananas, sugar cane, and things of a like nature. I have been told that the country from Kekaa to Hahakea and Wahikuli –that country now covered by cactus, in a northwesterly direction for Lahaina-was all cultivated. This chief [Kakaalaneo] also planted bread fruit and kukui trees down at Lahaina. Some of these trees southwest of the Lahaina fort, were called the bread fruit trees of Kauheana [Fornander 5:540–541].

Kaka`alaneo's possessions included fishponds in Hana and a famous breadfruit grove he planted outside of Lāhainā (Handy and Handy 1972). His son, Ka`ulula`au, became famous for traveling around Lāna`i fighting ghosts (Sterling 1998). Maui, the demi-god himself, was associated with the hill:

> At Kekaa lived Maui and Moemoe...The great desire of one [Moemoe] was to sleep. The other [Maui] desired to travel. When Moemoe slept, Maui was traveling, each according to his taste...[Moemoe] made up his mind...to search for his friend, Maui. A road on the northeast side of Kekaa was named after one of these men; it is called "Ke alanui kikeekee a Maui"-the zig zag pathway of Maui" [Fornander 1918-19, Vol. 5:540–544].

Kamakau records a burial site used by the *maka`āinana* of the district:

> Waiuli...is a deep pit where the corpses of the common people were thrown...It is directly mauka of Honokohau, Honolua, and Honokahua, and for those from Lahaina to Kahakuloa, it was the common burial place. The body of anyone from those places who had died on Molokai was brought back to that place [Kamakau 1964:39].

In *Ruling Chiefs*, Kamakau recounts the story of the battle between the chiefly brothers Kauhi`aimoku-a-kama and Kamehamehanui with the support of Alapa`inui from Hawai`i Island and Peleioholani of O`ahu: "When Pele-io-holani heard that Alapa`i was at Lahaina he gathered all his forces at Honokahua and at Honolua. At Honokawai [sic] an engagement took place between the two armies, and the forces of Alapa`i were slaughtered and fled to Keawawa" (1961:74).

It was recorded that Pu`ū Keka`a became the burial place for Kekaulike's oldest son, Kauhi`aimoku-a-kama, who was subsequently defeated by his brother and Uncle at the Battle of Koko-o-na-moku further south at Makaīwa Beach (Sterling 1998). Kahekili succeeded his brother Kamehameha-Nui as ruler of Maui and to prove he was a true descendant of the gods, he leapt from the `Ū-ha-ne lele or Soul-Leaping Place of Maui. No ordinary man would dare to do this (*ibid.*).

Evidence of the battle was confirmed in *Account of the Polynesian Race* (1969 2:140) by Abraham Fornander who wrote: ". . . .and to this day heaps of human bones and skulls, half buried in various places in the sand, attest the bitterness of the strife and the carnage committed.

LĀHAINĀ DISTRICT SETTLEMENT PATTERNS

In Hawai`i, much of the coastal lands were preferred for chiefly residence. Easily accessible resources such as offshore and onshore fish ponds, the sea with its fishing and surfing—known as the sports of kings, and some of the most extensive and fertile wet taro lands were located in the area (Kirch and Sahlins, 1992 Vol. 1:19). Inland resources necessary for subsistence, could easily be brought to the *ali`i* residences on the coast from nearby inland plantations. The majority of farming was situated in the lower portions of stream valleys where there were broader alluvial flat lands or on bends in the streams where alluvial terraces could be modified to take advantage of the stream flow. Dry land cultivation occurred in colluvial areas at the base of gulch walls or on flat slopes (Kirch 1985; Kirch and Sahlins 1992, Vol. 2:59). Lāhainā Village had the added advantage of a calm roadstead and close proximity to Lāna`i, and Moloka`i (Handy and Handy 1972).

Trails extended from the coast to the mountains, linking the two for both economic and social reasons. A trail known as the *alanui* or "King's trail" built by Kihapi`ilani, extended along the coast passing through all the major communities between Lāhainā and Mākena, After the conquest of Maui by Kamehameha I, Lāhainā became the capitol of the Hawaiian Kingdom until it moved to Honolulu around 1855.

Most of the *ahupua`a* on the coast have been overshadowed by the famous roadstead and village of Lāhainā. In addition, a high percentage of archaeological sites in the Lahaina District have been impacted by early historic and modern day agricultural activities. Therefore, little is known about the settlement patterns outside of the city. However, ethnographic and historic literature, often our only link to the past, reveal that the lands around Lāhainā were rich agricultural areas irrigated by aqueducts originating in well-watered valleys with permanent occupation predominately on the coast. Handy and Handy have stated the space cultivated by the natives of Lāhainā at about "...three leagues [9 miles] in length, and one in its greatest breadth. Beyond this all is dry and barren; everything recalls the image of desolation" (1972:593). Crops cultivated included coconut, breadfruit, paper mulberry, banana, taro, sweet potato, sugar cane, and gourds.

Menzies, the naturalist and surgeon on board HMS Discovery during Captain George Vancouver's 1793 tour, made these observations of the Lāhainā coast and village:

> [We]...soon entered the verge of the woods where we observed the rugged bands of a large rivulet that came out of the chasm cultivated and watered with great neatness and industry. Even the shelving cliffs of rock were planted with esculent roots, banked in and watered by aqueducts from the rivulet with as much art as if their level had been taken by the most ingenious engineer...[Menzies 1920:105].

> ...to see the village of Lahaina, which we could scattered along shore on a low tract of land that was nearly divided into little fields and laid out in the highest state of cultivation and improvement by being planted in the most regulated manner with the different esculent roots and useful vegetables of the country, and watered at pleasure by aqueducts that ran here and there along the banks intersecting the fields, and in this manner branching through the greatest part of the plantation [Menzies 1920:112].

Little had changed twenty-six years later when J. Arago visited Hawai`i with Captain Louis de Freycinet in 1819. He recorded:

> The environs of Lahaina are like a garden. It would be difficult to find a soil more fertile, or a people who can turn it to greater advantage...various sorts of vegetables and plants...amongst which we distinguish the Caribee-cabbage, named here taro; double rows of banana, bread-fruit, cocoa-nut, palma-christi, and the paper-mulberry trees...[Arago cited in Handy and Handy 1972:493].

Rev. C.S. Stewart, a missionary in 1823 assigned to the Lāhainā station, also commented on the attractiveness of the environs:

> The settlement is far more beautiful than any place we have yet seen on the Islands. The entire district stretching nearly three miles along the seaside, is covered with luxuriant groves, not only of the cocoanut, the only tree we have before seen except on the tops of the mountains, but also of the breadfruit and the kou...while the banana plant, kappa and sugar-cane are abundant, and extend almost to the beach, on which a fine surf constantly rolls [Taylor 1928:42].
>
> ...The breadfruit trees stand as thickly as those of a regularly planted orchard, and beneath them are kalo patches and fishponds, 20 or 30 yards square, filled with stagnant water, and interspersed with kappa trees, groves of banana, rows of the sugar cane, and bunches of the potato and melon...It scarcely ever rains, not oftener, we are told, than half a dozen times during the year, and the land is watered entirely by conducting streams, which rush from the mountains, by artificial courses, on every plantation. Each farmer has a right, established by custom, to the water every fifth day [Taylor 1928:43].

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16). There were only five LCA claims for entire *ahupua`a* of Honokōwai. None were in the vicinity of the present project area.

HISTORIC LAND USE

Lāhainā, long the port of choice and where commercial endeavors had succeeded the traditional economy, suffered with the demise of the whaling industry and the change in Capitol of the Hawaiian Kingdom to Honolulu. By the mid-1800s the surrounding areas were being converted from traditional agriculture to commercial sugar cane. As early as 1849, Judge A.W. Parsons operated a sugar mill in Lāhainā. Henry Dickenson began a sugar plantation in 1859 that was quickly followed by the Pioneer Mill Co. By 1883, Pioneer Mill Co. had assets in excess of $50,000,000 (Simpich 1974). Pioneer Mill's railroad extended from the center of Lāhainā Village to a point north, past Honokōwai to the town of Pu`ukoli`i in Hanaka`ō`ō (Condé 1975). Pioneer Mill Co. reorganized in 1900 at which time its cane fields were located along the coast for 10 miles with some areas extending back as far as two and one half miles:

> The bulk of the crop is raised on lands that range from 10 feet to 700 feet elevation above sea level; the highest being cultivated at 1500 feet [Condé and Best 1973:254].

Sugar would be processed and bagged at the mill in Lāhainā and then taken by train to the landing at Pu`u Keka`a (Black Rock). Other buildings had been constructed there to aid in the plantations activities, such as oil and molasses tanks, as well as a pavilion and some beach cottages on the beach for the use of Pioneer Mill Company's personnel (Clark 1980:61). The Kā`anapali Landing, used for sugar cane exports, was abandoned before World War II and by 1957 plans were in motion for a multi-million dollar resort to be built around Pu`u Keka`a. The shift to tourism in the 1950s sent the plantations into decline, however, the development of golf courses, hotels, condominiums, and shops have continued the popularity of region up to and including the present.

SUMMARY AND CULTURAL ASSESSMEMNT

The "level of effort undertaken" to identify potential effect by a project to cultural resources, places or beliefs (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential. Sending inquiring letters to organizations concerning development of a piece of property that has already been totally impacted by previous activity and is located in an already developed industrial area may be a "good faith effort". However,

when many factors need to be considered, such as in coastal or mountain development, a good faith effort might mean an entirely different level of research activity.

In the case of the present parcels, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O`ahu; the Maui Planning Department Cultural Resources Committee; Na Kupuna O Maui; the Hawaiian Civic Club, Lahaina; National Hawaiian Preservation Council; and State Historic Preservation Division Cultural Historian.

Additionally, historical and cultural source materials were also consulted, extensively used, and can be found listed in the References Cited portion of the report. Such scholars as Kamakau (1961), Thrum (1908, 1916 1917), Fornander (1919, 1969), Walker (1930), Kuykendall (1938), Beckwith (1940), Chinen (1961), Handy and Handy (1972), Puku`i *et al.* (1974), Kelly (1983, 1998), and Kame`eleihiwa (1992) have contributed, and continue to contribute, to our knowledge and understanding of Hawai`i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona `Aina Data base (2005).

Analysis of the potential effect of the project on cultural resources, practices or beliefs, the potential to isolate cultural resources, maintain practices or beliefs in their original setting, and the potential of the project to introduce elements that may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). The project area has not been used for traditional cultural purposes within recent times. The passing of Act 50 in April 2000 mandates the assessment of impacts on cultural practices by the proposed project. As stated earlier, this includes the cultural resources of the different groups comprising the multi-ethnic community of Hawai`i. Cultural resources can include sites, behaviours, values, beliefs, rights and stories, among other things.

Based on the lack of response from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O`ahu; the Maui Planning Department Cultural Resources Committee; Na Kupuna O Maui; the Hawaiian Civic Club, Lahaina; National Hawaiian Preservation Council; and State Historic Preservation Division Cultural Historian, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering will not be affected by development activities on Parcels 03 and 29. Because there were no activities identified on Parcels 03 and 29, there were no adverse effects.

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APPENDIX C.

Excerpt of Preliminary Engineering Report

Final Submittal

Lahaina Wastewater Pump Station No. 1 Modifications
Preliminary Engineering Report

Prepared For:
County of Maui
Wastewater Reclamation Division
Department of Environmental Management

Prepared by:
HDR|Hawaii Pacific Engineers

Job No. 06-11, Contract No. C3723
HPE Project No. 2006006
August 31, 2007

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Chapter 4 (Continued)

APPENDICES

LIST OF TABLES

List of Tables (continued)

LIST OF FIGURES

List of Figures (continued)

Executive Summary

EXECUTIVE SUMMARY

This preliminary engineering report evaluates alternatives to replace or upgrade the existing Lahaina Wastewater Pump Station (WWPS) No. 1. The Lahaina WWPS No. 1 is the largest of 16 wastewater pumping stations servicing West Maui and one of two pump stations discharging to the Lahaina Wastewater Reclamation Facility (WWRF). The pump station is serviced by a 1,600 feet long, 20-inch diameter force main.

The Lahaina WWPS No. 1 was constructed in the late 1970's and has a capacity of approximately 7 million gallons per day (mgd). The Lahaina WWPS No. 1 currently does not have sufficient capacity to handle peak wet-weather flows based on its original design and installed equipment. The existing peak flow is estimated to be as high as 10 mgd. A portable engine-driven pump and temporary force main is currently used to provide the required additional capacity. Future developments in the service area are expected to increase the peak wet-weather flow to approximately 20 mgd within a 25 to 30 year time period. Peak wet-weather flows are projected to be as high as 25 to 30 mgd under the projected ultimate full-development conditions.

Three alternatives that were evaluated are as follows:

- Alternative 1 – Construction of a new drywell/wetwell dry pit submersible pump station at the Lahaina WWRF and abandoning the existing Lahaina WWPS No. 1.
- Alternative 2 – Construction of a new pump wet pit submersible pump station at the Lahaina WWRF and abandoning the existing Lahaina WWPS No. 1.
- Alternative 3 – Construction of an additional wet pit submersible pump station at the existing Lahaina WWPS No. 1 site and operating both the new and existing pump stations.

Alternative 3 has been selected for implementation by the County of Maui. The proposed new submersible pump station will have a design capacity of 12.5 mgd initially, with the capability of increasing capacity up to 28 mgd in the future. Together with the existing pump station, the total capacity of the pump station will be 19.5 mgd. The existing pump station is expected to be in service for approximately the next ten years, after which it will be abandoned and additional pumps will be installed in the new pump station.

The following upgrade work is proposed:

- New submersible pump station with a two compartment self-cleaning wetwell, with three 70 horsepower pumps installed in one wetwell compartment initially. The new pump station would have the capability of being outfitted with up to five 100 horsepower pumps to increase capacity up to 28 mgd.

- Renovation and expansion of the existing chemical storage building to provide approximately 1,100 square feet of space for new electrical motor control center equipment and 350 kW /emergency generator.
- New two stage bioscrubber and activated carbon odor control system.
- Approximately 1,300 lineal feet of new 30-inch force main to the Lahaina Wastewater Reclamation Facility screening building.

The estimated probable construction cost for the proposed pump station upgrade work and new force main is $9.2 million.

Chapter 1

Introduction

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

This preliminary engineering report develops and documents the basis for the proposed upgrade work for the existing Lahaina Wastewater Pump Station (WWPS) No. 1. The Lahaina WWPS No. 1 is the largest of 16 wastewater pumping stations servicing West Maui and one of the two downstream pump stations discharging to the Lahaina Wastewater Reclamation Facility (WWRF).

The Lahaina WWPS No. 1 is located on the east side of Honoapiilani Highway, approximately 300 feet south of Lahaina WWRF. A 1,600 feet long, 20-inch diameter force main discharges flow from the pump station to the influent structure at the Lahaina WWRF. The Lahaina WWPS services residential, resort, commercial and industrial areas located in Lahaina.

1.2 OVERVIEW OF LAHAINA WWPS NO. 1

The Lahaina WWPS No. 1 was constructed in the late 1970's to convey wastewater collected on the southern portion of West Maui to the Lahaina WWRF. In the mid 1980's, odor control facilities were constructed at the pump station site.

The Lahaina WWPS No. 1 is a pre-engineered triplex "canned" pump station with a factory-built fabricated steel below-grade drywell and built-in-place reinforced concrete wetwell. The pump station has three 50-horsepower variable speed non-clog pumps. Emergency standby power is provided by a diesel engine generator.

The Lahaina WWPS No. 1 currently does not have sufficient capacity to handle peak wet-weather flows based on its original design and installed equipment. A portable engine-driven pump and temporary force main is being used to provide the required additional pumping capacity.

1.3 PROJECT OBJECTIVES AND SCOPE

The primary objective of this preliminary engineering report is to develop recommendations for the proposed upgrade work for the existing Lahaina Wastewater Pump Station (WWPS). Significant emphasis was placed on developing and evaluating alternatives to either replace or upgrade the existing Lahaina WWPS No. 1 to provide adequate capacity. Other key objectives include the evaluation of future wastewater flows, development and evaluation of preliminary pump station design criteria and layouts, and investigation of alternatives for replacement of the existing odor control system.

Specific tasks and scope items for this study include the following:

- Investigation of existing conditions based on review of available information and site observations.

- Evaluation of design flows based on historical flow data and proposed future development in the service area.

- Evaluation of pump station alternatives, including developing preliminary site layouts, for:

    - Constructing a new drywell/wetwell dry pit submersible pump station at the Lahaina WWRF and abandoning the existing Lahaina WWPS No. 1.

    - Constructing a new pump wet pit submersible pump station at the Lahaina WWRF and abandoning the existing Lahaina WWPS No. 1.

    - Constructing an additional wet pit submersible pump station at the existing Lahaina WWPS No. 1 site and operating both the new and existing pump stations.

  The alternatives would be required to have sufficient capacity to handle the projected future design flows. The alternatives include the construction of required new sewers, force mains, standby emergency generator facilities, odor control systems, and other support facilities associated with the pump station replacement/upgrade.

- Evaluation of chemical scrubber and biological odor control system alternatives.

- Development of proposed design criteria, preliminary layout and estimates of probable construction costs for proposed new facilities and modifications to existing facilities.

1.4 ORGANIZATION OF THE STUDY AND REPORT

The study was conducted in two phases. The two phases are briefly described below.

The first phase focused on conceptual evaluation of general alternatives described above primarily to determine whether a completely new pump station would be constructed at the Lahaina WWRF or a supplemental pump station would be constructed at the existing Lahaina WWPS No. 1 site. This initial phase concluded that a supplemental pump station should be constructed at the existing pump station site.

The second phase involved more detailed preliminary engineering work to reevaluate and refine the findings of the first phase. This resulted in revisions to the size, design, and layout of the proposed facilities.

The remaining chapters of this report are organized as follows:

- Chapter 2 Existing Pump Station Facilities
  (overview of existing pump station and force main facilities)

- Chapter 3 Wastewater Design Flow
  (analysis of existing wastewater flows and projected future development and flows)

- Chapter 4 Pump Station Upgrade Recommendations
  (preliminary layouts, descriptions, design criteria and estimated probable construction costs for proposed new facilities)

A substantial amount of information is also presented in the appendices of this study. The appendices are as follows:

- Appendix A Background Information on Existing Facilities

- Appendix B Wastewater Flow Information

- Appendix C Initial Evaluation of Pump Station Alternatives (evaluation of three pump station alternatives, including preliminary facility layouts, estimated costs, and operation and maintenance requirements)

- Appendix D Initial Evaluation of Odor Control Alternatives
  (evaluation of three alternative odor control systems, including estimated costs, and operation and maintenance requirements)

- Appendix E Manufacturer's Literature

The evaluations of general pump station and odor control alternatives, which comprised much of the initial phase of this study, are included in the appendices rather than the main body of the report. This approach to the report organization minimizes confusion caused by some substantial differences in: 1) the revised recommended actions described in Chapter 4 that are intended to serves as the basis of design, and 2) the preliminary conceptual alternatives analysis and recommendation in Appendices C and D that were developed in the initial stages of the project. The reasons for the differences and revised recommendations are described in Chapter 4.

Chapter 2

Description of Existing Facility

CHAPTER 2
EXISTING PUMP STATION FACILITIES

2.1 INTRODUCTION

This chapter presents a brief overview of the existing Lahaina Wastewater Pump Station No. 1 facilities. Basic background information is presented on the pump station, electrical and emergency generator facilities, odor control system and force mains.

A vicinity map showing the location of the Lahaina WWPS No. 1, existing 20-inch force main, and temporary force main is presented in Figure 2-1. A site plan of the pump station is shown in Figure 2-2. The pump station entrance tube, wetwell hatches, emergency generator building and temporary engine-driven pump are shown in Photograph No. 1. The odor control facilities are shown in Photograph No. 2. Excerpts of the construction drawings for the original pump station construction are presented in Appendix A-1.

2.2 PUMP STATION DRYWELL AND WETWELL

2.2.1 General

The Lahaina WWPS No. 1 utilizes a pre-engineered triplex "canned" pump station with a factory-built fabricated steel below grade drywell and built-in-place reinforced concrete wetwell. The drywell and wetwell were constructed as part of the original pump station in the late 1970's. In 2001, the pump station underwent renovations to refurbish the pumps, motors, electrical components and other equipment.

The drywell is approximately 24 feet deep, with the floor elevation at (-) 3.52 feet below mean sea level (MSL). Major components housed in the drywell include the three variable speed non-clog wastewater pumps, suction and discharge valves/piping, remote control panel, ventilation and air conditioning equipment, and sump pump. Access into the can drywell is provided by an electrically operated maintenance lift on the west side of the drywell.

The floor of the wetwell is at elevation (-) 3.60 feet below MSL. The wetwell is provided with two compartments to allow isolation of any one compartment for maintenance work. A wetwell influent flow chamber, which adjoins the wetwell, allows flow to be directed to either or both compartments by installing and removing stop gates in the flow channels. Flow through an opening between the two wetwell compartments can also be blocked off by installing a stop gate.

2.2.2 Wastewater Pumps and Motors

The pump station has three identical ITT Allis-Chalmer (A-C) Model 400 (10 x 8 x 17SC) variable speed, vertical non-clog pumps. The nameplate data indicates that each pump has

FIGURE 2-1

EXISTING LAHAINA WWPS NO. 1 AND FORCE MAIN GENERAL PLAN

TRUE NORTH

LAHAINA WASTEWATER RECLAMATION FACILITY (WWRF)

EXISTING LAHAINA WWPS NO. 1 20" FORCE MAIN

FROM LAHAINA COLLECTION SYSTEM

EXISTING 36" SEWER LINE FOR FUTURE USE (NOT USED)

HONOAPIILANI HIGHWAY

NAPILI WWPS NO. 1 FORCE MAIN

DRYWELL

PROCESS EQUIP BLDG.

LAHAINA WWPS NO. 1 (SEE FIG. 2-2)

HALAWA DRIVE

1985 CHLORINE CONTACT CHAMBER

SECONDARY CLARIFIER 3

SECONDARY CLARIFIER 1

SECONDARY CLARIFIER 2

AERATION BASIN

CHLORINE BLDG.

CHLORINE CONTACT CHAMBERS

RAS/WAS PUMPING STATION

CHEMICAL STORAGE BLDG.

GENERATOR BLDG.

ODOR REDUCTION TOWER

WET WELL

CLARIFERS

TEMPORARY FORCE MAIN CONNECTION TO EXIST. 20" FORCE MAIN

SOLIDS PROCESSING FACILITY

BLOWER BLDG.

GENERATOR BLDG.

FLEXIBLE AERATION BASIN

DIVERSION BOX

BLOWER BLDG.

AERATION BASIN

SCREENING BLDG.

MAINTENANCE BLDG.

INFLUENT STRUCTURE

TEMPORARY 10" ABOVE GROUND FORCE MAIN

CANE HAUL ROAD

EXISTING 20" FORCE MAIN

30" GRAVITY INFLUENT LINE

GRAPHIC SCALE:

0 50 100 200

SCALE: 1" = 100'

DATE: 12/28/06
SCALE: 1" = 1'
FILE: 2006006-FIG3

PM: RA
OPER: FAI*LI
REVISED: 01/10/07

LAHAINA WASTEWATER PUMP STATION NO. 1
MODIFICATIONS PRELIMINARY ENGINEERING REPORT
LAHAINA, MAUI, HAWAII

Hawaii Pacific Engineers

TRUE NORTH

EXISTING 20" FORCE MAIN

TO LAHAINA WWRF

EMERGENCY CONNECTION DISCHARGE LINE

FROM LAHAINA COLLECTION SYSTEM

FM 10"

TEMPORARY 10" ABOVE GROUND QUICK-CONNECT LIGHTWEIGHT STEEL FORCE MAIN

FM 20"

DRYWELL ENTRANCE TUBE

A/C EQUIP. WETWELL HATCH (TYP. OF 2)

EMERGENCY CONNECTION

EDGE OF AC ROADWAY

PROCESS EQUIPMENT BUILDING

AIR BLOWER W/ ENCLOSURE

CONC

BACKFLOW PREVENTER

FACTORY BUILT PUMP STATION

DRYWELL

WETWELL

EMERGENCY FORCE MAIN DISCHARGE CONNECTION

S 27"

SMH

ODOR REDUCTION TOWER

VENT

SMH

PORTABLE PUMP

CHAIN LINK FENCE

S 12"

SIDEWALK

D R I V E

EMERGENCY GENERATOR BUILDING

FM 10"

COVERED CHEMICAL STORAGE AREA

CHEMICAL STORAGE BUILDING

ODOR CONTROL DISCHARGE STACK

FOUL AIR FAN

BACKFLOW PREVENTER

WATER METER

W 3/4"

H A L A W A I

ABOVE GROUND FUEL TANK

A C R O A D W A Y

CONC DRIVEWAY

EDGE OF AC ROADWAY

ELEC PAD

CHAIN LINK FENCE

TO LAHAINA WWRF

NOTE:
FOR CLARITY, NOT ALL UNDERGROUND LINES SHOWN.

GRAPHIC SCALE:

0 5 10 20

SCALE: 1" = 10'

DATE: 12/28/06
SCALE: 1 = 1
FILE: 2006006-FIG4

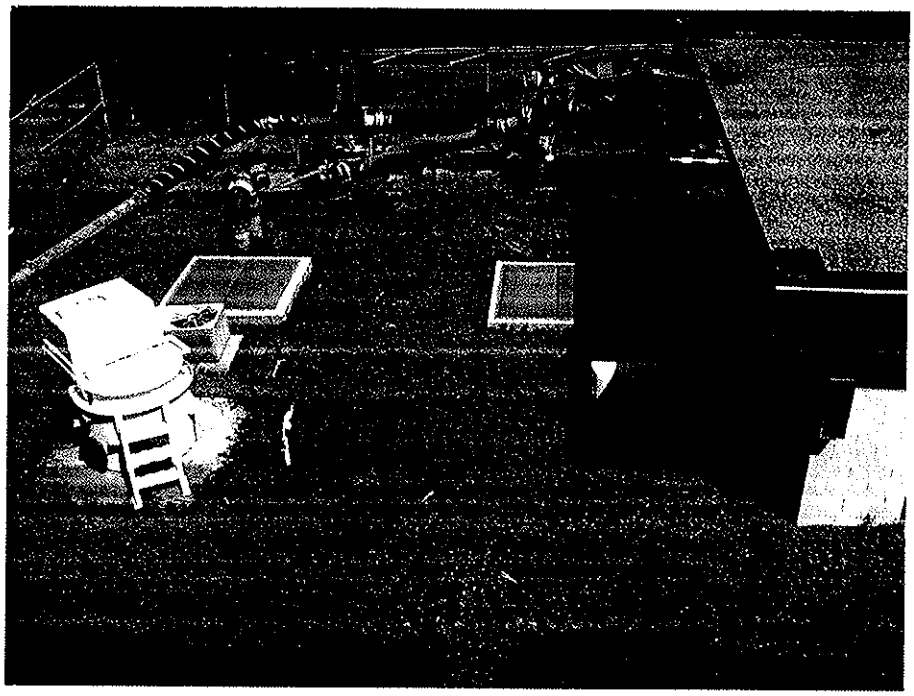
PM: RA
OPER: FAI,LI,*BTY
REVISED: 01/12/07

FIGURE 2-2

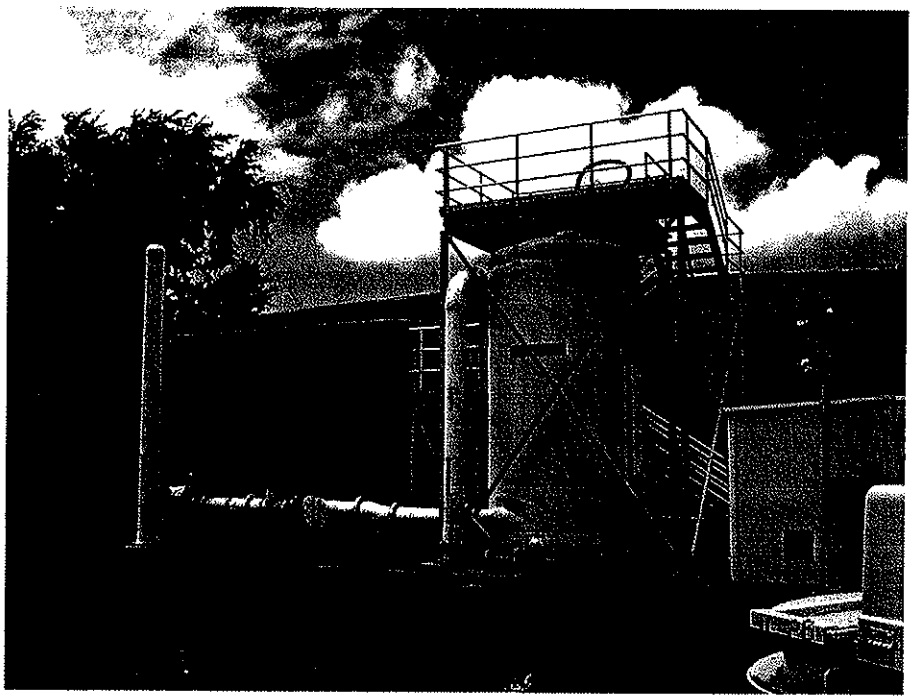
EXISTING LAHAINA WWPS NO. 1 SITE PLAN

LAHAINA WASTEWATER PUMP STATION NO. 1
MODIFICATIONS PRELIMINARY ENGINEERING REPORT
LAHAINA, MAUI, HAWAII

Hawaii Pacific Engineers



Photograph 1. Lahaina Wastewater Pump Station No. 1
(Drywell entrance is on the left and emergency generator building is on the right. The temporary engine-driven portable pump draws flow from the suction riser near the left wetwell hatch and discharges flow to the force main riser and temporary above-ground force main.)



Photograph 2. Odor Control System at the Lahaina Wastewater Pump Station No. 1
(From left to right are the exhaust stack and exhaust fan, chemical storage building, odor control scrubber tower and process equipment building.)

17-inch diameter impellers and a design capacity of 2,500 gallons per minute (gpm) at 55 feet of head and 900 rpm. Each pump is provided with 50 horsepower (hp) U.S. Electrical Motors premium efficiency, inverter-duty type electric motors frame mounted on the pump and driven via short-coupled shafts. The pumps are provided with water-lubricated mechanical seals. The seal water is supplied by a potable water supply line protected with a reduced pressure principle backflow preventer.

The existing ITT-AC pumps were installed in 2001 as part of the pump station refurbishment project. The County of Maui was able to provide operation and maintenance manuals and manufacturer's literature on the pumps but was unable to locate the pump curves. From the nameplate data, however, CBC, Inc. was able to provide a copy of the pump curve, which is included in Appendix A-2. The original construction drawings indicate that the pump station has a design capacity of 7.1 mgd with two of the three pumps operating. Pump and system curves for multiple pump operation are presented in Appendix A-2. The theoretical curves indicate a capacity of 6.8 mgd at 54 feet of head based on two pumps operating and a Hazen-Williams friction factor of 120. The slight discrepancy with the 7.1 mgd capacity may be due to slightly differing pump curves (original vs. new pumps), differences in the assumed static head, and variations in minor loss coefficients. For the purposes of this study, it was assumed that the existing pump station has a capacity of 7.0 mgd. The capacity of the pumps and pump station are discussed further in the next chapter.

The pumps and motors appear to be in good condition. Some corrosion of the pump volute and pump supports was observed. With adequate maintenance, it is anticipated that the pump station could be utilized for at least ten more years.

2.2.3 Piping and Valves

The pump station is provided with 14-inch suction plug valves, 8-inch spring-type swing check valves, and 12-inch discharge plug valves. The discharge plug valves and check valves are mounted in the vertical position on the discharge riser that discharges to the 16-inch header. The valves and piping appear to be in good condition.

2.2.4 Ventilation and Air Conditioning System

The drywell is ventilated by a force air ventilation system with supply and exhaust fans. The drywell is also provided with an air conditioning system to cool and dehumidify the drywell. Information on the capacities of the exhaust fans and air conditioning system was not readily available.

2.2.5 Sump Pump

The single sump pump is provided in a shallow round floor sump. Some corrosion is present on the bottom and sides of the steel sump.

2.3 ELECTRICAL SYSTEMS AND EMERGENCY STANDBY POWER

The motor control centers, pump level control system, electrical switch gear, emergency standby generator, and other support equipment are located in an above-grade masonry building on the east of the wetwell. All of the existing electrical and pump control systems, including the emergency generator, were installed as part of the 2001 renovation work.

Variable speed capability is provided by Robicon variable frequency drives. A bubbler-type level control system with float switch backup system is utilized for the level control system.

Pumps No. 1, No. 2, and No. 3 are driven by Robicon variable frequency drives (VFDs). Under automatic operation, any one pump can be chosen as the lead pump with the second and third pumps serving as lag and standby pumps.

Emergency standby power is provided by an Onan 200 KW diesel-engine emergency generator with automatic transfer switch. Fuel for the standby generator is provided by a 1,000 gallon SuperVault aboveground concrete vault type fuel tank.

The pump station is monitored by Supervisory Control and Data Acquisition (SCADA) equipment similar to other County of Maui pumping stations.

2.4 ODOR CONTROL SYSTEM

The existing odor control facilities at the Lahaina WWPS No. 1, which occupies the southern half of the site (see Figure 2-2), were constructed in the mid-1980's. The system includes an odor control atomizing chemical mist scrubber tower, treated air exhaust fan and stack, masonry building for bulk chemical handling and storage, prefabricated fiberglass process equipment building housing chemical pumps and water softening equipment, and small prefabricated shed housing an air blower.

The odor control system is a chemical wet scrubber system manufactured by Calvert Environmental. The odor control system, which is nearly 20 years old and utilizes more chemicals than newer chemical scrubber-type systems, is slated to be replaced. Discussions on the odor control system alternatives are presented in Chapter 5.

2.5 FORCE MAINS AND TEMPORARY ENGINE-DRIVEN PUMP

The Lahaina WWPS No. 1 discharges to a 20-inch diameter 1,600 feet long force main that discharges to the influent structure at the Lahaina WWRF. The force main was built in the late 1970's at approximately the same time as the pump station. The construction drawings indicate that the force main is either constructed of ductile iron or asbestos cement pipe.

As shown on Figure 2-1, the force main crosses Halawai Drive and is aligned on the mauka side of the Honoapiilani Highway right-of-way. The force main traverses across the Lahaina WWRF and discharges to the original plant influent structure. At the influent structure, the flow combines with flow from the Napili WWPS No. 1 force main and flows to the new screening

building headworks channel via a 30-inch gravity sewer. The County of Maui plans to replace the Lahaina WWPS No. 1 force main in the near future due to the age and condition of the pipeline.

The Lahaina WWPS No. 1 pumps currently do not have adequate capacity to handle the peak wet-weather flow during major storm events. A portable engine-driven pump is currently located at the pump station site to provide additional capacity to meet peak wet-weather flow requirements. The portable pump is connected to the emergency force main connection riser that allows discharge to the permanent 20-inch force main and/or to a temporary 10-inch force main that is also connected to the riser. The temporary 10-inch force main consists of above and below ground piping aligned on the mauka side of the pump station and Lahaina WWRF. The temporary force main connects to a previously unused existing 20-inch force main at the southeast corner of the Lahaina WWRF (see Figure 2-1). The temporary 10-inch above ground portion of the force main consists of lightweight steel piping with quick-disconnect couplings.

Chapter 3

Wastewater Design Flow

CHAPTER 3
WASTEWATER DESIGN FLOW

3.1 INTRODUCTION

This chapter focuses on the development of future design flows for the Lahaina WWPS No. 1 based on an assessment of historical wastewater flows and projected future land development within the Lahaina area.

The determination of the design flows for the Lahaina WWPS No. 1 is a critical step in the development and evaluation of alternatives. The objective is to size and design the future pump station upgrade to accommodate existing and projected increases in flows for a reasonable design period and also minimize the need for excessive future capital outlays for major upgrade work to meet ultimate "full development" flows. Operation and capacity of the pumping facilities must consider both typical dry-weather flow conditions and peak wet-weather flows.

3.2 GENERAL OBJECTIVES AND APPROACH

Wastewater pumping stations should be capable of handling peak wet-weather flows that occur periodically due to rain-induced infiltration and inflow. The pumping stations, however, should also be capable of accommodating average dry-weather flows conditions with good pumping efficiencies, and without operational problems such as sedimentation and odor generation in force mains and wetwells caused by low velocities and excessive detention time.

The following assessments and analyses are presented in this chapter:

- Evaluation of the existing and projected average wastewater flows.
- Evaluation of historical peak wet-weather flows.
- Evaluation of future development and the projected future average and peak wet-weather flows at various stages of development.
- Determination of an appropriate peak design flow for the Lahaina WWPS No. 1 replacement/upgrade project.

3.3 EXISTING AND FUTURE AVERAGE WASTEWATER FLOWS

Analysis of existing average wastewater flows for the Lahaina WWPS No. 1 was based on flow monitoring data provided by the County of Maui. The flow from the Lahaina WWPS No. 1 is measured at a flow meter located on the force main discharge at the Lahaina WWRF.

Projections of future average flows for the Lahaina WWPS No. 1 were based on information from excerpts of the following studies furnished by the County of Maui:

- 2006 Maui County Wastewater Flow Study, Proposed Development and Projected Flows at the Lahaina, Kihei and Kahului Wastewater Reclamation Facilities, prepared by the County of Maui, Department of Public Works and Environmental Management, Wastewater Reclamation Division, dated July 2006.

- Schematic Design Report, Lahaina Wastewater Reclamation Facility, prepared by CH2M Hill, dated September 2006.

The 2006 Maui County Wastewater Flow Study (referred to hereon as "2006 Flow Study") is the primary reference used in this study as it provides detailed future development information for the Lahaina WWPS No. 1 service area. Excerpts of the report are included in Appendix B-1. Flows presented in the report are evaluated along with the actual recorded Lahaina WWPS No. 1 flows.

Excerpts from the Schematic Design Report for Lahaina WWRF, which is copyrighted, are not appended to this report. The Lahaina WWRF report does not include specific information for the Lahaina WWPS No. 1 service area. The study presents an analysis of population and flows for the entire Lahaina WWRF service area but does not indicate a timeframe for the future increase in flow.

3.3.1 Historical Average Flows

The Lahaina WWRF receives all of its flow from two tributary pump stations. The southern portion of the Lahaina WWRF service area is handled by the Lahaina WWPS No. 1 while the northern portion of the service area is serviced by the Napili WWPS No. 1. The discharge of each pump station's force main is metered at the Lahaina WWRF and the two flow readings are summed to obtain the total influent flow at the Lahaina WWRF.

Historical average monthly flows from the Lahaina WWPS No. 1 and Napili WWPS No. 1 are summarized in Table 3-1 based on flow data provided by the County of Maui. The time period covered is from October 2004 through October 2006, except that no data was provided for April through June of 2006. The data is shown graphically on Figure 3-1.

Based on the data provided, the average flow is 3.32 mgd for the Lahaina WWPS No. 1, 1.66 mgd for the Napili WWPS No. 1, and 4.98 mgd for the Lahaina WWRF. The Lahaina WWPS No. 1 accounts for approximately two-thirds of the Lahaina WWRF flow. The average monthly flow at the Lahaina WWPS No. 1 ranged from 2.9 to 3.8 mgd.

3.3.2 Projected Future Average Flow

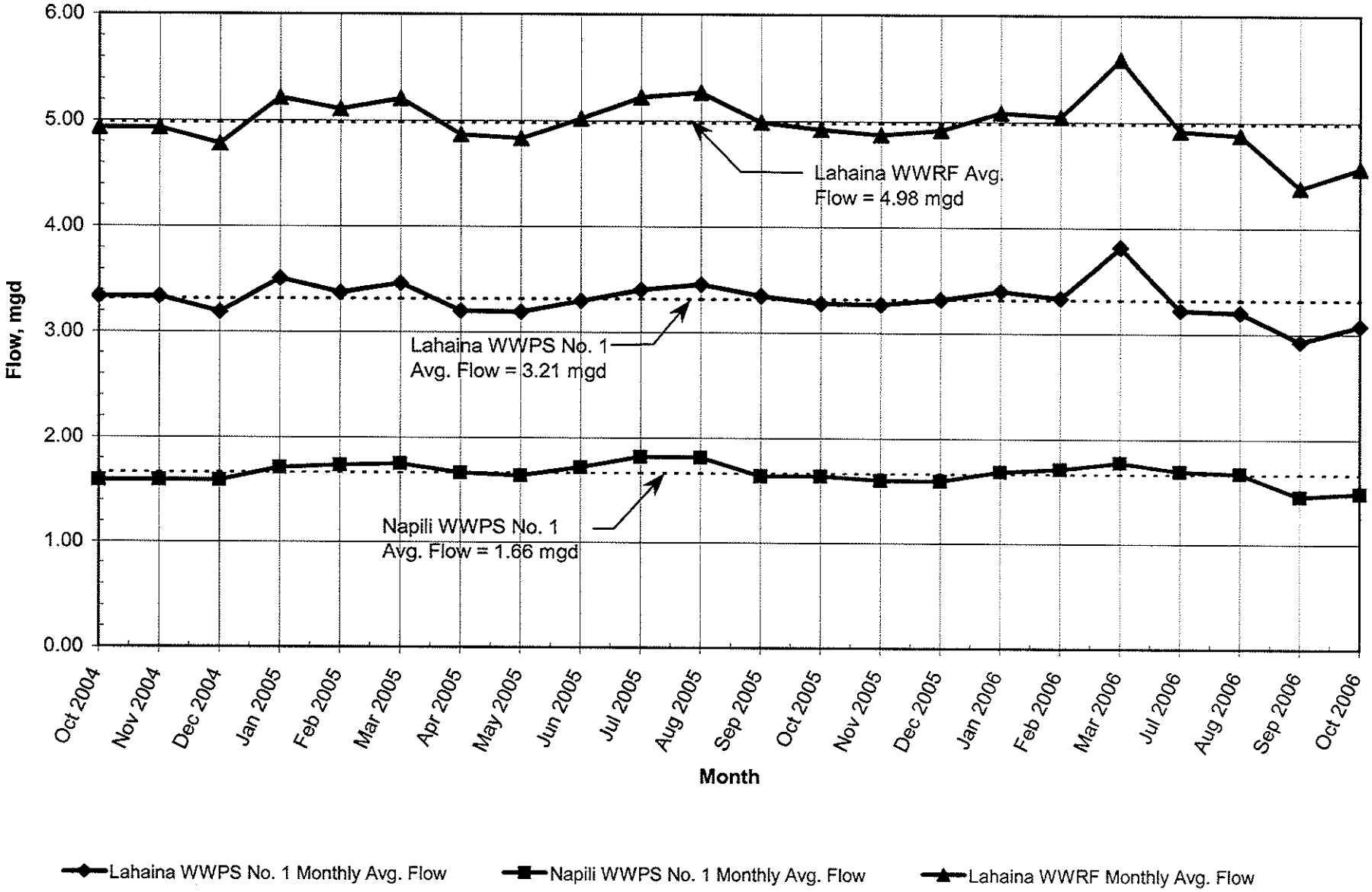
The 2006 Flow Study identified 34 development projects in the West Maui area that will contribute additional wastewater flow to the Lahaina WWRF through the year 2030 (see Appendix B-1). Of these projects, 27 projects are projected to impact the Lahaina WWPS No. 1.

Table 3-1
Summary of Average Flows

Time Period[1]	Recorded Lahaina WWPS No. 1 (mgd)	Recorded Napili WWPS No. 1 (mgd)	Total Lahaina WWRF Flow[2] (mgd)
Oct 2004	3.34	1.59	4.93
Nov 2004	3.34	1.59	4.93
Dec 2004	3.19	1.59	4.78
Jan 2005	3.51	1.71	5.22
Feb 2005	3.38	1.73	5.11
Mar 2005	3.47	1.75	5.21
Apr 2005	3.21	1.66	4.87
May 2005	3.20	1.64	4.83
Jun 2005	3.30	1.72	5.02
Jul 2005	3.41	1.82	5.23
Aug 2005	3.46	1.82	5.28
Sep 2005	3.35	1.64	4.99
Oct 2005	3.28	1.64	4.92
Nov 2005	3.27	1.60	4.88
Dec 2005	3.32	1.60	4.92
Jan 2006	3.40	1.69	5.09
Feb 2006	3.34	1.71	5.05
Mar 2006	3.82	1.78	5.59
Jul 2006	3.22	1.69	4.92
Aug 2006	3.21	1.67	4.88
Sep 2006	2.93	1.45	4.38
Oct 2006	3.08	1.49	4.56
Average	3.32	1.66	4.98
Percent of Total	66.63	33.37	100.00
Maximum	3.82	1.82	5.59
Minimum	2.93	1.45	4.38

Notes:
1. No data provided for April through June of 2006.
2. Sum of Napili and Lahaina WWPS flows.

Figure 3-1 Historical Monthly Average Wastewater Flows



Information on projects within the Lahaina WWPS No. 1 service area, including the projects' tax map key, name, total estimated ultimate average flow contribution, and estimated future flow contribution and average flow by year (in five year increments between 2010 and 2030) is summarized in Table 3-2. The estimated Lahaina WWPS No. 1 future average flow is based on the sum of the projected future flow contribution and the estimated existing average flow of 3.32 mgd calculated in Table 3-1.

3.4 HISTORICAL PEAK WET-WEATHER FLOWS

Adequate capacity must be provided at the Lahaina WWPS No. 1 to accommodate peak wet-weather flows to avoid wastewater spills and backups. The wet-weather peaking factor (ratio of peak wet-weather flow to average flow) can vary substantially depending on the characteristics of the service area and condition of the collection lines.

To determine an appropriate peaking factor for the Lahaina WWPS No. 1, historical flow data in the form of graphed flow data obtained from the County of Maui's SCADA system database was reviewed for six major storm events that occurred between 2002 and 2005. The dates of the storm events were determined by examining rainfall records and searches on the Internet for reports of major storms and flooding in the Lahaina area.

A summary of the approximate recorded peak flow for the Lahaina WWPS No. 1 and Napili WWPS No. 1 force main flow meters at the Lahaina WWRF during the six storm events is presented in Table 3-3. The flows were obtained from the graphed data generated by the SCADA system. Copies of the graphs for the six storm events are presented in Appendix B-2. The computed total flow at the Lahaina WWRF, which is based on the sum of the Lahaina and Napili wastewater pump station flow readings, is also shown in Table 3-3 and graphs in Appendix B-2. It should be noted that the graphed data has an upper range of 12.5 mgd and therefore the flow values obtained off the graph do not exceed 12.5 mgd. As indicated in the notes of Table 3-3, the limits of the graphs for the graphed data were exceeded for all the major storm events for the Lahaina WWRF. For this reason, the computed sum of the individual Lahaina and Napili pump station peak flows provides a more accurate representation of the Lahaina WWRF peak flow. For the purposes of this study, however, the peak flow at the Lahaina WWRF is not important as only the Lahaina WWPS No. 1 peak flow is of concern.

It is believed that the peak flows in Table 3-3 that were obtained from graphed SCADA data provided by Maui County may be higher than the actual flows. In an analysis of flows during dry weather, it was observed that the graphed data produced average flows that were substantially higher than the tabulated flows. The tabulated average flows are based on daily totalizer meter readings. A comparison of representative discrepancies between the graphed flow data and tabulated data for typical dry-weather flow is presented in Table 3-4. The Maui County flow graphs and flow data tables, on which the comparison is based upon, is included in Appendix B-3. The flows from the graphed data appear to be higher than the actual flows. The sum of average flows for the Lahaina WWPS No. 1 and Napili WWPS No. 1 are lower than the Lahaina WWRF average flow, which seems to be caused by an upward bias at higher flows.

Table 3-2
Lahaina WWPS No. 1 Average Flow Projections by Year

2006 Flow Study Project ID No.	Tax Map Key	Development Description	Total Ultimate Avg. Flow (gpd)	By 2010		By 2015		By 2020		By 2025		By 2030	
				Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)
7	244014004	Kaanapali Ocean Resort Villas (Lot 2) 258 MF	92,790	100%	92,790	100%	92,790	100%	92,790	100%	92,790	100%	92,790
8	244014005	North Beach (Lot 3) 250 MF	90,000	0%	0	100%	90,000	100%	90,000	100%	90,000	100%	90,000
9	244014006	Honua Kai (North Beach Lot 4) 700 MF Resort	220,000	100%	220,000	100%	220,000	100%	220,000	100%	220,000	100%	220,000
10	243001031	Pulelehua 445 SF / 602 MF	371,390	5%	18,570	67%	248,831	100%	371,390	100%	371,390	100%	371,390
12	244002039	Kaanapali 2020 1,157 SF	1,700,000	5%	85,000	20%	340,000	40%	680,000	60%	1,020,000	80%	1,360,000
13	244006074	Lanikeha Phase I 67 SF	23,450	50%	11,725	100%	23,450	100%	23,450	100%	23,450	100%	23,450
14	244006074	Lanikeha Phase II 65 SF	22,750	25%	5,688	75%	17,063	100%	22,750	100%	22,750	100%	22,750
15	244006056	Kaanapali 10-H Subdivision 23 SF / 23 Ohana	12,190	0%	0	100%	12,190	100%	12,190	100%	12,190	100%	12,190
16	244013008	Hyatt Regency Time Share Expansion 806 Units	282,100	0%	0	100%	282,100	100%	282,100	100%	282,100	100%	282,100
17	245036001	Villages at Leiali'i: Village 1A 104 SF	36,400	80%	29,120	100%	36,400	100%	36,400	100%	36,400	100%	36,400
18	245021020	Villages at Leiali'i: Village 1B 234 SF	81,900	0%	0	50%	40,950	100%	81,900	100%	81,900	100%	81,900
19	245021003	Villages at Leiali'i: Balance 1,545 SF	1,264,950	0%	0	5%	63,248	10%	126,495	15%	189,743	25%	316,238
20	245011008	Lahaina Gateway Commercial, 11.4 Ac.	127,680	100%	127,680	100%	127,680	100%	127,680	100%	127,680	100%	127,680
21	245011009	Hawaii Omori Mauka - Lot 2 Commercial, 3.9 Ac.	43,680	50%	21,840	100%	43,680	100%	43,680	100%	43,680	100%	43,680
22	245011010	Hawaii Omori Mauka - Lot 3 Commercial, 5.2 Ac.	58,240	0%	0	0%	0	30%	17,472	60%	34,944	90%	52,416
23	245011003	Lahaina Cannery Mall Expansion Commercial	25,000	0%	0	50%	12,500	100%	25,000	100%	25,000	100%	25,000

Table 3-2
Lahaina WWPS No. 1 Average Flow Projections by Year

2006 Flow Study Project ID No.	Tax Map Key	Development Description	Total Ultimate Avg. Flow (gpd)	By 2010		By 2015		By 2020		By 2025		By 2030	
				Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)	Projected Percent Complete	Avg. Flow (gpd)
24	245021024	Kahoma 300 SF	159,000	0%	0	0%	0	33%	52,470	67%	106,530	100%	159,000
25	245010005	Kahoma Employee Housing 60 SF / 12 MF	24,060	0%	0	50%	12,030	100%	24,060	100%	24,060	100%	24,060
26	245011001	Villas at Kahoma 114 MF	29,000	100%	29,000	100%	29,000	100%	29,000	100%	29,000	100%	29,000
27	245010007	Lahaina Business Park Phase II 31 Lots	21,700	50%	10,850	100%	21,700	100%	21,700	100%	21,700	100%	21,700
28	245023070	Lokahi Kuhua Subdivision 12 MF	4,200	100%	4,200	100%	4,200	100%	4,200	100%	4,200	100%	4,200
29	245021010	Lahaina Civic Center Police, Fire, etc.	18,720	100%	18,720	100%	18,720	100%	18,720	100%	18,720	100%	18,720
30	246012005	West Maui Boys and Girls Club Commercial	3,250	100%	3,250	100%	3,250	100%	3,250	100%	3,250	100%	3,250
31	24606004	Wainee Village (Kaanapali Dev. Co.) 401 SF	290,000	10%	29,000	40%	116,000	70%	203,000	90%	261,000	100%	290,000
32	246015003	Na Hale O Wainee Phase 2 26 MF	6,630	100%	6,630	100%	6,630	100%	6,630	100%	6,630	100%	6,630
33	246018003	Kamehameha Schools Ku'ia Res. Infill 900 SF	315,000	0%	0	10%	31,500	30%	94,500	50%	157,500	65%	204,750
34	244008013	Royal Lahaina Resort Revitalization 330 Hotel	-44,800	50%	-22,400	100%	-44,800	100%	-44,800	100%	-44,800	100%	-44,800
Future Additional Avg. Flow, mgd			5.28		0.69		1.85		2.67		3.26		3.87
Existing Avg. Flow, mgd			3.32		3.32		3.32		3.32		3.32		3.32
Future Total Avg. Flow, mgd			8.60		4.01		5.17		5.99		6.58		7.19
% Increase			159		21		56		80		98		117

Note: Development and flow projection data obtained from 2006 Maui County Wastewater Flow Study, July 2006. Average existing flow based on flow data provided by Maui County (see Table 3-1).

Table 3-3
Summary of Approximate Peak Flows During Storm Events

Date and Approximate Time	Approximate Peak Flow (mgd)			
	Lahaina WWPS No. 1 Flow (from graph)	Napili WWPS No. 1 Flow (from graph)	Computed Sum of Lahaina and Napili WWPS Flows	Lahaina WWRF Flow (from graph)
Jan. 2, 2005, 10:00 a.m.	10.0	6.0	16.0	12.5
Feb. 27, 2004, 12:00 a.m.	10.8	2.3	13.1	12.5
Feb. 28, 2004, 12:00 to 5:00 p.m.	10.0	2.3	12.3	12.5
Jan. 1, 2004, 3:30 p.m.	12.5	6.0	18.5	12.5
Jan. 3, 2004, 7:00 a.m.	11.0	4.2	15.2	12.5
Oct. 15, 2002, 7:00 a.m.	12.5	3.6	16.1	12.5

Notes:
1. The upper limit of the graphed data is 12.5 mgd.
2. The values obtained from the graphed flow data may be higher than actual. See discussions.

Table 3-4
Comparison of Graphed vs. Tabulated Data

Date	Estimated Napili WWPS No. 1 Average Flow from Graphed Data (mgd)	Napili WWPS No. 1 Average Flow from Tabulated Data (mgd)	Difference (mgd)	Estimated Lahaina WWPS No. 1 Average Flow from Graphed Data (mgd)	Lahaina WWPS No. 1 Average Flow from Tabulated Data (mgd)	Difference (mgd)	Estimated Lahaina WWRF Average Flow from Graphed Data (mgd)	Estimated Lahaina WWRF Average Flow from Tabulated Data (mgd)	Difference (mgd)
10/4/05	1.5	1.5	0.0	3.8	3.2	0.6	5.7	4.7	1.0
12/6/05	1.4	1.5	-0.1	3.6	3.0	0.6	5.4	4.5	0.9
1/9/06	1.5	1.7	-0.2	4.2	3.5	0.7	6.1	5.2	0.9
2/6/06	1.6	1.6	0.0	3.8	3.2	0.6	5.6	5.1	0.5
3/5/06	1.6	1.7	-0.1	4.2	3.4	0.8	6.1	5.1	1.0
7/10/06	2.0	1.7	0.3	3.8	3.2	0.6	6.4	4.9	1.5
8/7/06	2.2	1.8	0.4	4.0	3.2	0.8	6.5	5.0	1.5
Average	1.7	1.6	0.1	3.9	3.2	0.7	6.0	4.9	1.1

The high wet-weather peak flows of the Lahaina WWPS No. 1 that are as high as 12.5 mgd based on the graphed SCADA data would appear to be high based on the capacities of the existing pumps (see pump and system curves in Appendix A-2), although such a high capacity could potentially be attained with the use of the portable pump.

The existing pump station has a capacity of about 7 mgd with two pumps operating. The pump station could potentially discharge flows of up to 10 mgd with all three pumps operating and with the wetwell level approximately 10 feet higher than the normal high wetwell level (lead pump start level of 3.4 feet above mean sea level). County of Maui personnel indicated that spills occur at the upstream manhole on Honoapiilani Highway just makai of the pump station. Since the elevation of the manhole lid is approximately 19.3 feet above mean sea level, the water level in the wetwell could be as much as about 15 feet higher than the normal high wetwell level. Under such conditions, however, the discharge would be expected to still be less than 11 mgd. Under the earlier operating conditions reflected by the peak flow data examined, the portable pump discharged to the 20-inch force main since the temporary force main was not yet installed so the meter readings should reflect the contribution of the portable pump. It is uncertain when the portable pump was actually used during the various storms and how much additional flow the pump may have contributed.

County of Maui personnel indicated that the tabulated data should be more accurate than the graphed SCADA data as the tabulated data is based off the plant flow meters that are regularly calibrated. The tabulated data unfortunately does not include hourly flow information that can be used to evaluate peak hourly flows.

3.5 FUTURE PEAK FLOW PROJECTIONS AND DETERMINATION OF DESIGN FLOW

Based the information presented in previous discussions, it was concluded that the existing average flow is approximately 3.3 mgd and that a reasonable design wet-weather peak flow under current conditions is 10 mgd. For reasons previously discussed, the 12.5 mgd peak flows indicated in graphed flow data for past storm events appear to be unrealistically high unless further investigations confirm the validity of the graphed data. The 3.3 mgd average flow and 10 mgd peak flow translates to a peak-to-average flow ratio of 3.0.

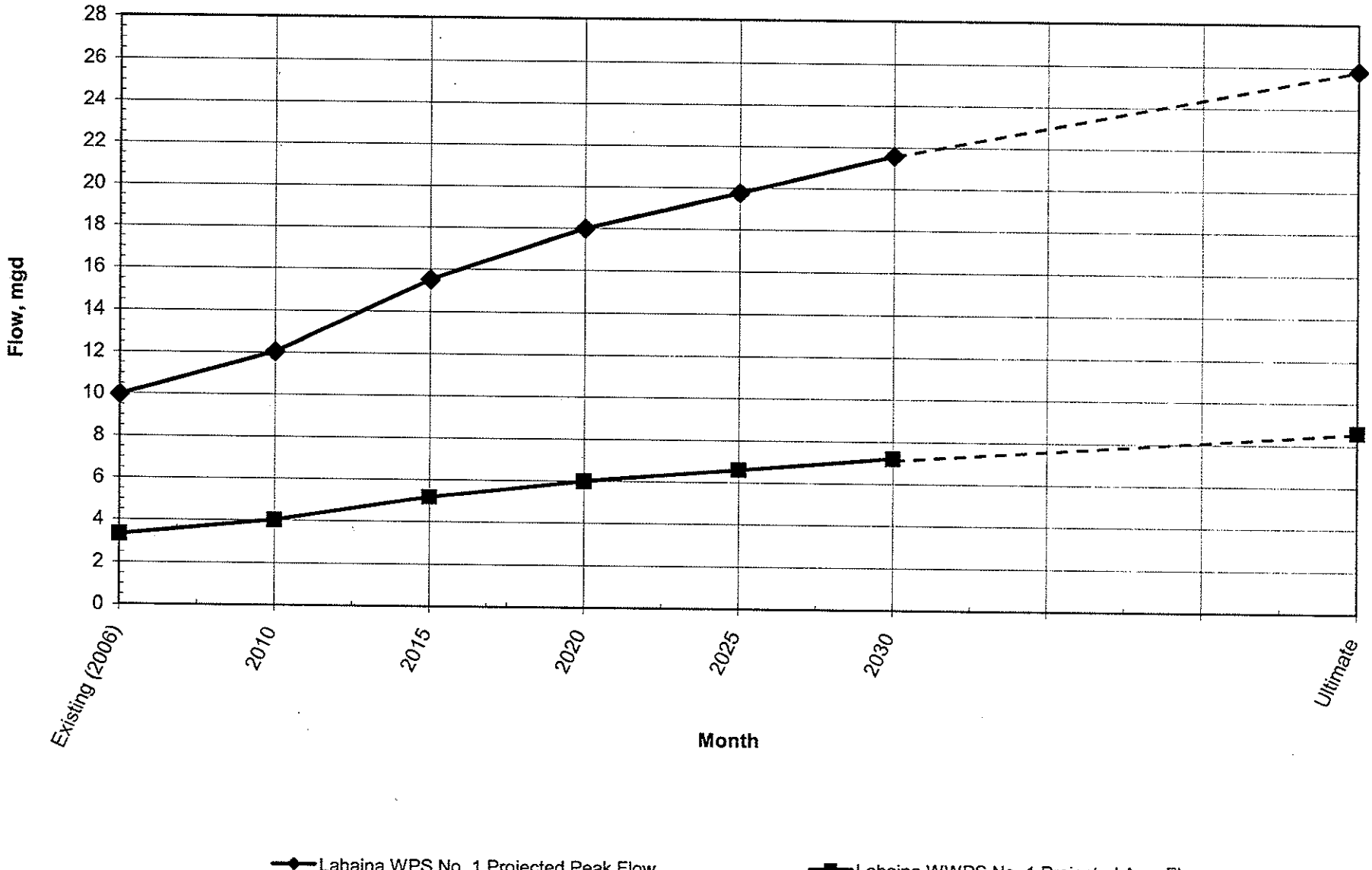
Future projections of peak and average flows are shown in Table 3-5 and Figure 3-2 based on the peak-to-average flow ratio of 3.0 and the assumed increases in average flow presented earlier in Table 3-2. The flow projections indicate that the peak flows would be 18.0 mgd in 2020, 19.7 mgd in 2025 and 21.6 mgd in 2030. The peak flow under the assumed ultimate full development conditions is 25.8 mgd.

A key factor that would tend to result in the projected peak flows being conservative is the likelihood that the peak-to-average flow factor will likely decrease as the flows increase. This would be due to the large amount of existing trunk lines that are already contributing much of the infiltration/inflow and the probable dampening of flows in a larger collection system. Factors

Table 3-5
Projected Peak Flow

Time Period	Projected Average Flow (mgd)	Assumed Peak to Avg. Flow Factor	Projected Future Flow (mgd)
Existing (2006)	3.3	3.0	10.0
2010	4.0	3.0	12.0
2015	5.2	3.0	15.5
2020	6.0	3.0	18.0
2025	6.6	3.0	19.7
2030	7.2	3.0	21.6
Ultimate	8.6	3.0	25.8

Figure 3-2 Projected Peak and Average Wastewater Flows



that would tend to increase the actual future peak flow include the addition of developments that have not been identified and further deterioration of the existing sewer lines that would increase infiltration/inflow. Such increases in flow, however, would be offset by identified future projects that are not implemented as planned, and by repairs to the collection system to reduce infiltration and inflow. Lahaina WWRF personnel indicated that one major source of inflow appears to be residents opening manhole covers to drain flooded areas. It is uncertain whether actions such as drainage system improvements, public education and installing locking manhole covers could substantially reduce the amount of inflow form this source in the future.

Based on the above assessment, a design peak flow of 19 mgd is proposed for the upgrade of the Lahaina WWPS No. 1. This would represent a significant increase in capacity with respect to the existing pump station capacity of 7.1 mgd and the existing estimated peak flow of 10 mgd. Based on the projected flow increases, it is expected that the capacity would be adequate up to the period between 2020 and 2025. If substantial decreases in infiltration and inflow are achieved by planned sewer rehabilitation projects in the Lahaina area, the capacity may be adequate to 2030 and beyond. Given the uncertainties associated with the future peak flow, the proposed 19 mgd design flow appears to be a reasonable compromise with respect to undersizing and oversizing the pumps. Facilities sized for the 19 mgd flow should operate relatively efficiently and at worst, would require upsizing and/or addition of pumps sooner than projected.

Where possible and cost-effective, design features to facilitate further increasing the capacity up to 25 to 30 mgd in the future should be considered. This would include sizing of the wetwell and pump station buildings to accommodate larger pumps and support equipment.

Chapter 4

Pump Station Upgrade Recommendations

CHAPTER 4
PUMP STATION UPGRADE RECOMMENDATIONS

4.1 INTRODUCTION

This chapter describes the recommended upgrades to the Lahaina WWPS No. 1. The basic recommendation is to construct a new wet pit submersible pump station at the existing Lahaina WWPS No. 1 and to operate both the new and existing pump station facilities. This recommendation is based on the findings of the initial phase of this study, which evaluated the following alternatives:

- Constructing a new drywell/wetwell dry pit submersible pump station at the Lahaina WWRF and abandoning the existing Lahaina WWPS No. 1.
- Constructing a new pump wet pit submersible pump station at the Lahaina WWRF and abandoning the existing Lahaina WWPS No. 1.
- Constructing an additional wet pit submersible pump station at the existing Lahaina WWPS No. 1 site and operating both the new and existing pump stations.

The initial phase evaluation of the above three pump station alternatives is presented in Appendix C. The initial evaluation of the odor control system alternatives is presented in Appendix D.

The remainder of this chapter addresses the preliminary layout, design criteria, and estimated probable construction costs for proposed new facilities. The recommendations presented in this chapter differ somewhat from those in the initial phase of the study due to refinements to the conceptual design of the facilities. Description of the changes and the rationale behind the changes are described in the following discussions.

4.2 OVERVIEW OF PROPOSED FACILITIES AND OPERATING CONCEPT

The proposed new pumping facilities is comprised of a new wet pit submersible pump station at the existing Lahaina WWPS No. 1 site and a new 30-inch force main to the Lahaina Wastewater Reclamation Facility (WWRF). The new facilities are proposed to supplement the capacity of the existing pump station and 20-inch force main in the near term, and eventually replace the existing facilities in the future. The general plan for existing and proposed new facilities is presented in Figure 4-1. The proposed site plan for the pump station is presented in Figure 4-2.

In the initial phase of this study, it was envisioned that the existing and new force mains would be interconnected to allow the use of the force mains to be alternated and both force mains to be operated together during high flow conditions. The concept was subsequently revised to

FIGURE 4-1

NEW FORCE MAIN ALIGNMENT

TRUE NORTH

LAHAINA WASTEWATER RECLAMATION FACILITY

HONOAPIILANI HIGHWAY

FROM LAHAINA COLLECTION SYSTEM

EXISTING 36" SEWER LINE (NOT USED)

EXISTING LAHAINA WWPS NO. 1 20" SEWER FORCE MAIN

NAPILI WWPS NO. 1 FORCE MAIN

ODOR CONTROL SYSTEM

FUEL TANK

LAHAINA WWPS NO. 1

ELECTRICAL EMERGENCY GENERATOR BLDG

TRANSFORMER

NEW WET PIT SUBMERSIBLE PUMP STATION

HALAWA DRIVE

SECONDARY CLARIFIER 3

SECONDARY CLARIFIER 1

RAS/WAS PUMPING STATION

SECONDARY CLARIFIER 2

CHLORINE CONTACT CHAMBER

AERATION BASIN

CHLORINE BLDG.

CHLORINE CONTACT CHAMBERS

CLARIFERS

GENERATOR BLDG.

NEW 30" FORCE MAIN

SOLIDS PROCESSING FACILITY

BLOWER BLDG.

FLEXIBLE AERATION BASIN

BLOWER BLDG.

AERATION BASIN

INFLUENT STRUCTURE

SCREENING BLDG.

MAINTENANCE BLDG.

CANE HAUL ROAD

NEW 30" FORCE MAIN IN CANE HAUL ROAD (PIONEER MILL PROPERTY; NEW SEWER EASEMENT REQUIRED)

PROPOSED 15' WIDE SEWER EASEMENT

EXISTING 20" SEWER FORCE MAIN (NOT USED)

EXISTING 16" RECLAIMED WATER LINE

EXISTING 30" GRAVITY INFLUENT LINE

CONNECT NEW 30" SEWER FORCE MAIN TO SCREENING BUILDING

GRAPHIC SCALE:

0 50 100 200

SCALE: 1" = 100'

DATE: 08/16/07
SCALE: 1 = 1
FILE: 2006006-FIG16

PM: RA
OPER: LI
REVISED: -

LAHAINA WASTEWATER PUMP STATION NO. 1
MODIFICATIONS PRELIMINARY ENGINEERING REPORT
LAHAINA, MAUI, HAWAII

Hawaii Pacific Engineers

FIGURE 4-2

PUMP STATION SITE PLAN

TRUE NORTH

CHAIN LINK FENCE

EDGE OF AC ROADWAY

EXIST 20" FORCE MAIN

TO LAHAINA WWRF

RELOCATED CHAIN LINK FENCE

NEW ODOR CONTROL SYSTEM

ACTIVATED CARBON SCRUBBER

ODOR CONTROL PANEL

FOUL AIR FAN

BIOSCRUBBER

DRYWELL ENTRANCE TUBE

A/C EQUIP.

WETWELL HATCH (TYP. OF 2)

EMERGENCY CONNECTION

EMERGENCY CONNECTION DISCHARGE LINE

SIDEWALK

NEW WATER METER

NEW BACKFLOW PREVENTER

NEW FLOW SPLITTER BOX

SMH (TYP.)

EXISTING BACKFLOW PREVENTER

EXISTING DRYWELL

EXISTING WETWELL

SMH

27" WEIR SLIDE GATE

VENT

FACTORY BUILT PUMP STATION

FOUL AIR FROM WETWELLS AND FLOW SPLITTER BOX.

SPACE FOR FUTURE SEWER CONNECTION

NEW GATE

CONC DRIVEWAY

HALAWAI DRIVE

NEW 42" GRAVITY SEWER LINE

NEW 30" SEWER FORCE MAIN

TO ODOR CONTROL

MAGNETIC FLOW METER

NEW SUBMERSIBLE PUMPS (TYPICAL OF 3)

SMH (TYP.)

NEW SUBMERSIBLE PUMP STATION (SEE FIGURE 4-)

TO LAHAINA WWRF

EMERGENCY PUMP DISCHARGE CONNECTION

VENT

EMERGENCY PUMP SUCTION CONNECTION

NEW TRANSFORMER

CHAIN LINK FENCE

EDGE OF AC ROADWAY

NEW ELECTRICAL/ EMERGENCY GENERATOR BLDG (RETROFITTED/EXPANDED CHEMICAL STORAGE BLDG)

NEW A.C. PAVEMENT

AC ROADWAY

AC ROADWAY

AC ROADWAY

GRAPHIC SCALE:

0 5 10 20

SCALE: 1" = 10'

DATE: 08/16/07
SCALE: 1 = 1
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dedicate the new force main to the new pump station and utilize the existing force main with only the existing pump station. This concept change was made for the following reasons:

- The existing force main, if continued to be relied upon to meet peak flow conditions, will eventually need to be replaced due to corrosion concerns. It was determined that constructing a new 30-inch force main that will be able to fully accommodate future flows would be more economical than constructing a smaller supplemental force main and replacing the existing force main in the future. In this scenario, the existing 20-inch force main would serve as partial backup to the new force main. Under the proposed scenario, a new 30-inch force main would be constructed up to the Lahaina WWRF Screening Building and the existing unused 20-inch force main would not be used as initially envisioned (see discussions on Alternative 3 in Appendix C).

- The pumps at the existing pump station are designed to operate at the higher head created by the existing 20-inch force main and cannot operate properly at the lower head associated with the new larger force main.

The new force main is proposed to be aligned entirely on the east side of the Lahaina WWRF rather than along the Honoapiilani Highway for the following reasons:

- The proposed alignment requires a shorter force main that would result in lower capital and long-term operating costs.

- The proposed alignment in a cane haul road owned by Pioneer Mill rather than in the State of Hawaii Department of Transportation highway right-of-way results in less traffic disruption and construction impacts, and less problems and delays associated with easement acquisition issues.

The proposed operating scheme involves alternating the use of the existing and new pump stations under normal dry weather flows and utilizing pumps of both pump stations under higher peak flows. A larger portion of the dry weather flows are proposed to be directed to the existing pump station for the following reasons:

- The existing pump station has lower capacity pumps that can deliver more uniform flow to the Lahaina WWRF headworks (versus flow surges created by more frequent starting and stopping of the new higher capacity pumps).

- Higher usage of the existing pumps, which will result in increased wear on the pumps, is appropriate as the intent is eventually to abandon the use of the existing pump station once the pumps, piping, drywell structure and electrical equipment reach the end of their useful lives.

- The new 30-inch force main will require a flow of approximately 6 mgd to achieve a minimum scoring velocity of two feet/sec. This is somewhat higher than the existing

pump station flow of 3 to 4 mgd with one pump operating. As noted previously, minimizing the use of the new pumps will minimize undesirable flow surges at the Lahaina WWRF. The higher flows of the new pumps will be less of a factor in the future when flows to the Lahaina WWRF increase.

4.3 WET PIT SUBMERSIBLE WASTEWATER PUMP STATION

4.3.1 Submersible Wastewater Pumps

The proposed layout of the pumps and wetwell are shown in Figures 4-3 and 4-4. Three new pumps are proposed to be initially installed in the larger two wetwell compartments to provide a 12.5 mgd peak flow capacity with two of the three pumps operating (one pump serving as a standby pump). Together with the 7 mgd capacity of the existing pump station, the Lahaina WWPS No. 1 would have a total peak flow capacity of 19.5 mgd. Pump and system curves for the proposed initial 70 horsepower pumps are shown in Figure 4-5. Manufacturer's literature on the proposed N-series of submersible pumps manufactured by Flygt Corporation is presented in Appendix E-1.

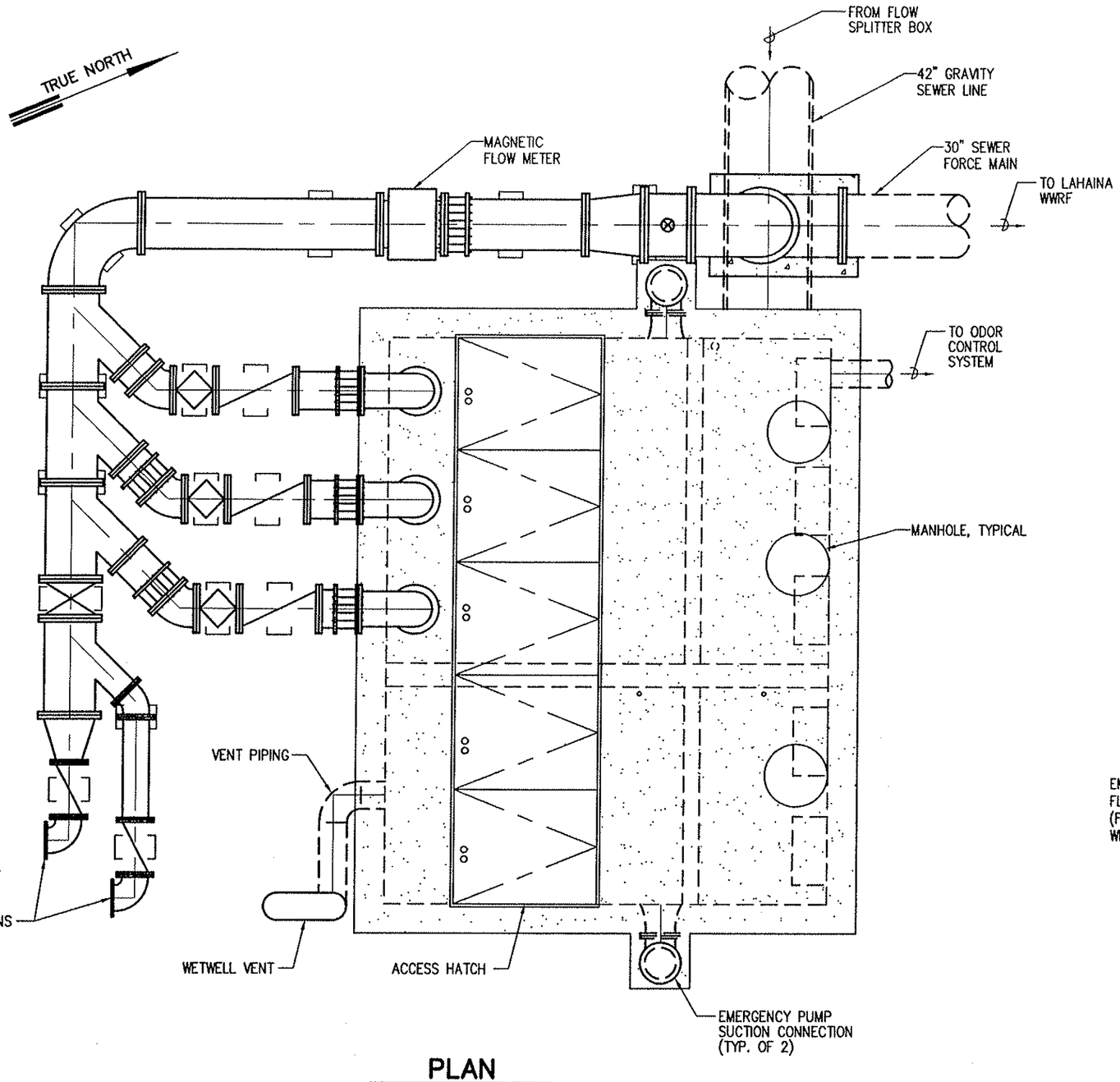
The 19.5 mgd capacity is somewhat conservative due to the assumed friction factors for old pipe (Hazen-William C values of 100 for ductile iron pipe and 110 for PVC force main pipe). Higher flows would also be achieved if the wetwell levels were allowed to rise above the designated high water level, which is set near the influent pipe invert.

Construction of the second wetwell compartment to allow two additional pumps to be installed is proposed as part of the current project to avoid costly and difficult construction of the adjacent wetwell in the future, and to provide emergency flow storage capacity. A small sump pump is proposed to pump overflow and any water accumulation from leakage (through isolating slide gates) to the existing wetwell. The sump pump and sump in the wetwell floor would be removed when the second wetwell is placed in service in the future.

Two additional 70 horsepower pumps could be installed in the second wetwell as required to boost the capacity of the new pumping station to 18.4 mgd (four pumps operating with the standby pump out of service). Larger 100 horsepower pumps could also be installed in the future to increase the pumping capacity as required to allow the existing pump station to be abandoned. Replacement of all the 70 horsepower pumps with larger 100 horsepower pumps in the future would allow peak pump capacity (with standby pump out of service) to be increased to 28 mgd in the future. The pump and system curve for five 100 horsepower pumps is presented in Figure 4-6.

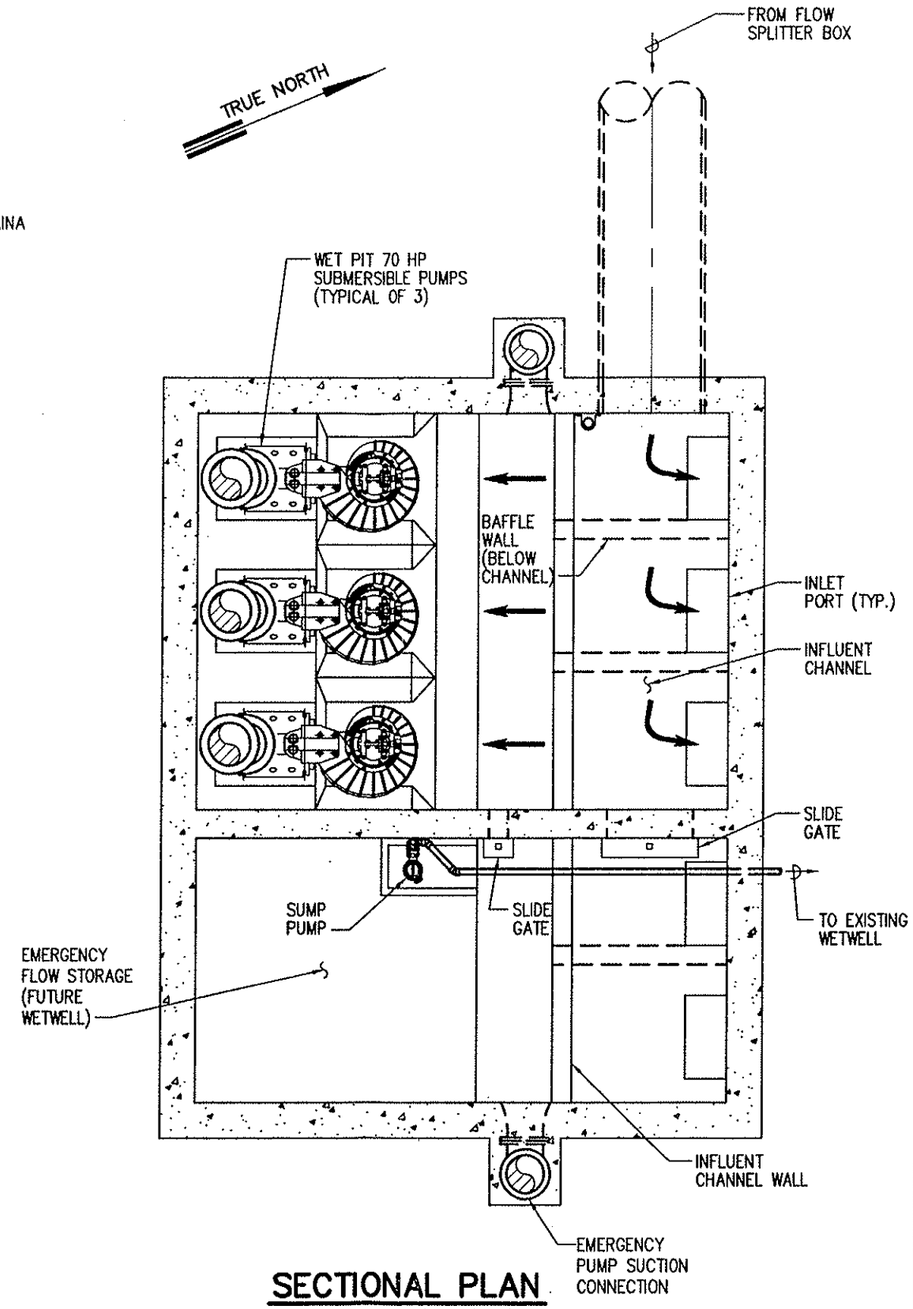
4.3.2 Wetwell Configuration

During the initial phase of this study, it was assumed that the new submersible wet pit pump station would utilize a state-of-the-art self-cleaning trench type wetwell (see discussions in Appendix C). In the subsequent preliminary engineering phase of the project, however, the engineering staff of Flygt Corporation, Maui County's preferred brand of submersible pumps,



PLAN

SCALE: 3/16" = 1'-0"



SECTIONAL PLAN

SCALE: 3/16" = 1'-0"

GRAPHIC SCALE:

4' 0 4' 8'

SCALE: 3/16" = 1'-0"

DATE: 08/29/07
SCALE: 1" = 1'-0"
FILE: 2006006-FIGA
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FIGURE 4-3

NEW PUMP STATION PLAN

LAHAINA WASTEWATER PUMP STATION NO. 1
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LAHAINA, MAUI, HAWAII

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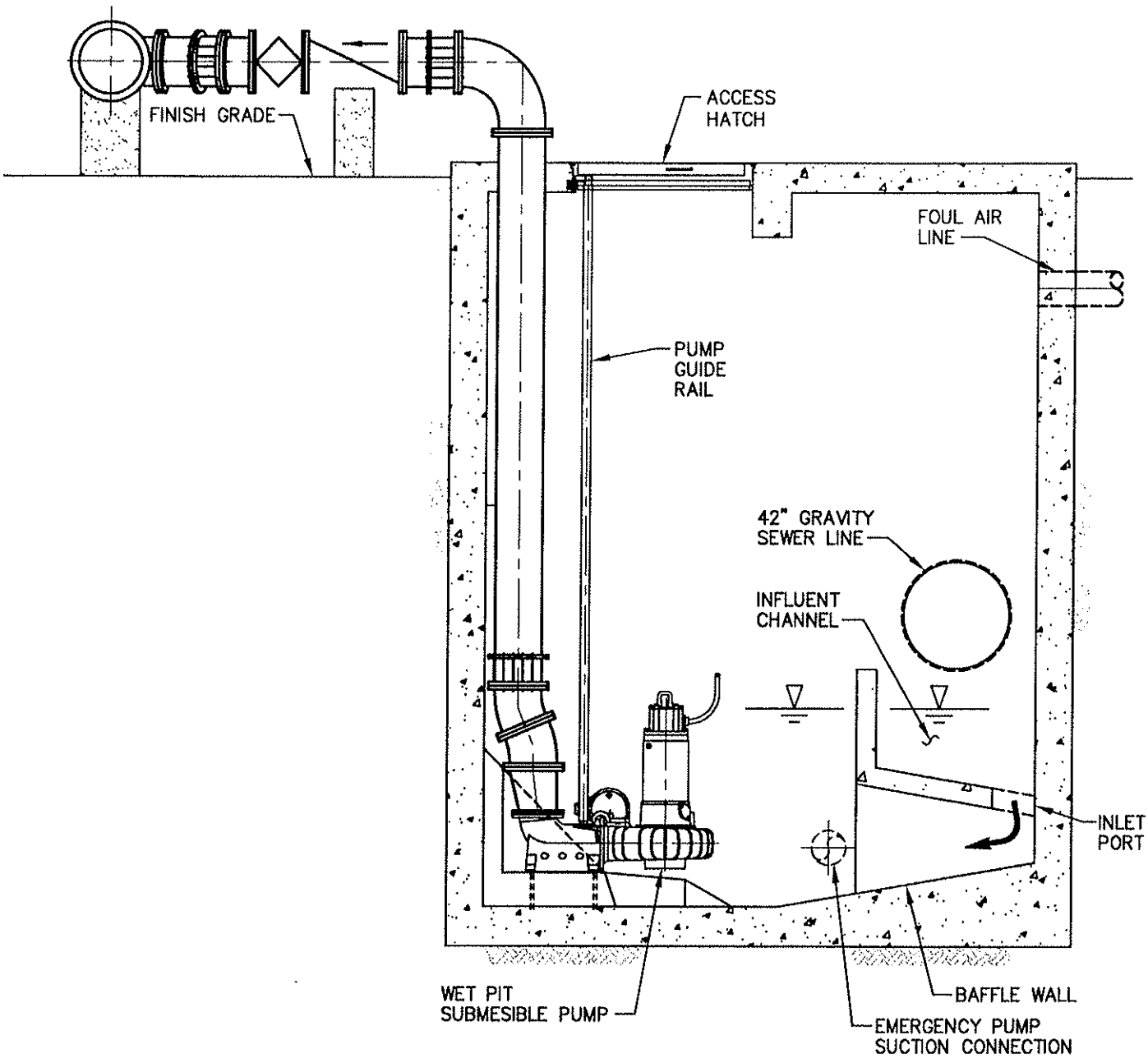

GRAPHIC SCALE:

4' 0 4' 8'

SCALE: 3/16" = 1'-0"

DATE: 08/29/07
SCALE: 1 = 1
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OPER: LJ
REVISED: -

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LAHAINA WASTEWATER PUMP STATION NO . 1 MODIFICATIONS

LAHAINA, MAUI, HAWAII

NEW PUMP STATION SECTION

FIGURE 4-4

Figure 4-5
Pump and System Curves for Initial 70 Hp Pumps
(Flygt Model NP 3356/605)

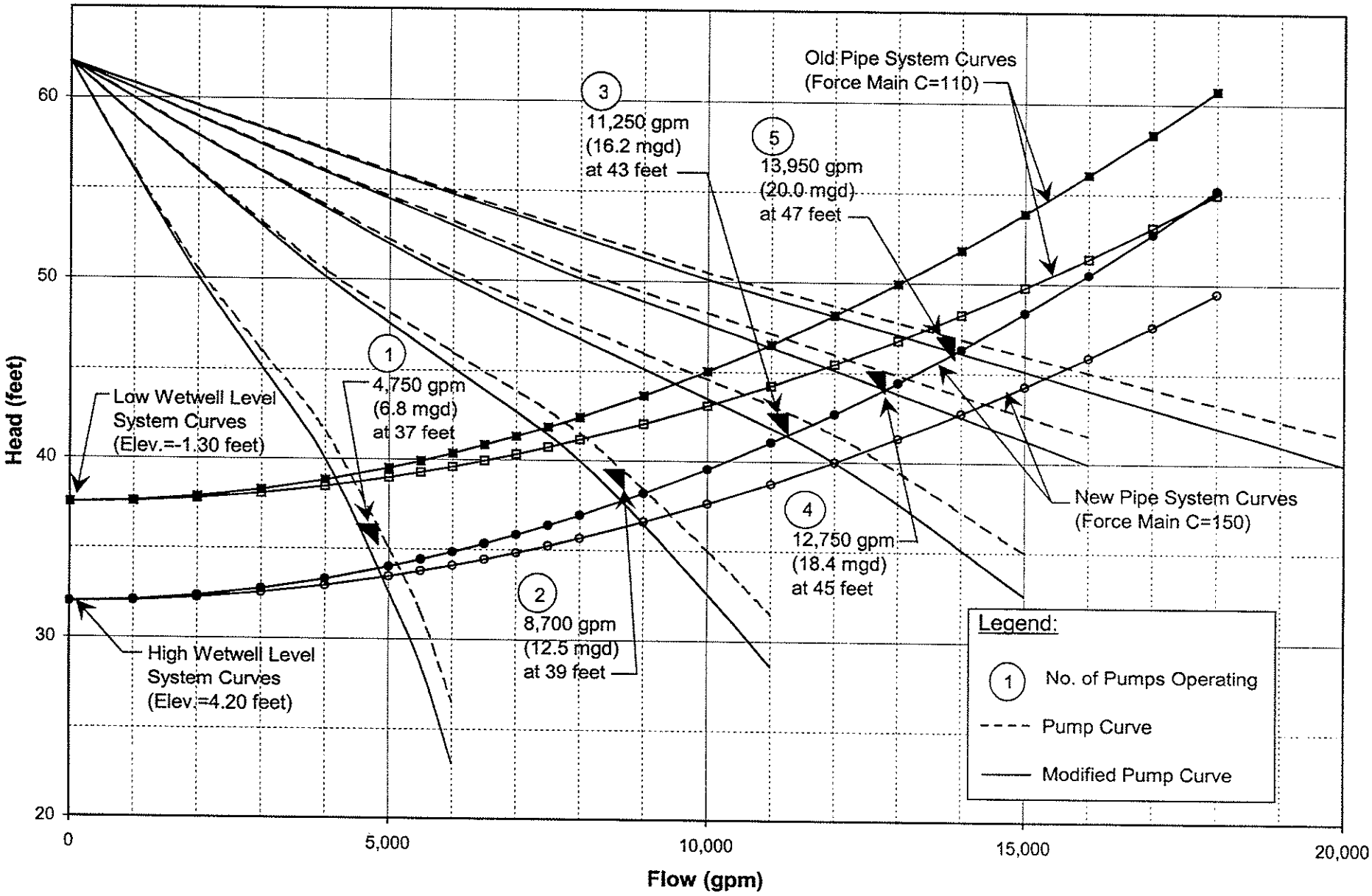
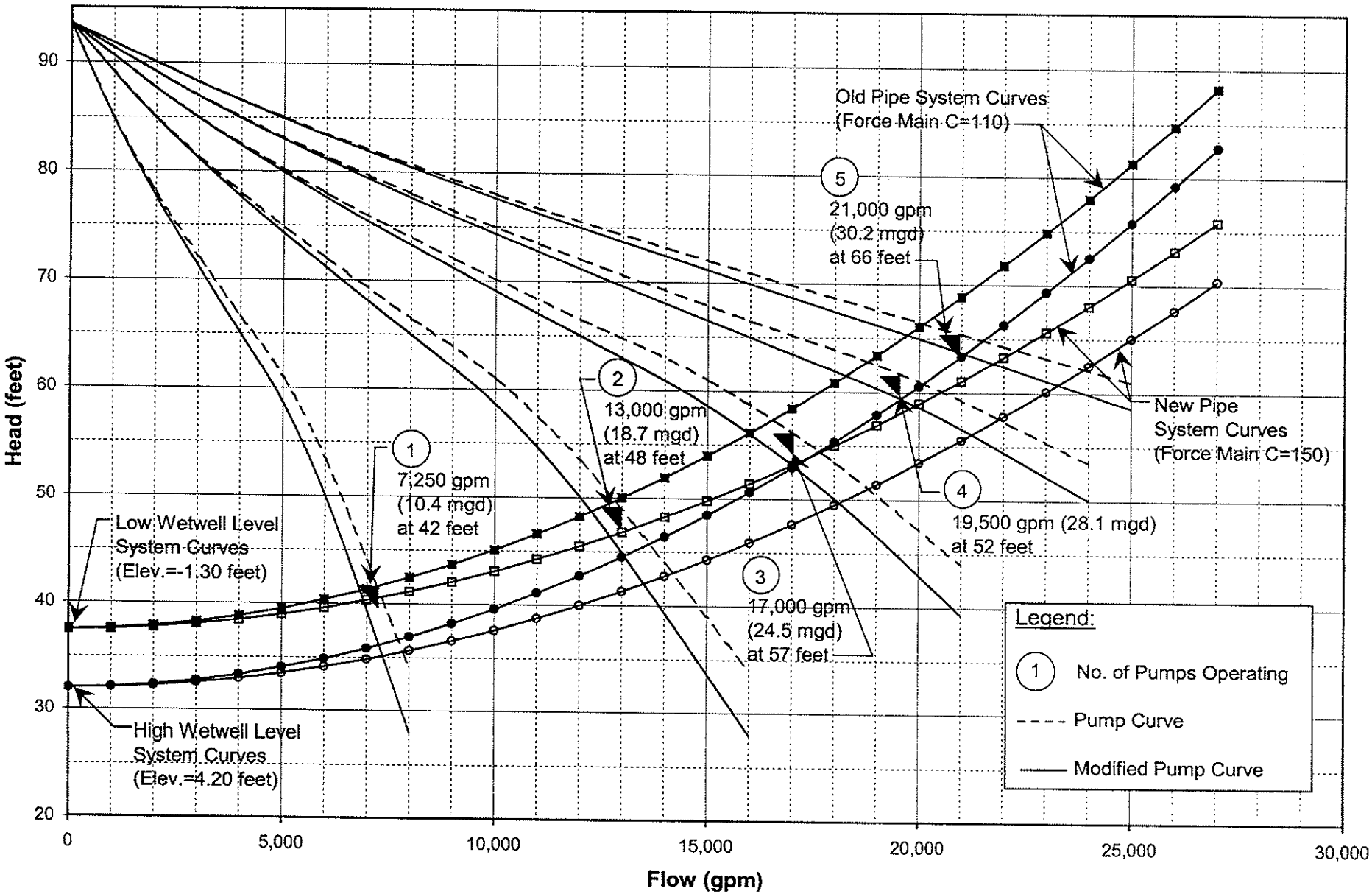


Figure 4-6
Pump and System Curves for Future 100 Hp Pumps
(Flygt Model NP 3356/675)



recommended against the use of the trench type wetwell. It was indicated that the trench type wetwell can promote severe cavitation problems resulting from entrained air and undesirable turbulent flow conditions during the cleaning mode. For this reason, Flygt will not allow its pumps to be installed in the trench type of wetwell. As a result, an alternate state-of-the-art self cleaning wetwell recommended by Flygt is proposed to be utilized. Wetwell design issues and recommendations are discussed in Flygt pump design brochure presented in Appendix E-2.

The proposed self-cleaning wetwell utilizes an influent channel with baffle walls and inlet ports to minimize air entrainment and to redirect and distribute the incoming flow evenly towards the pumps. Flow is channelized towards the pumps along a sloping floor to reduce swirling at the pump intake and to minimize solids deposition. Solids deposition is further reduced by benching and fillets. The wetwell is relatively compact and has minimal amount of stagnant areas. Scum and other floating material can be removed by periodically lowering the water level to increase velocity and turbulence. Further information on the self-cleaning wetwell is presented in Flygt literature presented in Appendix. E-1. Flygt engineering personnel indicate that the wetwell will be included in a future update of the American Hydraulic Institute standards in the future.

One limitation of the proposed wetwell is that the pump station influent pipe is recommended to have a minimum straight length of five diameters upstream of the wetwell to minimize "pre-swirl" of the influent flow. Abiding by this recommendation results in some difficulty in splitting the flows to the two wetwell compartments as it prevents the flow splitting structure to be adjacent to the wetwell. Under the proposed wetwell configuration, bypassing the first wetwell compartment will require special action, such as blocking the inlet ports by installing plates over them, or installing a bypass pipe (with flow plugs at the ends) from the wetwell inlet pipe to the second wetwell compartment. The need to bypass the wetwell compartment is expected to occur very infrequently, primary when major maintenance work is required on the wetwell. The wetwell is proposed to be provided with an epoxy coating over the concrete and gates constructed of fiberglass and stainless steel to minimize corrosion.

4.3.3 Valves and Piping

The pump discharge piping will utilize aboveground flanged ductile iron piping. In lieu of locating the piping and valves in a vault as initially envisioned (see discussions in Appendix C), the discharge piping will be located above grade. Above grade piping was preferred by the County of Maui to facilitate access for maintenance and eliminate confined space access issues.

Since the discharge piping will be located above the force main, an air release valve will be required to release trapped air. Recent improvements in air release valve design should minimize clogging and other malfunctions that have been a problem with past sewage air release valves. Drain piping can be provided from the air discharge port to eliminate the occurrence of sewage spills in the event of a valve malfunction.

Long-radius 90 degree bends will be utilized to minimize head loads and promote energy efficiency. Eccentric plug isolation valves and spring loaded swing check valves are proposed to be used.

Two discharge and suction connections for portable engine driven pumps will be provided to allow for emergency pumping capability. Each discharge connection will be provided with a check valve. A single resilient seated gate isolation valve will be provided to allow the check valves to be serviced without disruption to the pump station operation. The discharge connections will need to be relocated in the future when the two additional pumps are installed. The suction connection will consist of a near-grade blind flange to allow a lightweight steel elbow to be attached and directed in the desired direction based on the location of the portable pumps.

4.4 SUPPORT FACILITIES

4.4.1 Flow Splitter Box and Influent Sewer

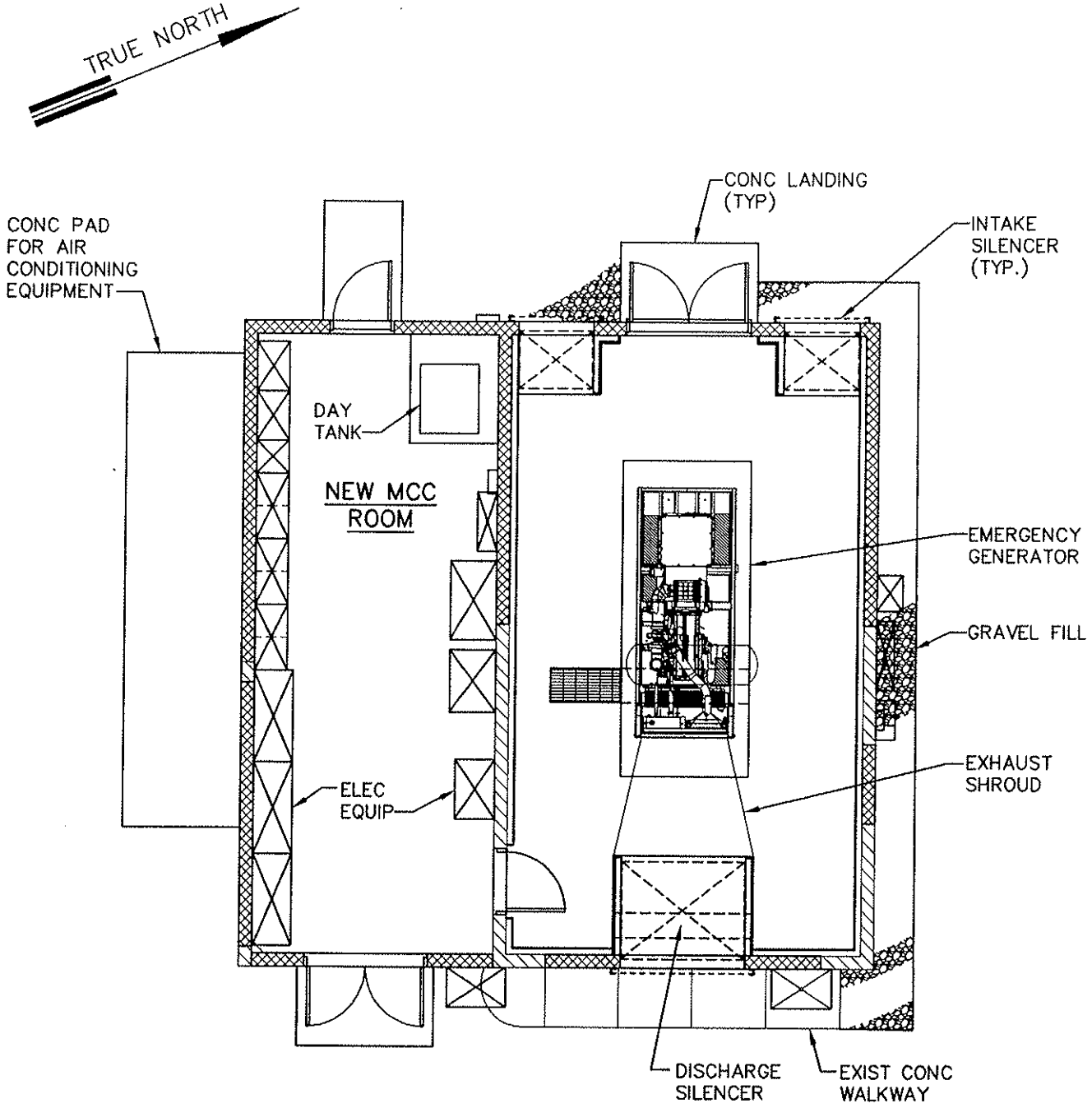
A flow splitter box is proposed to be constructed upstream of the existing wetwell. The flow splitter box will be designed to allow flow to be directed to either the existing or new pump station wetwells, or both wetwells through the use of slide gates. A low weir gate is proposed to be installed in the flow splitter box to allow a portion of flow to be diverted to the new pump station to minimize septicity problems caused by excessive detention times in the wetwell and force main.

The existing 27-inch influent sewer does not have adequate capacity to handle the projected increase in peak flows and therefore the line will need to be replaced or supplemented by a new influent line in the future. The flow splitter box will have sufficient wall area to accommodate up to a 48-inch new gravity influent sewer line. It is assumed that a hole of the required diameter will be cored in the flow splitter box. Supplemental diagonal reinforcing bars will be included in the design of the flow splitter box wall at the proposed location of the future pipe.

A 42-inch gravity sewer is proposed to convey flow from the splitter box to the new wetwell. The use of corrosion resistant fiberglass reinforced polymer pipe is proposed. Two manufacturers that have supplied pipe on Hawaii projects are Hobas Pipe and Amitech Flowtite.

4.4.2 Electrical/Emergency Generator Building

Demolition of the existing electrical/emergency generator will be required due to space restriction at the site (see discussions below). To house the new electrical equipment and emergency generator, the existing chemical storage building is proposed to be expanded and extensively renovated. The floor plan and exterior elevations of the proposed building are shown on Figures 4-7 and 4-8.



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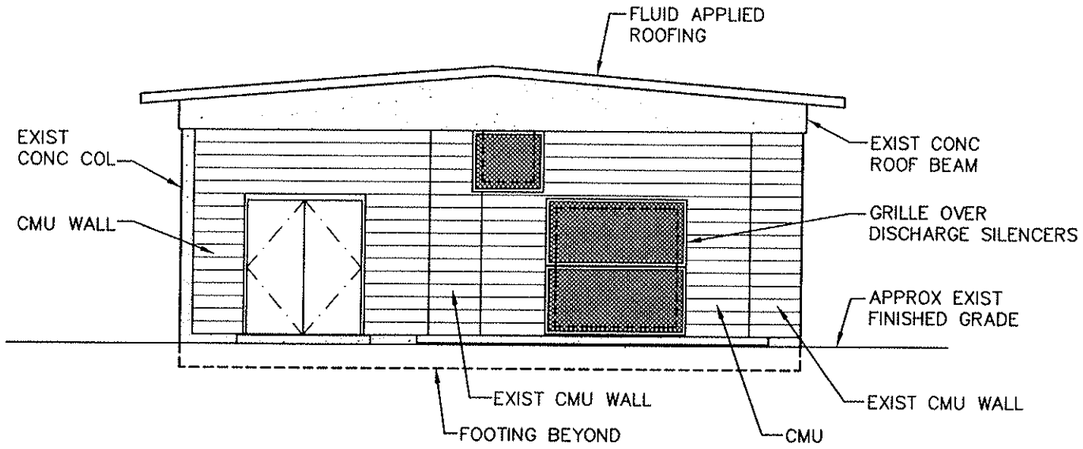
GRAPHIC SCALE:

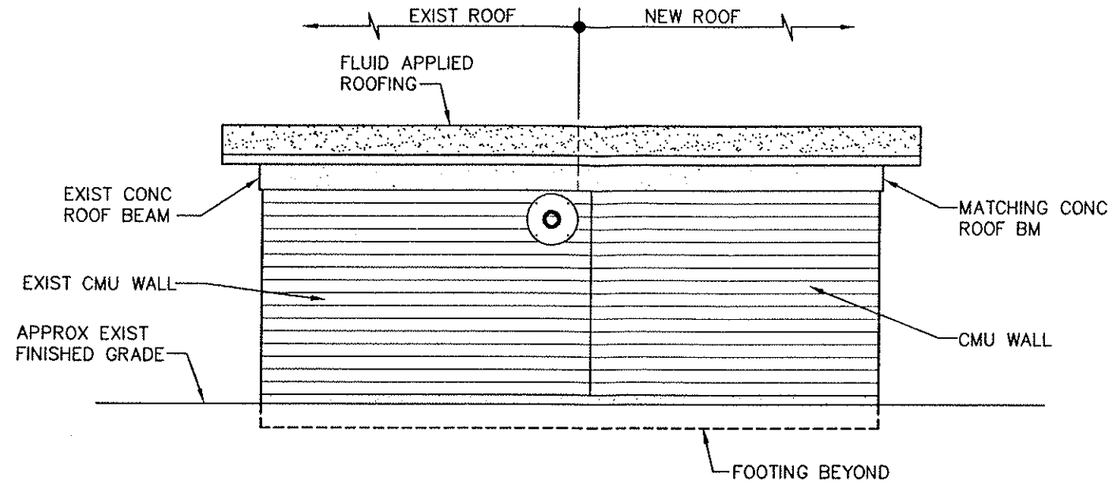
0 4' 8' 16'

SCALE: 1/8" = 1'-0"

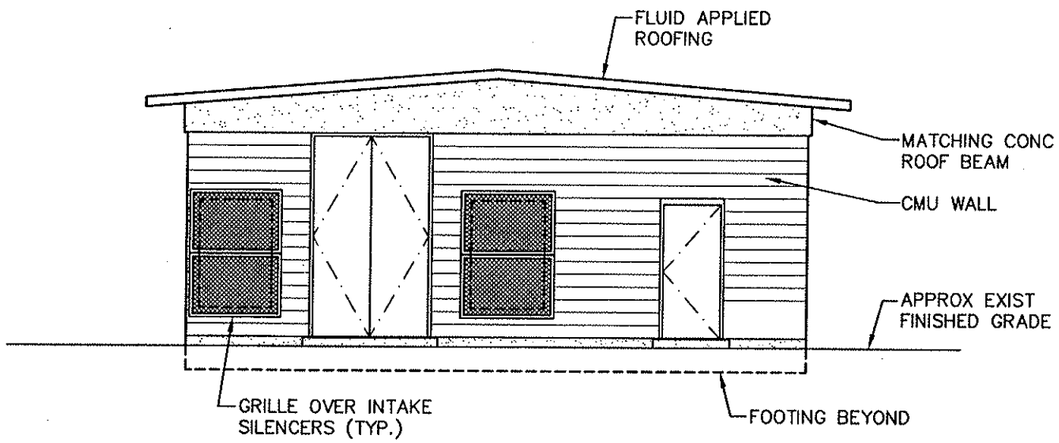
Hawaii Pacific Engineers	LAHAINA WASTEWATER PUMP STATION NO. 1 MODIFICATIONS PRELIMINARY ENGINEERING REPORT LAHAINA, MAUI, HAWAII	ELECTRICAL/EMERGENCY GENERATOR BUILDING FLOOR PLAN	FIGURE 4-7



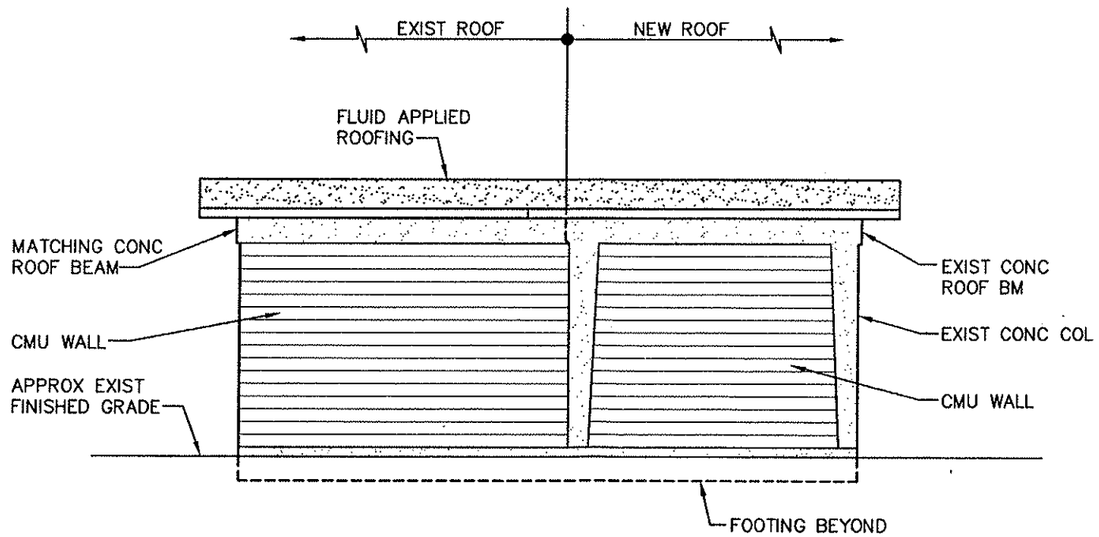
SOUTH BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



EAST BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



NORTH BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



WEST BUILDING ELEVATION
SCALE: 1/8" = 1'-0"

GRAPHIC SCALE:

0 4' 8' 16'

SCALE: 1/8" = 1'-0"

DATE: 08/31/07
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FIGURE 4-8

ELECTRICAL/EMERGENCY GENERATOR BUILDING EXTERIOR ELEVATIONS

LAHAINA WASTEWATER PUMP STATION NO. 1
MODIFICATIONS PRELIMINARY ENGINEERING REPORT
LAHAINA, MAUI, HAWAII

Hawaii Pacific Engineers

The existing building is proposed to be lengthened by approximately 15 feet to the west. The work would include constructing a reinforced concrete slab and roof with masonry walls similar to the existing building and enclosing the existing open chemical storage area.

A wall will divide the building to create separate motor control center (MCC) and emergency generator rooms. Due to space limitations, the day tank for the emergency generator will be located in the MCC room.

The MCC room will be provided with air conditioning utilizing three small split system units to meet the noise limits at the south property line. The fan coil units will be located in the ceiling of the MCC room and the air-cooled condensing units will be located on an outdoor pad on the south side of the building. The emergency generator room will be provided with an exhaust fan.

The generator room will be provided with intake and exhaust silencers to meet the 70 dBA noise limit at the property line. The building will be designed to accommodate larger intake and exhaust silencers in the event that a larger generator is required in the future (i.e., if 100 horsepower pumps are installed).

4.4.3 Electrical and Instrumentation System

A new transformer to support the increase in electrical load is proposed to be located in the southeast corner of the site. New MCC equipment, including variable frequency drives (VFDs) for the new pumps, will be located in the MCC room. The existing VFDs for the existing pump station will be relocated to the MCC room. The VFD will be provided with backup solid-state bypass soft starters.

Pressure transducers mounted in a stilling well pipe is proposed to be used for new pump station's wetwell level sensor system. The existing bubbler wetwell level sensor system is proposed to be replaced with pressure transducers. To provide a fail-safe level control system, independent float switches are proposed to be installed at the high-high and low wetwell elevations to automatically start and stop the pumps in a constant full-speed mode. The system will be independent of the pump controls and will have a dedicated power source. Upon activation of this system, an alarm signal will be sent to the Lahaina WWRF. The pump station will be monitored by SCADA equipment similar to other County of Maui pumping stations.

A new magnetic flow meter will be installed on the new force main header to measure and record the new pump station flows. The flow from the existing pump station will continue to be measured by the existing magnetic flow meter at the Lahaina WWRF.

4.4.4 Backup Emergency Generator

A new 350 KW diesel engine generator and 2,000 gallon fuel tank is proposed to support the increase in electrical load.

The emergency generator will be provided with an exhaust silencer. A connection for a portable emergency generator will be provided for added reliability and flexibility during power outages.

The automatic transfer switch, which will be located in the MCC room, is proposed to utilize a concept called a "programmed transition" to allow for a period of time to reduce the effects of power surges and transients at the station.

The fuel tank, which will be located on the southwest corner of the site, will be a fire-rated concrete vault-type above ground tank. The fuel tank is sized for a 6-day fuel supply based on operation of the pump station at high sustained sewage flows.

The concrete pad for the emergency generator will be sized to allow installation of a 600 kW generator to accommodate higher electrical loads in the future if necessary.

4.4.5 Odor Control System

Following the initial assessment of odor control system alternatives, the decision was made to base the design of the system on the Bioway bioscrubber system evaluated in Appendix D. Manufacturer's literature on the Bioway system is presented in Appendix E-6. A similar system employing bioscrubber technology offered by USFilter will allow for competitive bidding. Substitution requests for other similar systems are proposed to be evaluated on a case-by-case basis.

Selection of the Bioway system for the basis of design was based on:

- Successful operating experience at numerous operating facilities.
- Use of non-organic media, which minimizes the need to replace the media.
- Use of a nutrient addition system to ensure maintenance of effective biological growth on the scrubber media.
- Relative simplicity due to minimal mechanical components (foul air fan and nutrient feed pumps) and automated controls.
- Availability of local representative (Hawaii Engineering Services, Michael Elhoff)

The proposed design airflow rate for the odor control system is 13,000 cfm. This will provide an air change rate of six air changes per hour for the air space in the existing and new wetwells and the flow splitting box. Based on the field monitoring data and experience based on similar pump station odor control system, the odor control system is proposed to be designed for an average H_2S concentration of 50 ppm and maximum concentration of 500 ppm with 99 percent removal of H_2S.

Due to the relatively high H_2S readings recorded at the existing wetwell, the odor control system is proposed to be provided with a second stage activated carbon scrubber unit. This will help ensure that detectible odors will not be present near the property line, particularly during low

wind conditions and during bioscrubber upsets. The two stage odor control system will be capable of lowering H_2S levels to below 0.25 ppm.

Similar to other biological odor control systems, water will need to be supplied to support biological growth on the bioscrubber media. Based of the design air flow rate and H_2S concentrations, the maximum anticipated water usage is 9 gallons per minute for 6 hours per day (3,200 gallons per day). The minimum required water pressure is 42 psi. Water pressure at the Lahaina WWPS No. 1 site is not expected to be a problem since a pressure reading taken at the site indicated a static pressure of 86 psi.

Fiberglass foul air piping is proposed to be used due to the need for corrosion resistant piping. Most of the foul air piping will be installed below grade. A damper installed on the vent serving the new wetwell will be used to regulate airflow and pressure.

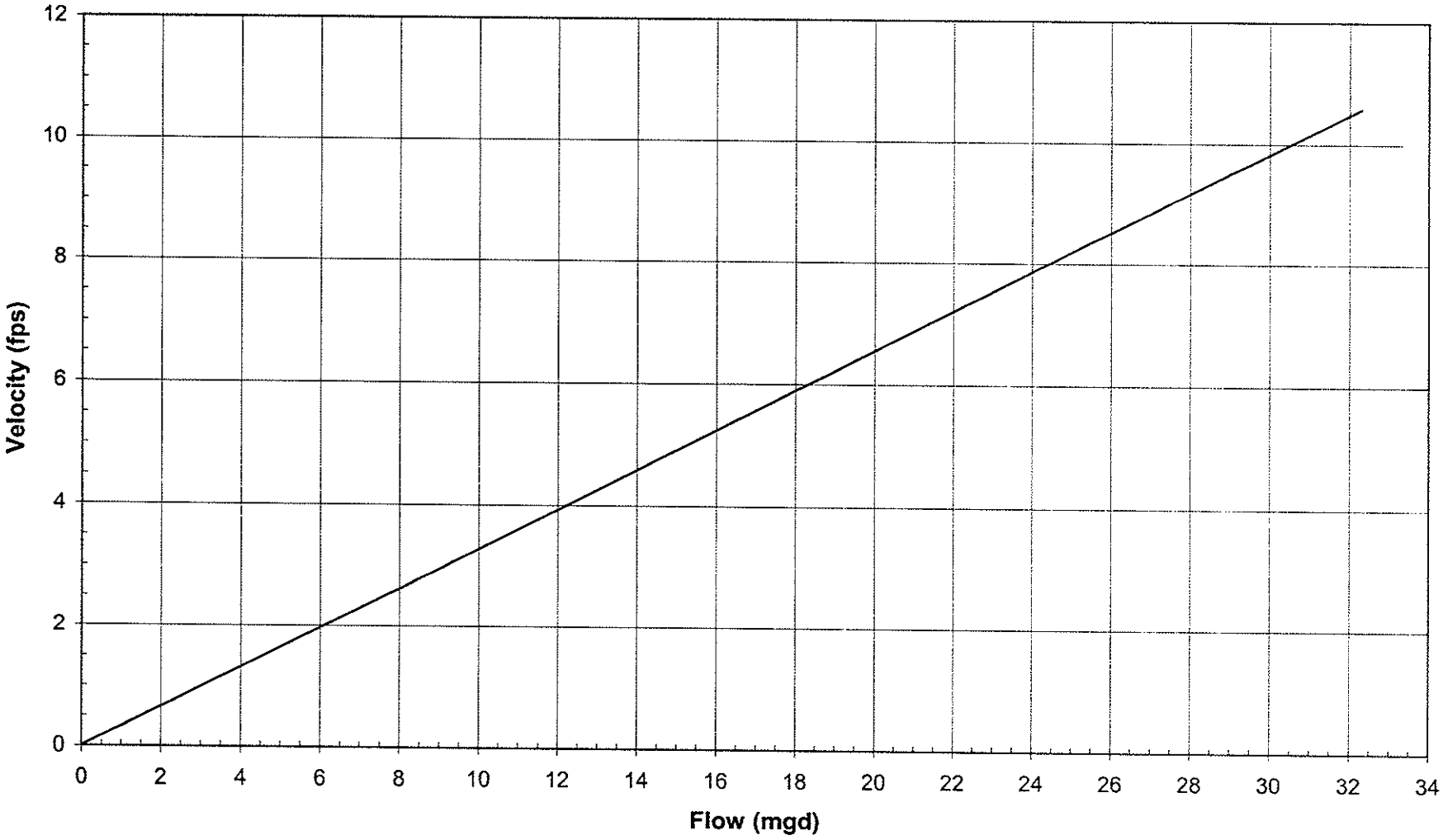
4.4.6 Force Main

Based on an analysis of the anticipated range of wastewater flows and resulting velocities, it was determined that a 30-inch pipe would be the optimum size for the new force main. The velocities for different pipe sizes at various flows are shown graphically on Figure 4-9. A 30-inch AWWA C-905 Class 150 PVC pressure pipe with an inside diameter of 29.44 inches exhibits velocities ranging from 2 to 9 feet/sec for the expected flow range of 6 to 28 mgd. Problems with deposition of sediments at the lower end of the flow range can be minimized if required by programming the pump control system to periodically operate a pump at full speed.

PVC is the recommended force main pipe material for the following reasons:

- PVC is not subject to corrosion problems. Past studies indicate that corrosion of the existing iron force is an ongoing concern that will eventually impact the structural integrity of the line.
- PVC pipe is hydraulically efficient due to its smooth interior pipe surfaces.
- PVC utilizes push-on gasketed joints that facilitate installation. High density polyethylene pipe (HDPE) requires special equipment to fuse the pipe.
- PVC pipe material is lower in stiffness than ductile iron pipe, which reduces the magnitude of hydraulic transients.
- PVC has higher strength than HDPE material, which results in a thinner pipe wall. This may be somewhat of a factor due to limited space and clearances along the force main alignment.
- PVC pipe has the same outside diameter as ductile iron pipe and can utilize the same repair products if necessary.

Figure 4-9 Flow vs.Velocity in a 30-inch PVC Force Main
(AWWA C-905 with 29.44" I.D.)



To resist stresses and thrust forces, the use of concrete jacketed ductile iron pipe is proposed for the force main riser sections at the upstream and downstream ends of the force main. Flange ductile iron piping is proposed for the aboveground portions of the force main.

4.5 PUMP STATION LAYOUT AND SITEWORK

4.5.1 Site Layout

A number of alternative facility layouts were developed and evaluated. The rationale for the proposed layout (see Figure 4-3) include the following:

- The new pump station was located near the north end of the site to minimize the need to extend the deep influent gravity sewer to the rear of the site (routing the influent sewer around the existing pump station would be difficult).

- Demolition of the existing electrical/generator building was justified due to its inadequate size and the need for a large clear area for the new pump station and access road.

- The new pump station was located along the east boundary of the site to maximize the distance from the existing pump station. Geotechnical investigations indicated that due to the presence of loose sandy material at the site, ground disturbances such as those caused by sheet pile driving may result in consolidation and liquefaction of the soils and settlement of the surrounding area. Significant differential settlement at the existing pump station could result in damage to the existing pump station structures and piping.

- The new odor control system was located in an existing open unused area due to the need to have the system in operation prior to demolition of the existing odor control system.

- The emergency generator fuel tank was located in the southwest corner to minimize the length of fuel piping and provide adequate clearances and access.

4.5.2 Access Roads

New asphalt concrete (AC) driveway areas will be required to provide adequate vehicular access to key areas of the pump station, including the existing and new pump station wetwells and pumps, fuel tank, electrical/emergency generator building, transformer, and flow splitter box.

Existing AC will be removed and the base in areas with damaged pavement will be reconstructed. Both the existing and new driveway areas will be provided with new AC.

4.5.3 Drainage

The generation of runoff will be increased due to addition of impermeable surfaces. Gravel filled trench drains are proposed to be constructed to minimize the increase in runoff.

4.6 ESTIMATE OF PROBABLE CONSTRUCTION COST

The estimated probable construction cost for the proposed pump station upgrade work and new force main is $9.2 million. A breakdown of estimated costs is presented in Table 4-1.

4.7 CONSTRUCTION PHASING

Phasing of the construction will be required to ensure that adequate wastewater pumping capacity and odor control is maintained throughout the construction of the facilities. The following phase of construction is proposed:

- Construction of the new odor control system, including temporary power supply (to allow demolition of the existing odor control system).
- Temporary and/or permanent rerouting of the electrical and other utility lines (to eliminate interference with construction of the new facilities). Temporary relocation of the MCC, powers supply and emergency generator for the existing pumps.
- Demolition of the existing electrical/emergency generator building.
- Relocation of the existing portable pump and piping to provide adequate room and clearance for construction.
- Driving of sheeting for the new wetwell, flow splitter box and gravity sewer (to occur before construction of the new electrical/emergency generator building to prevent settlement damage of the new building).
- Construction of the new pump station, electrical/emergency generator building, flow splitter box and gravity sewer. Installation of supporting utilities.
- Construction, repair and paving of the access roads.

Construction of the new force main may occur simultaneously with the other above phases of work.

Table 4-1
Estimated Probable Construction Cost for Proposed Lahaina WWPS No. 1 Modifications

Item	Quantity	Unit	Unit Price	Subtotal	Total
CAPITAL COSTS					
General and Sitework					$885,500
Mobilization/Demobilization	1	LS	$500,000	$500,000	
Demolition of Existing Elec/Generator Bldg.	1	LS	$50,000	$50,000	
Demolition of Existing Odor Control System	1	LS	$100,000	$100,000	
New A.C. Pavement - Driveway and Parking	350	SY	$100	$35,000	
Resurface Exist. A.C. Pavement	100	SY	$50	$5,000	
Water Line - 3/4" to 1-1/4"	1,600	LF	$70	$112,000	
Water Meter and Backflow Preventer	1	LS	$20,000	$20,000	
Fencing and Gate	100	LF	$60	$6,000	
Guard Posts	25	EA	$300	$7,500	
Landscaping and Miscellaneous Sitework	1	LS	$50,000	$50,000	
Flow Spitter Box and Gravity Sewer					$608,200
Excavation (structural)	230	CY	$200	$46,000	
Backfill	190	CY	$100	$19,000	
Sheet Piles	1,900	SF	$70	$133,000	
Dewatering	1	LS	$20,000	$20,000	
Crushed Rock Fill	20	CY	$60	$1,200	
Concrete (Walls/Slabs)	40	CY	$1,600	$64,000	
Concrete (Tremie)	50	CY	$300	$15,000	
Slide Gates	3	EA	$30,000	$90,000	
42" Gravity Sewer	36	LF	$5,000	$180,000	
Miscellaneous	1	LS	$40,000	$40,000	
Electrical/Chemical Building					$1,630,000
Structural/Architectural Expansion/Mods	1,100	CY	$500	$550,000	
Emergency Generator and Fuel Tank	1	LS	$400,000	$400,000	
HVAC System	1	LS	$50,000	$50,000	
Noise Attenuation	1	LS	$80,000	$80,000	
Motor Control Center and Elec. Equip.	1	LS	$500,000	$500,000	
Plumbing/Misc.	1	LS	$50,000	$50,000	
Pump Station					$3,507,100
Excavation	1,200	CY	$200	$240,000	
Backfill	560	CY	$100	$56,000	
Sheet Piles	6,000	SF	$70	$420,000	
Dewatering	1	LS	$80,000	$80,000	
Crushed Rock Fill	60	CY	$60	$3,600	
Concrete (Walls/Slabs)	220	CY	$1,800	$396,000	
Concrete (Tremie)	300	CY	$300	$90,000	
Wetwell Hatches	1	EA	$50,000	$50,000	
Rungs and Misc. Metals	1	LS	$20,000	$20,000	
Wetwell Slide Gate	2	EA	$30,000	$60,000	
Flow Meter	1	EA	$25,000	$25,000	

Table 4-1
Estimated Probable Construction Cost for Proposed Lahaina WWPS No. 1 Modifications

Item	Quantity	Unit	Unit Price	Subtotal	Total
Pump Station (continued)					
Pumps - Installed	3	EA	$180,000	$540,000	
Pump - Spare	1	EA	$100,000	$100,000	
Sump Pump, including piping	1	EA	$20,000	$20,000	
24" Pipe, Ductile Iron	15	LF	$2,800	$42,000	
18" Plug Valve	3	EA	$12,000	$36,000	
18" Check Valve	3	EA	$9,500	$28,500	
24" Gate Valve	1	EA	$10,000	$10,000	
Pipe Fittings	1	LS	$150,000	$150,000	
Emergency Connection Piping/Valves	1	LS	$80,000	$80,000	
Painting	1	LS	$130,000	$130,000	
Odor Control System (Bioscrubber)	1	LS	$350,000	$350,000	
Foul Air Piping	100	LF	$300	$30,000	
Instrumentation	1	LS	$50,000	$50,000	
Electrical	1	LS	$400,000	$400,000	
Miscellaneous	1	LS	$100,000	$100,000	
Force Main					$1,400,000
30" PVC Force Main	1,300	LF	$1,000	$1,300,000	
Miscellaneous	1	LS	$100,000	$100,000	
				Subtotal Construction Costs	$8,030,800
				Contingencies and Escalation (15%)	$1,204,620
				Total Construction Budget	$9,235,420